Commodity Price Volatility and Inclusive Growth in Low-Income Countries

EDITORS
Rabah Arezki, Catherine Pattillo, Marc Quintyn, and Min Zhu

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Commodity Price Volatility and Inclusive Growth in Low-Income Countries
I have been a guest scholar at the IMF for almost two years, and I have learned that there is an IMF approach to economics. A great many people have told me “I used to believe that in graduate school, but since I have been at the IMF I have learned that the world is different.” *Commodity Price Volatility and Inclusive Growth in Low-Income Countries* is deeply experience-based, reality-based. It reflects this practical, empirical approach that is the center of IMF thinking.

This book concerns a crucial, practical issue, always on, or near, center stage at the IMF: commodity prices and their variations. Most immediately, food price increases plunge a significant fraction of the world’s consumers into instant poverty; also, food price declines, which are the opposite sign of the volatility coin, plunge a significant fraction of the world’s food producers into instant poverty of a different kind. How to buffer this volatility, and how to respond to it when it does occur, are two of the core topics of *Commodity Price Volatility and Inclusive Growth*. But that is just the beginning. Of course it is not just food prices that are volatile; it is the prices of all commodities produced and consumed by poorer countries. Nor is it just a micro problem of how to deal with the poor people who are suddenly impoverished.

Commodity price volatility produces wild macroeconomic swings in both producer and consumer countries. And then, there is the question of longer-term growth. It is a commonplace that there is a trade-off between growth and better income distribution. But, as is a major theme of this book, the opposite is the case. The better the income distribution, the higher, not lower, is economic growth. The resource curse provides an assay. The same redistributive mechanisms that channel resource income to the elites are the same mechanisms that redistribute resource earnings away from growth-producing investments. This is just one more example of the highly practical nature of the contents of this fine book. Its analysis and prescriptions for how to deal with the resource curse could put a good share of the world on the path to sustained growth.

*Commodity Price Volatility and Inclusive Growth in Low-Income Countries* is thus a very important contribution. Its fine-grained treatment of practical, immediate problems casts it at the very heart of economic development.

George Akerlof
Nobel Laureate in Economics, 2001
IMF Guest Scholar
Commodity Price Volatility and Inclusive Growth in Low-Income Countries

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Rabah Arezki, Catherine Pattillo, Marc Quintyn, and Min Zhu
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Foreword

Over the past decade, low-income countries have witnessed a remarkable transformation. Strong economic growth has lifted millions of people out of abject poverty. The low-income countries also staged a rapid recovery from the global financial crisis. Last year, growth was expected to reach a strong 5 percent in the average low-income country.

This impressive performance is a testament to the hard work and dedication of policymakers across the developing world over the past decade. They reduced deficits and public debt. They brought down inflation and built up foreign exchange reserves. In short, they built up macroeconomic buffers and put their economies on a fundamentally stronger footing.

But the news has not all been good. Importantly, low-income countries still face enormous challenges in terms of pervasive inequalities and the lack of job opportunities, especially for the youth. Moreover, the food and fuel crisis of 2008, in conjunction with the global financial crisis that followed, has been devastating for the poor. And in 2011, we saw a renewed surge in commodity prices that could plunge an additional 44 million people into poverty, including in the Horn of Africa.

At the same time, downside risks to global growth have increased markedly—at a time when the capacity of many low-income countries to absorb further shocks has yet to be rebuilt from the two recent crises.

Once again, the low-income countries find themselves at a critical juncture. What policies are needed at this challenging time? And how best to rebuild resilience to future shocks? In the face of a more uncertain global environment, policymakers in low-income countries—as in many others—should be prepared to adapt policies as needed, according to country-specific circumstances. What policies are needed to unleash the growth potential of low-income countries over the medium term?

In the event of a sharp downturn, the key will be to protect vital spending, to mitigate the impact on growth, and to protect the most vulnerable. Because the scope for countercyclical fiscal policy has become more limited, monetary and exchange rate policy could be used more actively, provided that inflation is moderate.

For rebuilding resilience and promoting higher growth that is also inclusive of all the citizens, I see three priorities. The first priority is to build up “self-insurance” during the good times. When growth is strong and external conditions are favorable, it makes sense to rein in deficits and shore up reserves. This builds a cushion for the bad times—and especially for protecting the most vulnerable. Of course, self-insurance can only go so far. This is why low-income countries must be able to count on continued support from development partners when shocks hit.
The second priority is to strengthen social safety nets so that in times of crisis, support can reach the most vulnerable quickly and efficiently. This matters especially when food prices surge and when public support can mean the difference between life and death.

The third priority is structural change to boost longer-term resilience and achieve higher growth potential. Economies that are more diversified—and not overly dependent on a few products and trading partners—are better able to withstand shocks. Better domestic resource utilization (e.g., by deepening the financial sector and by broadening the tax base) also matters. More diversified economies are likely to deliver more inclusive growth; that is, growth that creates jobs for more people and shares the benefits more widely. We know from recent experience how much the social dimension matters for long-term stability.

Of course, countries that are commodity exporters have in recent years benefited from higher prices. For them, the challenge is to use the gains from higher prices wisely—to preserve macroeconomic stability, but also to share the natural resource wealth fairly across society and across generations.

The low-income countries have achieved remarkable gains during recent years, and they should be commended for that. But today, these gains are under threat. The international community—including the IMF—must be prepared to do even more to help the low-income countries help themselves. Aid commitments must be met. Trade channels must remain open. Private investment must be encouraged. All these would help low-income countries stay the course and address their important medium-term challenges ahead.

We must all do our part. If we do, I believe that the low-income countries will be able to withstand this new phase of the crisis, and we will be able to help bring lasting gains to the world’s poorest and most vulnerable people.

Christine Lagarde
Managing Director
International Monetary Fund
Acknowledgments

This volume is the culmination of the efforts of many policymakers, academics, and World Bank and IMF staff members. The majority of the chapters are based on presentations at a high-level seminar organized by the International Monetary Fund, “Commodity Price Volatility and Inclusive Growth in Low-Income Countries,” which took place in Washington, D.C., on September 21, 2011. Additional chapters on the seminar’s themes are also included.

The book is aimed at fostering our understanding of how to design policies that take into account redistributive objectives in the face of large swings in commodity prices in both commodity-exporting and -importing low-income countries. It also explores ways in which policies can promote higher growth that is inclusive for all the citizens.

The leadership and vision of IMF Deputy Managing Director Min Zhu was instrumental in this book’s publication. As one of its editors, his strong commitment to the important issues discussed in the volume helped to ensure a high-quality result. The efforts of Tarhan Feyzioglu, Assistant to the Deputy Managing Director, were also invaluable in bringing the volume to fruition.

We are most grateful to Joanne Blake and Michael Harrup of the IMF’s External Relations Department for coordinating a very smooth editing and production process. Special thanks also go to Jeremy Mark, Anneta Orraca-Tetteh, Nathalie Kerby-Lachnani, Sandrine Albin-Weckert, Gloria Adidi, and Noor Abdul Rahman for their dedication throughout the process. Last, but not least, we would like to thank a large number of colleagues at the IMF for their intellectual support and suggestions both before and during the seminar and during the process of composing this volume.

Rabah Arezki, Catherine Pattillo, and Marc Quintyn
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We all remember 2008, when global food and fuel prices went through the roof, when we saw food riots in 35 countries, and when more than 115 million were added to the ranks of the hungry. What we saw in 2008 was a new phenomenon: it was the first globalized humanitarian disaster, a silent tsunami that swelled the ranks of the hungry.

More than three years after the food and financial crises, food prices are again surging on global markets, and the result, according to the World Bank, could be millions more pushed into poverty. Even in spite of the troubled global economy, which has generally dampened demand, the World Bank's food price index for 2011 remained above the level of 2010. Similarly, the Food and Agriculture Organization (FAO) price index showed prices at nearly twice the level reached before the 2007–08 price spike.

Food price volatility, as we are witnessing, is not confined to a few crises that, as devastating as they are, happen to dominate the headlines for a few months—it is a long-term challenge. The risk of continued high and volatile prices is a systemic and covariate challenge larger than any one country or group of countries can manage alone. And as we have seen, system failure in one country can quickly affect an entire region.

Many countries, especially developing and emerging economies, are struggling with the implications of high food prices, given their effects on poverty, inflation, and, for importing countries, the balance of payments.

In 2008, the International Monetary Fund estimated that food imports would cost 43 net food-importing low-income countries (LICs) as much as US$7.3 billion, or nearly 1 percent of GDP. In 2011, the FAO estimated that developing economy food import bills would rise sharply to US$460 billion, a 25 percent increase from 2010.

This “perfect storm” of vulnerability is hitting countries across the globe. From the Dominican Republic to the Kyrgyz Republic, staple prices have nearly doubled. In many other countries, such as those in the Horn of Africa, they have increased by one-half or more. Such food price volatility not only affects nations, but it also affects the world's backup plan to support nations in times of crisis.

Josette Sheeran is Executive Director, United Nations World Food Programme. Adapted from remarks made at a seminar, “Commodity Price Volatility and Inclusive Growth in Low-Income Countries,” held at the Annual Meetings of the World Bank Group and the International Monetary Fund in September 2011.
As the World Food Programme (WFP) procure most of its food in developing economies (over 80 percent) and much of that in local markets, we see first hand the impact of rising food prices. Such volatility impacts the WFP’s budget and the ability to provide food assistance to its targeted beneficiaries, such as the 109 million hungry people in 75 countries that it reached in 2010 with food and nutrition support. Every 10 percent increase in the price of the WFP’s food basket costs an additional US$220 million a year to buy the same required amount of food.

Rising food prices affect the WFP’s operations and, at the same time, the number of people needing food assistance also increases, compounding the challenge of ensuring access to nutritious food for the most vulnerable. Through the Vulnerability Analysis and Mapping unit, the WFP monitors staple food commodity prices in more than 60 countries. A network of 150 food security experts ensures that the WFP has the most up-to-date information on the cost of food to vulnerable households, allowing it to tailor its response in the most effective manner. Analysis has shown that the estimated 80 percent of the world population that lives without food safety nets bears the environmental, social, political, and economic risks of everyday life on their dinner plates.

Food price spikes increase malnutrition as the poor eat less and switch from more expensive, nutritious food to cheaper staples. These changes can permanently damage the most vulnerable, especially children under the age of two years, as well as pregnant and lactating mothers. For households living on less than US$2 a day, many of whom spend as much as 60 to 80 percent of their incomes on food, this volatility hurts. It is the extremely poor and vulnerable who suffer the most; for example, women and girls often have disproportionately less food during economic shocks. Families are forced to sacrifice tomorrow for today by eating income-producing livestock and putting schoolchildren to work.

History shows that without adequate access to food, nations fall, people migrate, and millions can die. Food security is nonnegotiable; if it is neglected, we face catastrophe. That is why we must not only provide nutritious food to those who are denied access to it, but also protect the most vulnerable and help them build resilience to food price shocks. This is humanity’s critical task.

Over the last four years, we at the WFP have worked to transform aid into assistance that connects people to markets and builds up resiliency programs that buffer the most vulnerable from shocks, including commodity price volatility.

The WFP is working with countries at the grassroots level to develop—and now scale up—innovative ideas and new tools that are transforming the fight against hunger. In Cameroon, for example, where about 2.8 million people are food insecure, every year can be a crisis for the most vulnerable, as the lean season in northern Cameroon lasts on average three to four months. To help break the boom-and-bust cycles of hunger, the WFP, working with the European Union, provides a one-time donation of 10 metric tons of cereal for each community granary and helps train farmers in food storage management and financial accounting. Community members can withdraw stocks from the granary during the lean season, and later replenish from their own crops during the harvest, with
a little interest. The steering committee of each community granary uses the revenue collected from interest and sales of commodities to reconstitute stocks and ensure the local village access to affordable food year round.

Across the globe, the WFP is also supporting smallholder farmers, many of them women, in reducing their vulnerability and helping them become a bigger part of the supply solution to food security, including by leveraging local commodity purchases by the WFP. Women constitute, on average, 43 percent of the agricultural labor force in developing countries. According to the FAO’s 2010–11 State of Food and Agriculture, closing the gender gap in agriculture by giving women farmers more resources could bring the number of hungry people in the world down by an estimated 100 to 150 million people.

In theory, high food prices should be good news for smallholder women farmers. In practice, only a small minority of farmers in developing economies have enough land and capital to produce a significant surplus to sell to make the most of higher prices. Moreover, they do not always have access to markets. To increase production and take advantage of high food prices, farmers need to plant more acreage, raise more crops per year, or increase their crop yield. Small-scale farmers face many constraints that make it difficult for them to scale up quickly. These include small plots; high fertilizer prices; dependence on unpredictable rainfall; lack of ability to clean, package, and store produce; an inability to access loans; and long distance from markets. The WFP’s innovative Purchase for Progress program seeks to address many of these challenges by providing technical expertise, training, and credit, facilitating access to farming inputs, and promoting processing opportunities.

In 21 countries, Purchase for Progress is now empowering smallholder farmers, particularly women, by connecting them to the WFP’s supply chain and the broader marketplace and stimulating local economic growth. Over 100,000 farmers (more than one-third of whom are women), warehouse operators, and traders have received training in improved production, postharvest handling, and other key agribusiness skills. Already more than US$68 million have been contracted through Purchase for Progress.

The WFP is also helping nations scale up social protection safety nets, such as mother and child nutrition, school meals, and job creation programs—both food and cash based depending on market conditions—to help the most vulnerable build resiliency to food price shocks. Such safety nets not only are important tools to protect the most vulnerable, but also generate long-lasting positive effects. School meals, for example, serve as vital safety nets for many countries and directly contribute to wider socioeconomic benefits. Studies by the American Economic Review, the World Bank, and others have found that in 32 African states absolute enrolment for girls increased by nearly 30 percent after the first year of school feeding, that one additional year of schooling for girls reduces the infant mortality rate by 5 to 10 percent, and that providing girls with an extra year of education increases their future wages by 10 to 20 percent. This is why the WFP works tirelessly to reach over 22 million children, half of whom are girls, with meals and take-home rations each year.
Examples such as these demonstrate that protecting the most vulnerable against hunger and malnutrition from shocks such as food price volatility is an issue not only for humanitarians, but more importantly, also for finance ministers and prime ministers.

Indeed, inclusive growth in LICs cannot be achieved without first addressing one of the most fundamental and basic human needs. As Alfred Marshall, one of the founding fathers of modern economics, noted, “The most valuable of all capital is that invested in human beings.”

Hunger and malnutrition are long-term economic issues that reduce the earning potential of individuals and human capital of nations. Studies, such as those by the Economic Commission for Latin America and the Caribbean and the WFP have found that malnutrition can cost countries an average of 6 percent of their GDP, and this amount can be as high as 11 percent. But a more stunning—and hopeful—statistic shows the tremendous payoff that comes from investing in nutrition. The World Bank estimates that US$10.3 billion a year in nutrition interventions in 36 countries with the highest burden of undernutrition would result in 30 million fewer children stunted, prevent more than 1.1 million child deaths, and cut in half the prevalence of severe acute malnutrition. Still other studies have found that children who receive adequate nutrition earn wages that are nearly 50 percent higher as adults. This is not simply a humanitarian argument; this is a return on investment.

While the previously cited examples demonstrate that the world’s most vulnerable people can be buffered against the shocks of high food prices, poverty, and instability while investing in the human capital of future generations, the challenge of addressing food security and helping the most vulnerable build resiliency begins with leadership. Hunger ends when leaders stand up and say, “Not on my watch.” That happened when Brazil’s President Lula put in place the Zero Hunger program, and it is happening in other countries where leaders are making this a priority.

But in a world in which a financial crisis in New York and London raises food prices in Dakar and Nairobi, we need global solutions. New challenges require new system-wide approaches. They require coordinated and complementary action at national, regional, and global levels, such as the leadership and action taken by the World Bank through the Global Food Crisis Response Program. As the world has learned, it is not enough, or cost effective, to simply react after a crisis, whether it is a food crisis or a financial crisis. Risk management, prevention, and building strong national and regional systems of resilience must be a focus.

At their meeting in Cannes in November 2011, Group of Twenty (G-20) leaders united to support humanitarian food supply systems and food security for

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1The G-20 is an informal group of 20 major economies (19 countries plus the European Union) and representatives from the International Monetary Fund and the World Bank. Central bank governors and finance ministers of the G-20 have met yearly since 1999, and chiefs of state and heads of governments (G-20 summits) since 2008.
the most vulnerable people; for example, they made the decision to remove food export restrictions and extraordinary taxes for food purchased for humanitarian purposes by the WFP, and made a commitment not to impose them in the future. The WFP moves the vast majority of multilateral food assistance, and now it will have unfettered access to food from G-20 nations that provide the biggest share of global food exports, enabling it to reach the needy rapidly and efficiently. During the 2008 food price crisis, export restrictions threatened the WFP’s ability to provide a lifeline to hundreds of thousands of people who were struggling to access the food they needed for their families. The G-20 nations’ agreement to exempt WFP food from export restrictions and extraordinary taxes is an important step to ensure that humanitarian food gets where it is needed the most.

The G-20 decisions form part of a package of food security actions, including backing for an Economic Community of West African States initiative on regional emergency food reserves in West Africa following the WFP’s feasibility study, and cost-benefit analysis and support for targeted nutrition safety nets, efficient and flexible food assistance (including forward purchasing), and efforts to improve the lot for smallholder farmers (which will reduce the effects and risks of price volatility on the most vulnerable).

The food crisis of 2007–08 took the world by surprise. Now we know, and the world must work together to mitigate the impact of food price volatility on the most vulnerable. The IMF, government ministries, think tanks, and institutions of higher education can play an important role in addressing the urgent food security needs of the most vulnerable at a time of growing risk and vulnerability. Today, the challenges facing us are more than a temporary emergency; they are a collective responsibility. The world has the knowledge and the tools. Now we must act.
In discussions of inclusive, sustainable development, we hear a lot about stability and growth. These are certainly important, but there is a third variable that is also crucial and which must be carefully considered in any strategy for inclusive growth—inequality.

Why should we be interested in the issue of inequality? First, we have to recognize that the objective of growth should not be an increase in gross domestic product (GDP), which I call “GDP fetishism.” We do not seek growth for its own sake. We need growth because it is often—but not always—an ingredient in improved well-being. But GDP is not, in itself, a good measure of well-being. Nevertheless, policymakers, journalists, and even economists use it as a proxy for well-being all the time.

We need to improve our methods for quantifying well-being; until we do so, it will be hard to design policies that promote it. At the behest of French President Nicolas Sarkozy, I chaired the International Commission on the Measurement of Economic Performance and Social Progress, which consisted of an outstanding group of researchers who had done important work on various aspects of the issue. The outcome was a report we completed in 2010, published as *Mismeasuring Our Lives: Why GDP Doesn’t Add Up* (Fitoussi, Sen, and Stiglitz, 2010). It explains why GDP does not reflect well-being and does not reflect sustainability—facts that the financial crisis of 2008 made so evident. Even in the absence of a crisis, though, GDP is inadequate because it does not describe what is happening to the lives of ordinary citizens. It does not measure security, and crucially, it does not measure inequality.

There was a time when it was easier to argue that a rising tide lifts all boats—in other words, when it seemed easier to argue for trickle-down economics. The idea was that if we increased GDP per capita, regardless of the distributions of the gains, then everybody would benefit, even if some benefited more than others. We now know that that is just not true. Of course, there was never theory or empirical evidence that supported that view, but the crisis and the Great Recession it spawned have driven home the fallacy. For instance, recent U.S. data show that while GDP per capita has been going up year after year for a long time (with the exception of 2009), this has not been true for most Americans—the median household income in the United States in 2010 was lower than it was in 1997.
Even before the crisis, it had not recovered to its 2000 levels, and the current median income of a full-time male worker is lower than it was in 1968. So there has been stagnation for more than three decades for the average worker in the United States. What this makes clear is that GDP per capita can be going up but that the livelihoods of most citizens can still be going down. Any assessment of economic performance must focus on what is happening to the majority of citizens.

But there is another reason why we may be interested in inequality: Among its many deleterious effects is instability. This was one of the most important points raised at the IMF meetings in the spring of 2011, when the IMF announced a new official concern with inequality because of its recognized link with instability, the prevention of which is one of the principal mandates of the IMF. As then–Managing Director Dominique Strauss-Kahn put it, “Ultimately, employment and equity are building blocks of economic stability and prosperity, of political stability and peace. This goes to the heart of the IMF’s mandate. It must be placed at the heart of the policy agenda.”

One of the reasons for this conclusion is found in another IMF study, which concluded: “We find that longer growth spells are robustly associated with more equality in the income distribution. . . . Over longer horizons, reduced inequality and sustained growth may thus be two sides of the same coin” (Berg and Ostry, 2011).

This recognition by the IMF of the link between inequality and stability is consistent with a growing understanding in economics of the connections between the two. Part of the reasoning behind this had been put clearly in the report of a UN commission of experts (United Nations, 2010) charged with analyzing the causes of the Great Recession and the remedies. They pointed out that since higher-income individuals consume less than lower-income individuals (the savings rate at the top is 15 to 25 percent, and the savings rate at the bottom is normally close to zero), moving money from the bottom to the top lowers consumption. That lowers total demand. The result is that unless something else happens, total demand in the economy will be less than what the economy is capable of supplying—and that means that there will be unemployment. The way that the United States sustained growth before the crisis was to create a housing bubble through a combination of lax regulation and loose monetary policy. It was

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2 For more information, see Table H-9 of the U.S. Census historical tables, available at http://www.census.gov/hhes/www/income/data/historical/household/index.html.
4 Chapter 9 by the same authors in the present volume is based on Berg and Ostry (2011).
5 For a discussion of savings rates before the recession, see Dynan and others (2004). The authors find savings rates varying from zero for the lowest quintile of the American income distribution to in excess of 25 percent for the top.
inevitable that the bubble would eventually break, and it was inevitable that dire consequences would follow.\textsuperscript{6}

Inequality can also have an effect on economic growth both directly and indirectly as a result of the instability that it helps foster, since instability for a variety of reasons can also affect economic growth. Space does not allow a discussion of all the channels through which inequality affects both instability and inequality—and there is considerable controversy about many of these channels. It is clear, though, that we need to understand the causes of the very large increases of inequality that have affected so many countries around the world, and we need to think about what we can do to reduce the sources of that inequality.

While markets are central to the determination of incomes and inequality, markets are shaped and affected by policies, including laws and regulations. Every aspect of policy has the potential for distributive consequences. Fiscal policy’s distributive consequences should be obvious: Cutbacks in spending hurt those at the bottom or in the middle the most. But trade policy can have strong distributive consequences, too, particularly in the context of globalization. Jobs can be destroyed faster than they are created, and the resulting unemployment has both a direct effect on inequality and an indirect effect as it exerts downward pressure on wages. When we design policies for growth, is it pro-poor growth? There are policies that foster anti-poor growth, and there are policies that are more or less inclusive.

Earlier I noted the link between inequality and growth. If we think that inequality affects stability and growth, then we want to make sure that we are sensitive to the impacts of policies on inequality. But the relationship is two-sided: Those at the bottom typically suffer the most in a crisis.

Commodity price volatility is also related to inequality. Take, for example, agricultural or food price volatility. Because the poor spend a larger fraction of their income on food, this kind of volatility affects the poor more than it does other people. The poor have less of a buffer and thus have the harshest experience with price volatility. They have less access to capital markets, less ability to borrow, and less savings. Average savings of those in the bottom half, even in a rich country like the United States, are close to zero, so volatility in their real incomes is felt immediately.

But there is also an indirect effect of this volatility. Commodity price volatility has macroeconomic effects on countries, and those macroeconomic effects lead governments to respond in ways that often exacerbate inequality. When prices go down, the government must often cut back on spending, and among the areas of spending that often get hit very badly is social spending. Also, many countries still have large fuel subsidies, and when fuel and energy prices go up, it eats into government budgets, leaving less for other aspects of growth and development expenditures. In short, anybody concerned about inequality should be worried about the high level of commodity volatility that we have seen in recent years.

\textsuperscript{6}It should be clear that there were other ways by which the deficiency of aggregate demand arising from the growth in inequality could have been offset, such as more progressive taxation. But the increase in inequality itself gives rise to a politics that makes these alternatives more difficult.
Food and commodity price volatility is particularly important in sub-Saharan Africa for two reasons. For one, there are more countries in that region that are dependent on natural resources. They constitute a large fraction of exports and a large fraction of government revenues in those countries. Second, many of those countries have very low incomes, so food and oil are a large fraction of their consumption baskets.

Even within countries, the effect of price volatility is uneven, which can put additional burdens on the government. For instance, high food prices may benefit the agricultural workers in the country, but urban workers suffer a great deal. Those who benefit do not automatically compensate those who lose, and it is left to the government to try to deal with those who lose and to get revenues from somewhere else to make up for these increased expenditures. Commodity price volatility imposes real strains on government budgets.

The high volatility of commodity prices is one factor contributing to the natural resource curse, the fact that resource-rich, commodity-dependent countries have not grown as well as others. But another striking feature of the natural resource curse countries is they often have more inequality. This is a paradox because one would think that with all the revenue coming in from selling natural resources, which are inelastically supplied, it should be easier to engage in redistribution. If we tax rich individuals, they might decide to work less, and therefore, there is a limit on the taxes that we can impose on labor for redistribution. But if one taxes oil, oil will not decide to disappear. Oil is there. Natural resources are there. (Obviously you have to compensate people for extracting the resources, but the rents currently in the oil markets are enormous, as they are for a lot of the other natural resources, so one could increase the taxes on natural resource rents a great deal without adverse consequences; they are not going to disappear.) Given the magnitude of the rents that are available in these societies for redistribution, one would think that there would be more of it, more equality, and more spending on social areas; but in fact, these countries are characterized by more inequality.

Commodity price volatility does present a special set of problems for inclusive growth, and that is why it is important for us to discuss them. This is especially so because the problems of lack of growth, pervasive instability, and persistent inequality can be exacerbated by policy. It is important also to consider the origins of high commodity price volatility, although space does not allow us to do so in great detail here. But whatever the source of the volatility, policy can exacerbate the effects.

For instance, fiscal policies and monetary policies that are procyclical can exacerbate the macroeconomic fluctuations arising from highly volatile commodity prices. Inflation targeting, as it is normally formulated, is procyclical. It exacerbates these problems. In the aftermath of the 2008 crisis, many policymakers are discussing whether countries should continue with inflation targeting, which is a bit surprising. I would have thought that one of the big lessons of this crisis is that inflation targeting did not do what it was supposed to do. Many people thought that inflation targeting was necessary and almost sufficient for economic
stability, but clearly even though monetary policy may have played a role in keeping inflation low and stable, low and stable inflation did not lead, as predicted, to high and stable growth; it did not protect Europe and the United States from the huge crash. In fact, the models that are used to argue for inflation targeting focused on effects that were really of second, third, nth order of importance. The models focused on the relative price distortions that arise in the presence of inflation; that is, that relative prices can get out of line, which distorts the economy.

But the fact is that the losses from the output gap that resulted from the financial collapse were a magnitude greater than these inflation-related dead-weight losses. The quantitative magnitude of the effects that are usually linked to inflation are really not very important. The losses from the gap between the economy’s potential and its actual output as a result of the crisis, on the other hand, are in the trillions of dollars. The focus on inflation targeting was misguided and a distraction from the really important issues. There was an interesting meeting at the IMF in the spring of 2011 that brought together many academic experts and policymakers. The meeting highlighted a broad consensus that we need to move beyond the preoccupation with inflation targeting. Not that one should forget about inflation—when it gets out of control one has to worry about it. But inflation must not be our only concern. Financial stability, even for central bankers, is something that is equally, or more, important. And in most countries today, inflation has been low to moderate and relatively stable.

Inflation targeting has another danger—it can contribute to inequality. Because inequality can contribute to instability, there is an indirect channel by which inflation targeting may contribute to the weaknesses in the economy. And the link is pretty clear. Think about a small African country where the source of inflation is imported food and oil. Raising interest rates is not going to have any consequences for global prices of food or global prices of oil, so raising interest rates is not going to change that. So how can one dampen inflation in these circumstances? The only way to do it is to cause massive unemployment among those workers within the country, adding insult to injury. Workers are already suffering from high food prices and from high energy prices. Now, they are going to suffer from high unemployment, too. Obviously, this should be politically unacceptable, but it also should be economically unacceptable. It increases inequality, real inequality, because it is the workers who will suffer the most.

Globalization and inequality are also strongly linked. Some of the most obvious connections are in trade policy, arising from unfair and poorly designed trade agreements that have allowed, for instance, the continuation of agricultural subsidies, such as for cotton. The United States subsidizes thousands of rich cotton farmers to the tune of billions of dollars a year, thereby depressing cotton prices. Without those subsidies, American farmers would not be exporting cotton, but because of them, the United States is one of the largest cotton exporters. The

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7 Proceedings from that conference were published by the IMF in 2012, in a volume called In the Wake of the Crisis.
depressed global prices, in turn, depress incomes of cotton farmers in sub-Saharan Africa and increase poverty among the poorest people in Africa.

There are other examples. One way that globalization contributes to inequality arises from the fact that we have had asymmetric globalization (liberalization). We have liberalized capital markets but not labor markets, which means that capital can move all over the world much more freely than labor. This increases the bargaining power of capital relative to labor, which lowers wages relative to what they otherwise would be and increases inequality. It also puts pressure on countries to lower their taxes on capital, reducing the scope for redistributive taxation. Trade agreements and trade policy can be problematic in other ways. They often restrict the ability of countries to try to manage the risks that they face, including volatility in commodity prices. For instance, Colombia introduced a variable-rate tariff in recognition of the fact that international prices are very unstable. It wanted to stabilize incomes of those inside the country so that they would be insulated a little bit from the high volatility in international prices. But the United States put pressure on Colombia not to have these variable rate tariffs—it did not like the system.

Another example is that an important aspect of trade liberalization policy in recent years has been the elimination of quotas in a process that is called “tariffication.” But actually moving from quotas to tariffs can expose countries to more instability. Quotas are a way that a country can insulate itself to some extent from the volatility in international markets. If we had perfect risk markets, this would not make any difference. But we do not have good risk markets, especially in developing countries and especially in the least-developed countries. So this is another example in which international agreements focused on the wrong models. By relying on flawed assumptions, international agreements have thus contributed to increase the vulnerability of the poorest in the least-developed countries to the global volatility that has become so important.8

There are other aspects of globalization having to do with the globalization of international financial markets that have important consequences for stability and inequality. One is capital market liberalization. Should countries open themselves up to the destabilizing short-term flows of the capital market? This is in many ways very different from openness to foreign direct investment (FDI). China, for instance, has long been open to FDI and has been the largest recipient of FDI, with tens of billions of dollars coming into the country. For China, it has been an important way of getting access to international markets, access to technology, training, and so forth. But that is very different from the short-term capital flows that can come in and out of a country overnight. Those short-term capital flows were at the center of the East Asia crisis 13 years ago.

It should be clear too that these short-term flows, while they increase instability, do not in general lead to fast growth. One cannot build factories on money

8See Dasgupta and Stiglitz (1977). Newbery and Stiglitz (1984) show that, in fact, in the absence of good insurance markets, trade liberalization may make everyone worse off. Similarly, capital market liberalization may increase volatility (Stiglitz, 2008).
that can come in and out overnight. It does not lead to real development. Short-
term speculative capital focuses on short-term opportunities, not the long-term
growth that is at the center of development.

There is also a wide recognition that in general, more extensive capital market
integration played an important role in the spread of the crisis in the United
States to the rest of the world. This was a crisis that began in the United States
and very quickly spread through several channels. One of the channels was this
stronger capital and financial market integration. One of the broad lessons that
emerged from the financial crisis was that we need to have well-regulated financial
markets: A major source of the crisis was inadequate regulation. The core of the
problem was that banks did not manage risk very well. They did not allocate
capital very well. But this kind of problem has occurred over and over again in
the history of capitalism. After the Great Depression, however, we put in regula-
tions that worked. There was a long period of stability until about 1980, when
we started removing those regulations. Then the banks went back to the way they
behaved normally and we started getting more and more volatility and more
frequent crises.

One aspect of regulation is regulation of cross-border capital flows. A lot of the
instability facing developing countries comes from unstable cross-border capital
flows. Countries need to protect themselves against these destabilizing short-term
capital flows. Again, the people who tend to be hurt the most and have the least
resilience to these downturns are the poorest. Capital market liberalization thus
contributes to the creation of inequality through the crises that it brings about.
This points to another failing of GDP—that it does not measure security. When
I was at the World Bank, there was a study done called “The Voices of the Poor.”
We interviewed 10,000 poor people, asking them what most contributed to the
unpleasantness of poverty. One obvious answer was the lack of income, but there
were two other important things as well. One of them was lack of security.

In most developing countries, there is no adequate insurance to mitigate the
risks they confront. In fact, even in many developed countries, insurance markets
are far from perfect, but in developing countries the lack of insurance is even
worse and there are none of the buffers, none of the safety nets that people can
fall back on either in the public sector, the private sector, or the nongovernmental
sector. So that is why it is a special responsibility for developing countries to try
to protect themselves against instability, and that is why policies like capital mar-
ket liberalization need to be looked at very carefully—they can expose countries
to greater instability.

Financial market liberalization is a final area in which globalization may be
having an adverse effect on the poor and on inequality. Financial market liberal-
ization entails opening countries up to international banks and other financial
institutions. With financial market liberalization, in many countries, interna-
tional banks have bought domestic banks and/or have come in on their own. Very
often, they displace domestic banks. Depositors see the international banks as
safer than domestic banks. It is not always clear why, and it is not necessarily
because the banks know how to manage risk better—the crisis should have raised
an important question: that is, whether, for instance, Citibank was safer than the
local bank, as many people once assumed. Perhaps there was confidence that the
U.S. government would bail out Citibank should it run into trouble—which, of
course, was what happened. But for whatever the reason, the evidence is that
many depositors feel that way.

How depositors allocate their funds is important because it affects access to
credit. Banking is about lending, or should be about lending. It should not be
about speculation, and it should not be about all the other activities that some of
the banks have become involved in. The core function of banking is providing
funds to firms to do investing, and this is especially true in developing countries.
The funds provided by banks are particularly important for small- and medium-
sized enterprises. The function of allocating capital to small and medium-sized
enterprises (SMEs) is very information intensive. Domestic banks (and other
financial institutions) tend to have an informational advantage over international
banks. The latter often focus their lending activities to the government, multi-
national enterprises, and large domestic firms. The implication is that as deposi-
tory funds shift out of domestic banks, the domestic banks have to get funding
from other sources, which are typically less stable, and/or cut back in their lend-
ing. The result of all this is that there is less lending to SMEs and the lending that
there is can be less stable. This is of particular concern because the SMEs in any
country are the source of job creation. So financial market liberalization can
weaken the labor market, with an adverse effect on workers and inequality. There
can also be adverse macroeconomic effects on growth and stability.

There are a few concluding points. First, it is imperative that we focus more
on the effects on inequality of policies both at the national level and the global
level. The effect of policies on inequality is important in its own right, but it is
also important because an increase in inequality can lead to social, political, and
economic instability and indirectly lead to lower growth (appropriately mea-
sured). Second, volatility itself has a very high cost, so it is important to try to do
what we can not only to reduce it, but also to manage that volatility, so that its
economic and social consequences are mitigated and so that problems in one
country (or one region in a country) do not spread to others. Third, there are
some policies such as inflation targeting, financial market liberalization, and
capital market liberalization that may actually increase economic instability and
societal inequality and indirectly and directly lower economic growth. While
there is not yet consensus on these issues among economists, the crisis of 2008
has at least undermined the opposing consensus that such policies facilitated
growth and stability. Further research will be required to better elucidate the cir-
cumstances in which adverse effects are more likely to arise.

Finally, there is a range of policies that actually can encourage equality and
reduce instability. Some of these have been curtailed by global agreements, and
we have to make sure that those restrictions are removed from international agree-
ments. There is thus a wide agenda ahead if we want to promote inclusive growth
in the face of the high level of volatility in the price of commodities, which are so
important to so many developing countries.
The final thought is the following: There has been insufficient attention to the distributive consequences of various policies, including those that I have discussed here, and the distributive consequences of volatility. These distributive consequences, while they may not show up in representative agent macroeconomic models (so they simply have nothing to say about inequality), are vitally important. They affect macroeconomic behavior. They affect how a policy affects most citizens of a country. They affect social and economic stability and sustainability. These distributive consequences should not be ignored in our analyses.

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Introduction

RABAH AREZKI, CATHERINE PATTILLO, MARC QUINTYN, AND MIN ZHU

Four years after the onset of the global financial crisis, low-income countries (LICs), especially those that have benefited from high commodity prices, have begun to register strong economic growth. However, at the same time, several LICs are facing severe economic and social challenges associated with very high food and fuel prices. The fallout from these elevated prices is being felt acutely by the most vulnerable members of society, leading to increases in already high and persistent levels of inequality. The 2011 surge in commodity prices provided a tragic example of that link—it pushed approximately 44 million additional people below the poverty line. While swift action from governments and the international community is required to address the impacts of these commodity price shocks, such actions should not take attention away from the fact that LICs also face a large agenda of promoting institutional development and structural change in their economies. In fact, failure to address these challenges will keep LICs systematically below their economic potential, which in turn would increase the likelihood of yet another food crisis in the future.

The fallout from both the global financial crisis and the uprisings in the Middle East and North Africa has put the need to design policies that cater to the welfare of the entire citizenry at the top of both national and international policymakers’ agendas. Achieving higher levels of economic growth in LICs has been seen as the only way out of poverty and income inequality. Experience shows, however, that while growth is the main driver of poverty reduction in the long term, episodes of higher growth in LICs have not necessarily led to fewer inequalities but, on the contrary, sometimes resulted in greater inequalities. Recent research suggests that the appropriate balance between growth and distribution strategies depends on the level of economic development (Ravallion, 2010). Moreover, allowing poor people to participate in both a country’s growth process and its social policies is essential for the growth to yield significant progress in poverty reduction.

This book is intended to contribute to the renewed debate on the design of macroeconomic policies that both mitigate the consequences of commodity price volatility and promote growth that is inclusive of all the citizens in LICs. Many of the chapters are based on presentations at a high-level seminar organized by the International Monetary Fund, “Commodity Price Volatility and Inclusive Growth in Low-Income Countries,” which took place in Washington, D.C., on September 21, 2011. Additional chapters are presented on themes discussed during the seminar.
By bringing together contributions from top academics, senior policymakers, and leading thinkers from think tanks, nongovernmental organizations, and international organizations, the book takes a fresh look at these issues by asking what works and what does not, drawing from both leading research and cross-regional experiences. The book’s holistic approach of linking the issues of commodity price volatility and inclusive growth in LICs is new in the literature.

Addressing the issue of commodity price volatility in the short term and achieving inclusive growth in the medium term are intimately linked objectives. The book divides the treatment of these complex and intertwined topics into five parts. Part I offers an overview of the short- and long-term challenges for LICs stemming from commodity price volatility in both commodity exporters and importers. Part II studies the macroeconomic policy options in the face of commodity price volatility. Part III focuses exclusively on the challenges that the objective of inclusive growth poses for both commodity exporters and importers. Part IV complements these general approaches by offering regional and country-specific perspectives on the issues. Part V concludes with suggestions on how the international community can contribute to these issues to mitigate the impact of price volatility and use commodity wealth to promote inclusive development.

The overview chapters in Part I make it clear that the effect of commodity price volatility depends essentially on a country’s exporter status. Some LICs are exposed to commodity price volatility through their exports, such as oil and minerals. Others are exposed to volatility through their imports of commodities, such as food products. However, this dichotomy between commodity exporters and importers is not as clear cut as it first seems. A vast number of LICs—including resource exporters—have failed to modernize their domestic agricultural sector to respond to the needs of their fast-growing populations. Many natural resource exporters are also net food importers. In addition, new resource discoveries are adding more LICs to the ranks of commodity exporters, requiring a reorientation of their policies to meet these new challenges and opportunities.

In Chapter 2, Frankel surveys the literature that shows that resource-rich countries tend to have lower longer-term economic growth as well as growth of poorer quality than non-resource-rich countries. Short-term monetary and fiscal policy management to ensure macroeconomic stability presents particular challenges for commodity exporters; Frankel’s prescriptions include pegging the exchange rate to a nominal anchor based on the main export commodity. Ross argues in Chapter 3 that resource-rich LICs face a “political curse” that plagues the economy with rent seeking and a culture of patronage, which calls for specific design of government institutions such as petroleum funds. Chapter 4 by Bredenkamp and Bersch documents the significant impact of commodity price shocks on LICs’ trade and fiscal balances. Pragmatic policy responses could include targeted measures to protect the poor—fiscal space permitting, monetary policies that largely accommodate first-round impacts, and medium-term measures to build resilience.

Part II focuses on the macroeconomic policy options in the face of commodity price volatility. In light of the limited room for maneuvering that some LICs face in using fiscal measures to address higher food and fuel prices, new debates
have emerged on the role that monetary policy can play in dealing with inflationary impacts. In Chapter 5, Anand and Prasad analyze the choice of core inflation, excluding food and energy prices, as the price target of central banks in LICs where individuals face credit constraints and have consumption baskets with large weights of food and fuel products.

Collier assesses the difficult balancing act that resource-rich LICs face, in both the short term and medium term, in making decisions on public savings and investment. He argues in Chapter 6 that countries need to watch three “policy clocks” ticking at different speeds, namely, the prospect of resource depletion, the need to strengthen public investment capacity, and the need to build buffers to hedge against commodity price volatility. The latter challenge is the focus of Chapter 7 by Schmidt-Hebbel, which explores the lessons that can be learned from Chile’s experience on the design of fiscal institutions and rules to prevent boom-and-bust cycles in commodity exporters.

Part III of the book examines policies to promote inclusive growth in LICs. In the medium term, LICs need to continue to ensure macroeconomic stability and economic growth while working to achieve inclusive outcomes by also paying attention to the distributive consequences of policies. In Chapter 8, Ianchovichina and Lundstrom Gable define inclusive growth as growth that provides rapid and sustained poverty reduction to allow people to contribute to, and benefit from, economic growth. In Chapter 9, Warner also discusses the concept and the analytics of growth inclusiveness in the context of resource-rich countries and provides empirical evidence on the limited inclusiveness of growth in selected resource-rich countries. Chapter 10 by Berg and Ostry finds that societies with more equal income distributions tend to have more durable growth. This evidence suggests that there may be some “win-win” policies, such as better-targeted subsidies, better access to education for the poor that improves equality of economic opportunity, and active labor market measures that promote employment. Bourguignon argues in Chapter 11 that the immediate challenge for governments facing commodity price volatility is to cushion the negative shocks by using transfers that target the most vulnerable. Because many LICs are unable to borrow internationally to finance these mitigation measures, prudent fiscal policies that allow LICs to build reserves in “good” times to be used in “bad” times are important.

Part IV, which presents some regional and country experiences on the nexus between inclusive growth and commodity price volatility, starts with a review of the Middle East and North Africa by Arezki and Nabli in Chapter 12. They document that the resource-rich countries in this region have experienced relatively low and noninclusive economic growth, as well as high levels of macroeconomic volatility. Although important improvements in health and education have taken place, the quality of these services remains an important source of concern. The authors argue that the success of economic reforms in the region rests on the ability of those countries to invest boldly in building inclusive institutions as well as high levels of human capacity in public administrations. Next, in Chapter 13, Garcia-Verdu, Selassie, and Thomas analyze the extent to which sub-Saharan Africa’s recent high-growth experience has translated into benefits for the
population at large, examining indicators of well-being, distributional dimensions of changes in consumption, and employment outcomes. Using household survey data for selected countries, they find that high per capita growth does have a strong bearing on good distributional outcomes and that strong agricultural employment is associated with robust consumption growth. In Chapter 14, Jha and Rhee provide lessons from the policies that were effective in developing Asia in addressing the distributional consequences of commodity price volatility, including targeted transfers and the building of safety nets. Higher agricultural sector productivity and improved supply chains as well as regional coordination, including through maintaining and managing regional grain reserves, have also proven effective in hedging against the consequences of food price volatility in developing Asia. In Chapter 15, Duclaud and Garcia describe, in the context of oil exporting in Mexico, the operational and institutional challenges in developing and operating a successful large-scale hedging program against fluctuation in oil prices by using financial instruments.

Part V concludes by considering how the international community could help. In Chapter 16, Jacquet discusses the international policy challenges associated with food security and price volatility. He first notes that, to meet the objective of food security, LICs need to articulate their public policies with local ownership so as to avoid top-down and exclusive policies. Jacquet also argues that current successful public policies in LICs have to be based on the involvement of various stakeholders with governments playing the role of coordinators and catalysts. He concludes that there is a need for more coordination among both domestic and international actors, who tend to work in silos, across sectors and policies. In Chapter 17, Martin and Anderson argue that fostering closer trade policy coordination between countries can prevent the nonconcerted interventions by individual countries that often render a bad situation worse, especially during episodes of food price surges. Finally, in Chapter 18, Heuty reviews the international initiatives on transparency and accountability aimed at ensuring that limited public resources in resource-rich LICs are used for the benefit of all citizens. He argues that the empowerment of civil society is of paramount importance for that inclusive process to take place.

Hopefully, the audience for this volume will include policymakers involved in the design of economic and social policies at the national and international levels to influence the debate on the best policies for economic stability and inclusive growth in LICs. As the contributions in this volume make clear, the order is tall and complex. To paraphrase from the opening remarks of Josette Sheeran and Joseph Stiglitz at the conference on which this volume is based, policymakers need to take economic and structural measures to avoid another “perfect storm” (such as in 2007–08) and ignite economic growth, so that the tide (economic growth) will rise more evenly in the future and that with this rising tide, all boats are lifted equally.

REFERENCE

Commodity Price Volatility: Challenges
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The Natural Resource Curse: A Survey of Diagnoses and Some Prescriptions

JEFFREY A. FRANKEL

Oil, minerals, and agricultural resources can bring great riches to those who possess them. Yet countries that are abundantly endowed with such natural resources often encounter pitfalls that interfere with the expected superior economic performance. Possibly undesirable side effects include reallocation of production away from the manufacturing sector. The crowding out of manufacturing comes not just via expansion of the natural resource sector itself, but also via expansion of the government and nontraded goods sectors. The artificial inflation of these sectors in turn comes via relative prices (real appreciation of the currency), government spending, or both. One interpretation is that this phenomenon is cyclical, with the effects reversed when commodity boom turns to commodity bust. Another interpretation is that it can be permanent—countries endowed with natural resources more often develop social structures in which autocratic or corrupt political elites finance themselves through physical control of the natural resources. Meanwhile, those governments that lack these endowments have no choice but to develop decentralized, democratic, and diversified economies with market incentives that are more conducive to the development of manufacturing.

Examples of the natural resource curse are plain to see. Hong Kong Special Administrative Region, Japan, the Republic of Korea, Singapore, and Taiwan Province of China are rocky islands (or peninsulas) that were endowed with very little in the way of exportable natural resources. Nevertheless, they achieved Western-level standards of living. Many countries in Africa, the Middle East, and Latin America are endowed with oil, minerals, or other natural resources, and yet they have experienced much less satisfactory economic performance.

Figure 2.1 shows a sample of countries over the last four decades. Exports of fuels, ores, and metals as a fraction of total merchandise exports appear on the horizontal axis and economic growth on the vertical axis. Countries that are conspicuously high in growth and low in natural resources are China, Korea, and some other Asian countries. Countries that are conspicuously high in natural

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resources and low in growth are Gabon, Venezuela, and Zambia. The overall relationship is, on average, slightly negative. The negative correlation is not very strong, masking almost as many resource successes as failures. But the data certainly suggest no positive correlation between natural resource wealth and economic growth.

Auty (1993, 2001) is apparently the one who coined the term “natural resource curse” to describe this puzzling phenomenon. Sachs and Warner (1995) kicked off the econometric literature, finding that economic dependence on oil and minerals is correlated with slow economic growth, controlling for other structural attributes of the country. Sachs and Warner (2001) summarized and extended previous research showing evidence that countries with great natural resource wealth tend to grow more slowly than resource-poor countries. They state that their results are not easily explained by other variables or by alternative ways to measure resource abundance. Their paper claims that there is little direct evidence that omitted geographical or climate variables explain the curse or that there is a bias in their estimates resulting from some other unobserved growth deterrent. Other studies that have found a negative effect of the presence of oil, in particular, on economic performance, include those by Kaldor, Karl, and Said (2007); Ross (2001); Sala-i-Martin and Subramanian (2003); and Smith (2004).

Before considering possible policies or institutions to combat the natural resource curse, it is necessary to diagnose the problem. How could abundance of oil or mineral and agricultural products be a curse or lead to substandard economic performance? What would be the mechanism for this counterintuitive relationship? Six major hypotheses have been proposed:

![Figure 2.1](image-url)  
**Figure 2.1** Statistical Relationship between Mineral Exports and Growth, 1970–2008  
Source: World Bank, World Development Indicators.
1. The long-run trend of world prices for commodities;
2. Volatility in commodity prices;
3. Permanent crowding out of manufacturing, where spillover effects are thought to be concentrated;
4. Autocratic or oligarchic institutions;
5. Anarchic institutions, such as unenforceable property rights, unsustainably rapid depletion, or civil war;
6. Cyclical expansion of the nontraded sector via the Dutch disease.

Developing countries tend to be smaller economically than major industrialized countries, and they are more likely to specialize in the exports of basic commodities like oil. As a result, they are more likely to fit the small open economy model; they can be regarded as price takers, not just for their import goods, but for their export goods as well. That is, the prices of their tradable goods are generally taken as given on world markets. The price-taking assumption requires three conditions: low monopoly power, low trade barriers, and intrinsic perfect substitutability in the commodity as between domestic and foreign producers, which is a condition usually met by primary products and usually not met by manufactured goods and services. Not every barrel of oil is the same and not all are traded in competitive markets, and although Saudi Arabia is an oil producer, it does not meet the criteria as a price taker because of its strong presence in world oil markets. But the assumption that most oil producers are price takers holds relatively well.

To a first approximation, then, the local price of oil is equal to the dollar price on world markets times the country’s exchange rate. It follows, for example, that a devaluation should push up the local currency price of oil quickly and in proportion (leaving aside pre-existing contracts or export restrictions). An upward revaluation of the currency should push down the local price of oil in proportion. Throughout this chapter, we assume that the domestic country must take the price of the export commodity as given, in terms of foreign currency.

**LONG-TERM TREND OF WORLD COMMODITY PRICES**

The hypothesis that the prices of mineral and agricultural products follow a downward trajectory in the long run relative to the prices of manufacturers and other products is associated with Raul Prebisch (1950) and Hans Singer (1950). The theoretical reasoning is that world demand for primary products is inelastic with respect to world income. That is, for every 1 percent increase in income, the demand for raw materials increases by less than 1 percent. Engel’s law is the (older) proposition that households spend a lower fraction of their income on food and other basic necessities as they get richer.

This hypothesis, if true, would readily support the conclusion that specializing in natural resources is a bad deal. Mere “hewers of wood and drawers of water” will remain forever poor (Deuteronomy 29:11) if they do not industrialize. The
policy implication that was drawn by Prebisch was that developing countries should discourage international trade with tariff and nontariff barriers to allow their domestic manufacturing sector to develop behind protective walls rather than exploit their traditional comparative advantage in natural resources as the classic theories of free trade would have it. This “import substitution industrialization” policy was adopted in much of the developing world from the 1950s to the 1970s. However, the fashion reverted in subsequent decades.

There also exist persuasive theoretical arguments that we should expect prices of oil and other minerals to experience upward trends in the long run. The arguments begin with the assumption that we are talking about nonperishable nonrenewable resources, that is, deposits in the earth’s crust that are fixed in total supply and are gradually being depleted.

Let us add another assumption: Whoever currently has claim to the resource, such as an oil company, can be confident that it will retain possession unless it sells to someone else, who then has equally safe property rights. This assumption excludes cases in which private oil companies fear that their contracts might be abrogated or their possessions nationalized. It also excludes cases in which warlords compete over physical possession of the resource. Under such exceptions, the current owner has a strong incentive to pump the oil or extract the minerals quickly because it might never benefit from whatever is left in the ground. One explanation for the sharp rise in oil prices between 1973 and 1979, for example, is that private Western oil companies over the preceding two decades had anticipated the possibility that newly assertive developing countries would eventually nationalize the oil reserves within their borders and thus they kept prices low by pumping oil more quickly than they would have done had they been confident that their claims would remain valid indefinitely.

At the risk of some oversimplification, let us also assume for now that the fixed deposits of oil in the earth’s crust are all sufficiently accessible and that the costs of exploration, development, and pumping are small compared to the value of the oil. Hotelling (1931) deduced from these assumptions the important theoretical principle that the price of oil in the long run should rise at a rate equal to the interest rate.

The logic is as follows. At every point in time, the owner of the oil—whether a private oil company or state owned—chooses how much to pump and how much to leave in the ground. Whatever is pumped can be sold at today’s price (this is the price taker assumption) and the proceeds can be invested in bank deposits or U.S. Treasury bills, which earn the current interest rate. If the value of the oil in the ground is not expected to increase in the future or not expected to increase at a sufficiently rapid rate, then the owner has an incentive to extract more of it today so that it can earn interest on the proceeds. As oil companies worldwide react by extracting more today, they drive down the current price of oil below its perceived long-run level. When the current price is below its

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1 The concern that insecure property rights leads to excessively rapid depletion is further explored as part of the fifth channel.

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perceived long-run level, companies will expect that the price must rise in the future. Only when the expectation of future appreciation is sufficient to offset the interest rate will the oil market be in equilibrium. That is, only then will oil companies be close to indifferent between pumping at a faster rate or a slower rate.

If there are constant costs of extraction and storage, then the trend in prices will be lower than the interest rate by the amount of those costs; if there is a constant convenience yield from holding inventories, then the trend in prices will be higher than the interest rate by that amount.

The idea that natural resources are in fixed supply and that as a result their prices must rise in the long run as reserves begin to run low is much older than Hotelling. It goes back to Thomas Malthus (1798) and the genesis of fears of environmental scarcity (albeit without the role of the interest rate). Demand grows with population and supply is fixed; what could be clearer in economics than the prediction that prices will rise?

The complication is that supply is not fixed. It is true that at any point in time, there is a certain stock of oil reserves that have been discovered. But the historical pattern has long been that as the stock is depleted, new reserves are found. When the price goes up, it makes exploration and development profitable for deposits that are further underground, underwater, or in other hard-to-reach locations. This is especially true as new technologies are developed for exploration and extraction.

Over the two centuries since Malthus or the 70 years since Hotelling, exploration and new technologies have increased the supply of oil and other natural resources at a pace that has roughly counteracted the increase in demand from growth in population and incomes (Krautkraemer, 1998; Wright and Czelusta, 2003, 2004, 2006).

However, just because supply has always increased in the past does not necessarily mean that it will always do so in the future. In 1956, Marion King Hubbert, an oil engineer, predicted that the flow supply of oil within the United States would peak in the late 1960s and then start to decline permanently. The prediction was based on a model in which the fraction of the country’s reserves that has been discovered rises through time, and data on the rates of discovery versus consumption are used to estimate the parameters in the model. Unlike myriad other pessimistic forecasts, this one came true on schedule, earning subsequent fame for its author. The planet Earth is a much larger place than the United States, but it too is finite. A number of analysts have extrapolated Hubbert’s words and modeling approach to claim that the same pattern would follow for extraction of the world’s oil reserves. Specifically, some of them claim that the 2000–11 run-up in oil prices confirmed a predicted global “Hubbert’s peak” (see, for example, Deffeyes, 2005). It remains to be seen whether we are currently witnessing a peak in world oil production, notwithstanding that forecasts of such peaks have proven erroneous in the past.

With strong theoretical arguments on both sides, either for an upward trend in commodity prices or for a downward trend, one must say that the question is an empirical one.
Although specifics will vary depending on individual measures, it is possible to generalize somewhat across commodity prices. Terms of trade for commodity producers had a slight upward trend from 1870 to World War I, a downward trend in the interwar period, an upward trend in the 1970s, a downward trend in the 1980s and 1990s, and an upward trend in the first decade of the twenty-first century. Simple extrapolation of medium-term trends is foolish. One must take a longer-term perspective.

What is the overall statistical trend in the long run? Some authors find a slight upward trend, and some find a slight downward trend (Grilli and Yang, 1988; Cuddington and Urzua, 1989; Cuddington, 1992; Reinhart and Wickham, 1994; Pindyck, 1999; Hadass and Williamson, 2003; Kellard and Wohar, 2006; Cuddington, Ludema, and Jayasuriya, 2007; Balagtas and Holt, 2009; Harvey and others, 2010). The answer seems to depend, more than anything else, on the date of the end of the sample. Studies written after the commodity price increases of the 1970s found an upward trend, but those written after the 1980s found a downward trend, even when both kinds of studies went back to the early twentieth century. When studies using data through 2011 are completed, some will probably again find a positive long-term trend. This phenomenon is less surprising than it sounds. Real commodity prices undergo large cycles around a trend, each lasting 20 years or more. As a consequence of the cyclical fluctuations, estimates of the long-term trend are very sensitive to the precise time period studied.

One should seek to avoid falling prey to either of two reductionist arguments at the philosophical poles of Malthusianism and cornucopianism. On the one hand, the fact that the supply of minerals in the earth’s crust is a finite number does not in and of itself justify the apocalyptic conclusion that it must necessarily run out. As Sheik Ahmed Zaki Yamani, the former Saudi oil minister, famously said, “The Stone Age came to an end not for a lack of stones, and the oil age will end, but not for a lack of oil.” Malthusians do not pay enough attention to the tendency for technological progress to ride to the rescue. On the other hand, the fact that the Malthusian forecast has repeatedly been proven false in the past does not in itself imply the Panglossian forecast that this will always happen in the future. One must seek a broad perspective in which all relevant reasoning and evidence are brought to bear in the balance.

**VOLATILITY IN COMMODITY PRICES**

Commodity prices are highly volatile. The world market prices for oil and natural gas are the most volatile of all, but those for aluminum, bananas, coffee, copper, sugar, and others are close behind.

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2 Although prices do not always move together for oil, minerals, and agricultural products, there is a surprisingly high correlation; see Pindyck and Rotemberg (1990).

3 Cuddington and Jerrett (2008) find three “super cycles” in metals prices over the 150 years from 1850 to 2000, followed by the beginnings of a fourth.
Some have suggested that it is precisely the volatility of natural resource prices that is bad for economic growth (Hausmann and Rigobon, 2003; Blattman, Hwang, and Williamson, 2007; Poelhekke and van der Ploeg, 2007). Cyclical shifts of the factors of production (labor, land, and capital) back and forth across sectors—mineral, agricultural, manufacturing, and services—may incur needless transaction costs. Frictional unemployment of labor, incomplete utilization of the capital stock, and incomplete occupancy of housing are true deadweight costs, even if they are temporary.

What is the fundamental reason for the volatility? It is low short-term elasticities. That is, for any given increase in price, demand does not fall much in the short term nor does supply rise. Demand elasticities are low in the short term largely because the capital stock at any point in time is designed physically to operate with a particular ratio of energy or raw materials to output. Supply elasticities are also often low in the short term because it takes time to adjust output. The result is that when there is a shock, such as a bad harvest (reducing the supply of agricultural products) or a cold winter (raising demand for energy products), the corresponding price has to rise by a lot to clear the market.

**CROWDING OUT OF MANUFACTURING**

Outside of classical economics, diversification away from primary commodities into manufacturing in most circles is considered self-evidently desirable. Is industrialization the sine qua non of economic development? Is encouragement of manufacturing necessary to achieve high income? Classical economic theory says no—countries are best off producing whatever is to their comparative advantage, whether that is natural resources or manufacturing. According to this nineteenth-century view, attempts by Brazil to industrialize are as foolish as it would have been for Great Britain to try to grow coffee and oranges in hothouses.

But some argue that countries only get sustainably rich if they industrialize (oil-rich sheikdoms notwithstanding) and that industrialization in turn requires an extra push from the government, which is often referred to as industrial policy. Matsuyama (1992) provided an influential theoretical model formalizing this intuition: the manufacturing sector is assumed to be characterized by learning by doing, whereas the primary sector (agriculture, in his paper) is not. The implication is that deliberate policy-induced diversification out of primary products into manufacturing is justified and that a permanent commodity boom that crowds out manufacturing can indeed be harmful.4

On the other hand, it must be pointed out that there is no reason why learning by doing should be the exclusive preserve of manufacturing tradables. Mineral and agricultural sectors can enjoy learning by doing as well. Some countries have experienced tremendous productivity growth in the oil, mineral, and agricultural

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4The resource curse works through this channel; also see van Wijnbergen (1984) and Sachs and Warner (1995).
sectors. American productivity gains have been aided by American public investment since the late nineteenth century in such institutions of knowledge infrastructure as the U.S. Geological Survey, the Colorado School of Mines, the agricultural extension program, and land-grant colleges (Wright and Czelusta, 2003, pp. 6, 18–21, 25).

Although well-functioning governments can play a useful role in supplying these public goods for the natural resource sector, this is different than mandating government ownership of the resources themselves. In Latin America, for example, public monopoly ownership and prohibitions on importing foreign expertise or capital have often stunted development of the mineral sector, whereas privatization can set it free. Moreover, attempts by governments to force linkages between the mineral sector and processing industries have not always worked.

AUTOCRATIC/OLIGARCHIC INSTITUTIONS

A prominent trend in thinking regarding economic development is that the quality of institutions is the deep fundamental factor that determines which countries experience good performance and which do not and that it is futile to recommend good macroeconomic or microeconomic policies if the institutional structure is not there to support them. The theory is that weak institutions lead to inequality, intermittent dictatorship, and lack of constraints to prevent elites and politicians from plundering the country.5

Of the various possible channels through which natural resources could be a curse to long-term development, the quality of institutions and governance is perhaps the most widely hypothesized. Some studies focus on outright corruption.6 The “rent cycling theory” of Auty (1990, 2001, 2007) holds that economic growth requires recycling rents via markets rather than via patronage. In high-rent countries, the natural resource elicits a political contest to capture ownership, whereas in low-rent countries, the government must motivate people to create wealth, for example, by pursuing comparative advantage, promoting equality, and fostering a civil society.

The theory is thought also to fit Middle Eastern oil exporters especially well. In this region, governments’ access to rents, in the form of oil revenue, may have freed them from the need for taxation of their peoples, and this, in turn, has freed them from the need for democracy (Mahdavy, 1970; Luciani, 1987; Vandewalle, 1998). The need for tax revenue is believed to require democracy under the theory “no taxation without representation.” Huntington (1991) generalized the

5Prominent econometric studies include Barro (1991); Acemoglu and others (2001); Easterly and Levine (2003); Hall and Jones (1999); and Rodrik, Subramanian, and Trebbi (2003).
6Hodler (2006) and Caselli (2006) found a natural resource curse via internal struggle for ownership. Leite and Weidmann (1999) found that natural resource dependence has a substantial statistical effect on measures of corruption in particular. Also, Gylfason (2000), Papyrakis and Gerfach (2004), and Arezki and Brückner (2009) found that an increase in oil rents worsens corruption.
principle beyond Middle Eastern oil producers to states with natural resources in other parts of the developing world.

This theory is related to the explanation by Engerman and Sokoloff (1997, 2000, 2012) as to why industrialization first took place in the northern part of the Western Hemisphere rather than the south. It is worth recalling that the European powers who acquired colonies in Latin America, with their gold and silver, were considered at the time to have done better than those who acquired colonies in North America. Indeed, in the Treaty of Breda (1667), the Dutch ceded their claim to New Netherland (New York) to the English in exchange for Suriname in South America, and a century later, the French were willing to give up Canada, so long as they could keep their sugar plantations on Guadeloupe (Parker, 2011, pp. 138, 305).

These two economic historians argue that lands endowed with extractive industries ("point-source" sectors, such as oil, minerals, and plantation crops, as in Latin America) developed institutions of slavery, inequality, dictatorship, and state control. The long-lasting effects are observable in policies with regard to suffrage, education, land ownership, and immigration. Meanwhile, other countries (in those climates originally suited to fishing and small farms, as in the northeast United States) developed institutions based on individualism, democracy, egalitarianism, and capitalism. When the industrial revolution came along, the latter areas were well suited to make the most of it. Those that had specialized in extractive industries were not, because society had come to depend on class structure and authoritarianism rather than on individual incentive and decentralized decision making.

Statistical studies across large cross-sections of countries followed the development of the theories of rent seeking and democracy. Many of the studies find that economic dependence on oil or minerals is indeed correlated with authoritarian governments.7

What commodities, exactly, are the worrisome ones? Sala-i-Martin and Subramanian (2003) and Bulte, Damania, and Deacon (2005) find that the resources that undermine institutional quality and thereby growth include oil and some particular minerals, but not agricultural resources. Isham and others (2005) find that the commodities that are damaging to institutional development, which they call “point-source” resources, are, in addition to oil, minerals, plantation crops, and coffee and cocoa.

**UNSUSTAINABILITY AND ANARCHY**

A different sort of institutional failure could be described as anarchy as opposed to autocracy or oligarchy. Under this rubric fall three related pitfalls—unsustainably rapid depletion of resources, unenforceable property rights, and civil war.

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7Barro (2000), Ross (2001, 2006), Wantchekon (2002); Jensen and Wantchekon (2004); Smith (2004, 2007); and Ulfelder (2007). However, other studies reject the link from resources to lack of democracy, such as Karl (1997), Noland (2008), Dunning (2008), Wacziarg (2009), and Haber and Menaldo (2011).
Resource Depletion

Two hundred years ago, much of the island of Nauru in the South Pacific consisted of phosphate deposits, derived from guano. The substance is valuable in the fertilizer industry. As a result of highly profitable phosphate exports, Nauru in the late 1960s and early 1970s showed up globally with the highest income per capita of any country. Eventually, however, the deposits gave out. Not enough of the proceeds had been saved, let alone well invested, during the period of abundance. Today, the money is gone and so is the tropical paradise: the residents are left with little more than a narrow and environmentally precarious rim of land, circling wasteland where the phosphates used to be.

What happens when a depletable natural resource is indeed depleted? This question is not only of concern to environmentalists. It is also one motivation for the strategy of diversifying the economy beyond natural resources into other sectors. The question is also a reason to save a good share of the rents from exhaustible natural resources so that future generations do not suffer an exhaustion of total wealth or a diminution in the flow of consumption (Hartwick, 1977; Solow, 1986).

Sometimes, as in the Nauru example, it is the government that has control of the natural resource, and excessive depletion is another instance of a failure in governance. Politicians tend to extract at a rate in excess of the efficient path because they discount the future too much (Robinson, Torvik, and Verdier, 2006) as they are more intent on surviving the next election or coup attempt.

Privatization would be a possible answer to the problem of excessive depletion if a full assignment of property rights were possible, thereby giving private sector owners adequate incentive to conserve the resource in question. But often this is not possible, either physically or politically. The difficulty in enforcing property rights over some nonrenewable resources constitutes a category of its own of the natural resource curse.

Unenforceable Property Rights

While one theory holds that the physical possession of mineral wealth undermines the motivation for the government to establish a broad-based regime of property rights for the rest of the economy, another theory holds that some natural resources do not lend themselves to property rights whether the government wants to apply them or not. Overfishing, overgrazing, and overuse of water are classic examples of the so-called tragedy of the commons that applies to open-access resources. Individual fishermen, ranchers, or farmers have no incentive to restrain themselves, even while the fisheries, pastureland, or water aquifers are being collectively depleted. The difficulty in imposing property rights is particularly severe when the resource is dispersed over a wide area, as in the case of timberland. Even the classic point-source resource, oil, can suffer the problem, especially when wells drilled from different plots of land hit the same underground deposit.

This unenforceability of property rights is the market failure that can invalidate some of the standard neoclassical economic theorems in the case of open-
access resources. One obvious implication of unenforceability is that the resource will be depleted more rapidly than optimal calculations call for.\textsuperscript{8} The benefits of free trade are another possible casualty: the country might be better off without the ability to export the resource if doing so exacerbates the excess rate of exploitation.\textsuperscript{9}

Common-pool resources are those that are at the same time (1) subtractable (such as private goods) and (2) costly to exclude users from consuming (such as public goods), while yet (3) not impossible to exclude users from (Ostrom and Ostrom, 1977). Enforcement of property rights is all the more difficult in a frontier situation.\textsuperscript{10} The American “Wild West” saw legendary claim jumping in the gold or silver rushes of the late nineteenth and early twentieth centuries. Today, anarchic conditions can apply in the tropical forest frontiers of the Amazon, Borneo, or the Congo.

**Civil War**

Domestic conflict, especially when violent, is certainly bad for economic development. When a valuable resource such as oil or diamonds is there for the taking, rather than when production requires substantial inputs of labor and capital investment, factions are more likely to fight over it. Researchers have found that economic dependence on oil and mineral wealth is correlated with civil war.\textsuperscript{11} Chronic conflict in oil-rich countries such as Angola and Sudan is a good example of this. Civil war is, in turn, very bad for economic development.

**DUTCH DISEASE**

The last of the six channels takes us into the macroeconomics of the business cycle. The Dutch disease refers to some possibly unpleasant side effects of a boom in oil or other mineral and agricultural commodities. (The name is an arbitrary accident of history, originally inspired by the side effects of natural gas discoveries by the Netherlands in the late 1950s.\textsuperscript{12}) The phenomenon arises when a strong, but perhaps temporary, upward swing in the world price of the export commodity causes some or all of the following side effects:
• A large real appreciation in the currency (taking the form of nominal currency appreciation if the country has a floating exchange rate or the form of money inflow and inflation if the country has a fixed exchange rate)

• An increase in spending (especially by the government, which increases spending in response to the increased availability of tax receipts or royalties)

• An increase in the price of nontraded goods (goods and services such as housing that are not internationally traded) relative to traded goods (manufactures and other internationally traded goods other than the export commodity)

• A resultant shift of labor and land out of non-export-commodity traded goods (pulled by the more attractive returns in the export commodity and in nontraded goods and services)

• Sometimes a current account deficit (despite the enhanced revenue from commodity exports), thereby incurring international debt that may be difficult to service when the commodity boom ends.

What makes the Dutch disease a “disease?” One interpretation, particularly relevant if the complete cycle is not adequately foreseen, is that the process is all painfully reversed when the world price of the export commodity goes back down. In that case, the Dutch disease is an example of the costs of volatility in commodity prices. A second interpretation is that even if the perceived longevity of the increase in world price turns out to be accurate, the crowding out of non-commodity exports is undesirable, perhaps because the manufacturing sector has greater externalities for long-term growth (“de-industrialization”) (van Wijnbergen, 1984; Matsuyama, 1992; Gylfason, Herbertsson, and Zoega, 1999). In that case, an example of the costs of crowding out manufacturing, the problem is a high level of commodity prices, not cyclical fluctuations, per se.

The reallocation of resources across tradable sectors (e.g., from manufacturers to oil) may be the inevitable response to the fundamentals of the global economy, regardless of national macroeconomics. But the movement into nontraded goods is macroeconomic in origin and requires a thoughtful strategy from the monetary authorities. Simply “letting the markets work” is not a fully adequate guide to policy.

The expansion of the nontraded goods sector, sometimes into the territory of overheating (inflation and asset bubbles), is not solely a result of real appreciation

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13 For example, see Edwards (1986). During the boom of 2001–10, examples of fixed-rate oil-producing countries where the real appreciation came via money inflow and inflation include Saudi Arabia and the Gulf emirates. Examples of floating-rate natural resource countries where the real appreciation took the form of nominal currency appreciation include Australia, Chile, Kazakhstan, Mexico, Norway, Russia, and South Africa. (Chen and Rogoff, 2003, document the sensitivity of exchange rates to commodity prices in the cases of Australia and New Zealand. Frankel, 2007, does so for South Africa.)

14 Manzano and Rigobon (2008) argue that the negative Sachs-Warner effect of resource dependence on growth rates during 1970 to 1990 was mediated through international debt incurred when commodity prices were high. Arezki and Brückner (2010a, 2010b) find that commodity price booms lead to increased government spending, external debt, default risk, and sovereign bond spreads in autocracies, but do not have those effects in democracies.
of the currency. Fiscal policy also plays a big role. Many researchers have documented that fiscal policy tends to be procyclical in developing countries, especially in comparison with industrialized countries (Cuddington, 1989; Gavin and Perotti, 1997; Tornell and Lane, 1999; Kaminsky, Reinhart, and Vegh, 2004; Talvi and Vegh, 2005; Alesina, Campante, and Tabellini, 2008; Mendoza and Oviedo, 2006; Ilzetski and Vegh, 2008; Medas and Zakharova, 2009). An important cause of procyclical spending is precisely that government receipts from taxes or royalties rise in booms, and the government cannot resist the temptation or political pressure to increase spending proportionately or more than proportionately. Procyclicality is especially pronounced in countries that possess natural resources and where income from those resources tends to dominate the business cycle.\textsuperscript{15} Two large budget items that account for much of the increased spending from oil booms are investment projects (Gelb, 1986) and the government wage bill (Medas and Zakharova, 2009).

**Skeptics**

Some skeptics question whether there really is a natural resource curse. They point to examples of commodity-exporting countries that have done well, persuasively arguing that natural resource endowments do not necessarily doom a country to slow growth. Everyone recognizes that Norway is conspicuous as an oil producer at the top of the international league tables for governance and economic performance.\textsuperscript{16} Botswana and the Democratic Republic of the Congo are both abundant in diamonds, yet Botswana is the best performer in continental Africa in terms of democracy, stability, and rapid growth of income,\textsuperscript{17} while the Democratic Republic of the Congo is among the very worst.\textsuperscript{18}

The skeptics question the negative relationship even as a statistical generalization that holds on average. Delacroix (1977), Davis (1995), Herb (2005), and Alexeev and Conrad (2009) all find no statistical evidence of the natural resource curse.

Why do different studies come to opposite conclusions? In some cases, the explanation for different results may be that resource wealth may raise the level of

\textsuperscript{15} Cuddington (1989) and Arezki, Hamilton, and Kazimov (2011) show the correlation between commodity booms and spending booms.

\textsuperscript{16} Røed Larsen (2004). Norway is literally ranked number 1 out of 182 countries in the Human Development Index. In terms of real income, Norway is ranked number 5, just behind Qatar and the United Arab Emirates. For comparison, the United States is number 9 in real income, and 13 in the Human Development Index.

\textsuperscript{17} Engelbert (2000), Sarraf and Jiwanji (2001), Acemoglu, Johnson, and Robinson (2003), and Ilmi (2006) are among those noting Botswana’s conspicuous escape from the natural resource curse of its neighbors.

\textsuperscript{18} Most African countries grew more strongly in the years 2000 to 2010 than previously, in part due to rising mineral prices (Beny and Cook, 2009). But countries like the Democratic Republic of the Congo and Chad remain in the bottom 5 percent of countries in the Human Development Index. Oil-rich Nigeria ranks 142 out of 169 (UNDP, 2010).
per capita income while reducing or failing to raise the growth rate of income (or the end-of-sample level of income if the equation conditions on initial income) (Rodriguez and Sachs, 1999; Alexeev and Conrad, 2009). This is especially likely to make the difference if the data do not go back to a time before oil or minerals were discovered. Many researchers argue that the important question is whether the country already has good institutions at the time that oil or minerals are discovered, in which case it is more likely to be put to use for the national welfare instead of the welfare of an elite.19 Arezki and Van der Ploeg (2010, 2011) use instrumental variables to control for the endogenous component of institutional quality and trade; they confirm that the adverse effect of natural resources on growth is associated with exogenously poor institutions and, especially, that it is associated with exogenously low levels of trade.

The skeptics argue that “resource dependence” and commodity booms are not exogenous. In some cases, the crucial difference is whether natural resource intensity is measured by true endowments (natural resource wealth), or rather by exports (natural resource dependence). The skeptics argue that commodity exports are highly endogenous.20 In other words, oil wealth is not necessarily the cause and institutions are not necessarily the effect; it could be the other way around.

The endogeneity can arise in several different ways. Industrialization may determine commodity exports rather than the other way around. The reverse causality could explain the negative correlation—those countries that fail at manufacturing have a comparative advantage at commodity exports by default—or the reverse causality might have a positive sign: Good institutions and technological progress are just as useful for developing natural resources as they are for the other sectors of the economy, as the United States, Canada, Australia, and Chile have shown.21

POLICIES TO AVOID THE PITFALLS

The conclusion is not that natural resource wealth need necessarily lead to inferior economic or political development through any of these channels. It is best to view commodity abundance as a double-edged sword, with both benefits and dangers. It can be used for ill as easily as for good. That resource wealth does not in itself confer good economic performance is a striking enough phenomenon, without exaggerating the negative effects. The priority for any country should be

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19 Mehlum, Moene, and Torvik (2006); Robinson, Torvik, and Verdier (2006); McSherry (2006); Smith (2007); Collier and Goderis (2007); and Boschini, Pettersson, and Roine (2007). Bhattacharyya and Hodler (2009) find that natural resource rents lead to corruption, but only in the absence of high-quality democratic institutions.

20 Maloney (2002) and Wright and Czelusta (2003, 2004, 2006). Even recorded reserves, the most common measure of endowments, are somewhat endogenous as well, since they reflect discoveries, which in turn respond to both world prices and the productivity of the exploration industry, both globally and locally.

21 Norman (2009) points out that the discovery and development of oil is not purely exogenous, but rather is endogenous with respect to, among other things, the efficiency of the economy.
on identifying ways to sidestep the pitfalls that have afflicted other commodity producers in the past and to find the path of success.

Governments often adopt policies in the name of dealing with commodity price volatility that do not work or are actually harmful. These include commodity marketing boards, controls on exports, price controls, cartels, and bans on derivative markets. But some institutional innovations can help avoid the natural resource curse and achieve natural resource blessings instead.

Of eight particularly promising ideas, three seek to design contracts so as to spread risk efficiently; three are designed to make macroeconomic policy less procyclical, and two are intended to protect funds from waste or corruption:

1. Indexation of oil or mineral contracts to world prices of the commodity
2. Hedging of export proceeds on option markets, as Mexico has done
3. Denomination of debt in terms of the world price of the export commodity
4. Chile-style fiscal rules, which prescribe a structural budget surplus and use independent panels of experts to determine what long-term price of the export commodity should be assumed in forecasting the structural budget
5. An exchange rate policy that initially dampens upward pressure on the currency via sterilized intervention in the foreign exchange market and turns to currency appreciation only when the commodity boom has proved to be long lived or when inflation is no longer contained
6. An inflation target for the central bank that emphasizes product prices, rather than the consumer price index (CPI) on which the fashionable monetary regime of inflation targeting is usually based
7. Transparent commodity funds; Botswana’s “Pula Fund” is probably a better model than the frequently touted Norwegian Pension Fund because investments by the latter are subject to political influence
8. Lump sum, per capita distribution of oil or mineral revenues to make sure that they do not end up in the bank accounts of corrupt officials.

Let’s look at each of these in more detail.

Indexation of Contracts to World Prices

Contracts between producing countries and foreign mining companies are often plagued by “time inconsistency”: A price is set by contract, but later the world price goes up, and the government wants to renege. It does not want to give the company all the profits, and why should it? But this is a “repeated game.” The risk that the locals will renege makes foreign companies reluctant to do business in the first place. This limits the availability of capital to the country. The process of renegotiation can have large transaction costs, including interruptions in the export flow. Conversely, if the world price goes down, then the foreign firm may renege. The logical solution is indexation of the contracts: The two parties agree ahead of time, “If the world price goes up 10 percent, then the gains are split between the company and the government,” in some particular proportion.
Indexation shares the risks of gains and losses, without the costs of renegotiation or damage to a country’s reputation from reneging.

**Hedging of Export Proceeds on Options Markets**

Producers who sell their minerals on international spot markets are exposed to the risk that the dollar price will rise or fall. The producer can hedge the risk by selling that quantity on the forward or futures market. As with indexation of the contract price, hedging provides efficient sharing of risk and automatic adjustment to changes in world prices. Futures markets have one serious drawback from a bureaucratic or political point of view. If a government ministry hedges on the futures market, the minister receives no credit for having saved the country from disaster when the world price falls, but is excoriated for having sold out the national patrimony when the price rises. Better, then, is the hedging strategy employed by Mexico: It uses options to eliminate only the risk of a fall in the price of oil (Duclaud and García, 2011). In this way, it retains the upside risk while reducing the downside risk.

**Denomination of Debt in Terms of the World Price of the Export Commodity**

This is a proposal for those countries that are borrowers despite their commodity wealth. A copper producer should index its debt to the copper price. Then debt service obligations automatically rise and fall with the value of copper exports. Oil producers should index their debt in terms of oil, and so forth. Debt crises hit Mexico in 1982 and Ecuador, Indonesia, and Russia in 1998 when the dollar prices of their oil exports fell, and so their debt service ratios worsened abruptly. This would not have happened if their debts had been indexed to the oil price. Again, adjustment in the event of fluctuations in the oil price is automatic. This idea has been around for a long time but has virtually never been put into practice. Potential issuers worry that there is not enough demand for such bonds. One would think that airlines and utility companies would have a natural demand for oil bonds, electronic equipment manufacturers a natural demand for copper bonds, and so on. It must be that bonds denominated in a particular kind of oil and carrying the credit risk of a particular country are too specialized a niche to generate the necessary liquidity to make a viable market. But then the World Bank might be able to make the market: It would lend to interested oil-producing countries in terms of oil in place of lending to them in dollars and then offset its collective exposure to oil market conditions by selling to investors a bond denominated in a common oil price index.

**Chile-Style Fiscal Rules**

From 2000 to 2009, roughly one-third of developing countries managed to shift from the historic pattern of a procyclical fiscal policy to a countercyclical fiscal policy. The progress was particularly dramatic in the case of Chile: It ran large...
surpluses during the copper boom of 2003 to 2008 and was able to ease its fiscal policy substantially in the recession of 2009. This achievement was not solely the result of wise policymakers choosing the right policies. They were helped by an institutional framework that was put into place in 2000 and that can offer useful lessons for others (Frankel, 2011b; Frankel, Vegh, and Vuletin, 2011).

Chile’s fiscal institutions consist essentially of three rules. First, every government must set a budget target. Second, the target is phrased in structural terms: Deficits are allowed only to the extent that (1) output falls short of trend in a recession or (2) the price of copper is below its trend. The target for the structural budget surplus was set at zero in 2008 under President Bachelet, which implied a substantial actual surplus because the copper price was high and the economy was booming. Third, 10-year trends are projected by two panels of independent experts outside the political process. The result is that Chile avoids the pattern of 32 other governments, in which forecasts in booms are biased toward overoptimism. This is why Chile ran surpluses in the 2003 to 2007 boom. The United States and Europe failed to do so in part because their fiscal authorities made systematically overoptimistic forecasts during this period of expansion.

An Exchange Rate Policy That Responds to a Boom Initially by Accumulating Reserves and Then Turning Later to Currency Appreciation

One cannot prescribe an appropriate exchange rate regime without knowing a lot about a country. But for some countries that have been pursuing exchange rate targets of some sort, a sensible response to a natural resource export boom may run as follows. At the start, they continue to intervene in foreign exchange markets to dampen somewhat the upward pressure on the currency in the early stages of the booms while seeking to prevent the money supply from swelling (e.g., by raising reserve requirements on banks). The aim is to preserve the inflation-fighting credibility of the existing exchange rate anchor while also accumulating some foreign exchange reserves that would be useful in case of a reversal of fortune. (Another motive for accumulating reserves, if the central bank has political independence and the natural resource fund does not, is to leave the funds where they cannot easily be raided by politicians with short horizons.)

Subsequently, if the commodity boom has proved to be long lived or domestic inflation is no longer contained, allow gradual appreciation, thus accommodating the terms of trade shock when it turns out to be persistent, rather than trying to artificially suppress it. But then a country that gives up the exchange rate as the nominal anchor for its monetary policy will need a new one.

An Inflation Target for the Central Bank That Emphasizes Product Prices

Among the list of possible nominal anchors for monetary policy, inflation targeting has been the most popular alternative to exchange rate targeting over the last decade or two. For countries with terms of trade volatility, I have recently pro-
posed a new alternative called product price targeting (PPT) (Frankel, 2003, 2005, 2011a). The idea can be thought of as a modification of inflation targeting, with the important difference that the price index is output oriented rather than consumption oriented. The gross domestic product (GDP) deflator would do nicely, but it would be better to have a measure that is available monthly. The important point is that the index should give heavy weight to commodities that are produced for export, and should give little weight to commodities that are imported. The CPI does it the other way around.

Why is the difference important? On the one hand, if the export commodity is in the index, as under PPT, then monetary policy will automatically accommodate fluctuations in the export price: The currency appreciates when the world market for the export commodity is strong and depreciates when it is weak. This is a desirable property that CPI targeting unfortunately lacks. On the other hand, if the import commodity is in the index, as under CPI targeting, then the monetary policy reacts perversely to fluctuations in the import price: The currency appreciates when import prices are high and depreciates when they are low. This exacerbation of terms of trade fluctuations is an undesirable property that PPT fortunately lacks. Thus, PPT is less procyclical than CPI targeting.

One way to think of it is that PPT delivers the best of both worlds in the classic debate over exchange rate regimes: It accommodates terms of trade fluctuation as floating is supposed to do and yet at the same time provides a nominal anchor as exchange rate targeting and inflation targeting are supposed to do.

### Professionally Managed Commodity Funds

The proceeds of commodity exports should be used to establish transparent sovereign wealth funds in order to ensure that future generations share the bounty while investing in assets that earn a higher rate of return than the paltry return on U.S. Treasury bills (where most central bank reserves are held). Botswana’s Pula Fund, built on earnings from the sale of diamonds, is worth emulating. The fund, invested entirely in securities denominated in other currencies, serves both as a sinking fund to offset the depletion of diamonds and as a buffer to smooth economic fluctuations. Management of the Pula Fund is delegated to independent professionals with instructions to pursue only the financial interest of the people of Botswana, undistorted by any political goals. This makes it a better model for other resource-rich countries than the more widely touted petroleum fund of Norway.

### Lump Sum, Per Capita Distribution of Commodity Revenues

The Alaska Permanent Fund saves earnings from the state’s oil sector. Alaska state law says that the fund must distribute half of the investment earnings on an equal per capita basis. The theory is that the citizens know how to spend their money

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22 Broda (2004) supports the textbook proposition that floating exchange rates stabilize the economy relative to fixed rates in the presence of trade shocks.
better than their government does. Certainly, the system gives Alaskans a good reason to feel that they are full stakeholders in the fund. Sala-i-Martin and Subramanian (2003) suggest that Nigeria should similarly distribute its oil earnings on an equal per capita basis. Birdsall and Subramanian (2004) make the same proposal for Iraq, and Gelb and Majerowicz (2011) argue this for Uganda (Ross, 2007).

CONCLUSIONS

Much theoretical reasoning and statistical evidence suggests that possession of natural resources such as hydrocarbons, minerals, and perhaps agricultural endowments can confer negative effects on a country along with the benefits. This chapter has considered six channels whereby natural resources have been hypothesized to have negative effects on economic performance. The first, the Prebisch-Singer hypothesis of a negative long-term trend in commodity prices, is counteracted by theoretical arguments for a positive trend and empirical findings that there is no consistent trend either way. However, the other five channels each have some truth to them:

1. Commodity price volatility is high, which imposes risk and transaction costs.
2. Specialization in natural resources can be detrimental to growth if it crowds out the manufacturing sector and the latter is the locus of positive externalities.
3. Commodity endowments lead to autocratic and oligarchic institutions, characterized by corruption, inequality, class structure, and absence of rule of law.
4. Another possibility is anarchic institutions. Countries that are endowed with natural resources could have a proclivity for armed conflict. The absence of property rights can also exacerbate the incentive to deplete natural resource endowments too rapidly, leaving the country with little to show for them.
5. The Dutch disease, resulting from a commodity boom, entails real appreciation of the currency and increased government spending, both of which expand nontraded goods and service sectors, such as housing, and render noncommodity export sectors uncompetitive, such as manufacturers. If and when world commodity prices go back down, adjustment is difficult due to the legacy of bloated government spending and debt and a shrunk manufacturing sector.

It is clear that some resource-rich countries do surprisingly poorly economically, while others do well. I have noted examples of both sorts: Norway, Botswana, and Chile, which have done very well with their endowments (oil, diamonds, and copper, respectively), versus Sudan, Bolivia, and the Republic of the Congo, which have done much less well. The natural resource curse should not be interpreted as a rule that resource-rich countries are doomed to failure. The question is what policies to adopt to increase the chances of prospering. It is safe to say that
destruction or renunciation of resource endowments to avoid dangers such as the corruption of leaders will not be one of these policies. Even if such a drastic action would on average leave the country better off, which seems unlikely, who would be the policymaker to whom one would deliver such advice?

Finally, conclude with a list of ideas for institutions designed to address aspects of the resource curse and thereby increase the chance of economic success. Some of the ideas that most merit consideration by countries rich in oil or other natural resources are as follows.

1. In contracts with foreign purchases, include clauses for automatic adjustment of the price if world market conditions change.
2. Hedge export proceeds in commodity futures markets.
3. Denominate debt in terms of commodity prices.
4. To avoid excessive spending in boom times, allow deviations from a target surplus only in response to output gaps and long-lasting commodity price increases, as judged by independent panels of experts rather than politicians. Chile’s fiscal institutions are a model.
5. In response to an increase in world prices of the commodity, initially dampen nominal currency appreciation, adding to foreign exchange reserves. If the boom turns out to be longer lasting, allow more exchange rate flexibility, accommodating the shift in the terms of trade even though it means sacrificing the exchange rate as a nominal anchor for monetary policy.
6. If the new monetary anchor is to be inflation targeting, consider using as the target, in place of the standard CPI, a price measure that puts greater weight on the export commodity, such as an index of export prices or producer prices. I propose using PPT.
7. Commodity funds should be transparently and professionally run, with rules to govern the payout rate and with insulation of the managers from political pressure in their pursuit of the financial well-being of the country. Botswana’s Pula Fund is a model.
8. When spending oil wealth, consider lump sum distribution on an equal, per capita basis.

Needless to say, policies and institutions have to be tailored to local circumstances, country by country. But with good intentions and innovative thinking, there is no reason why resource-rich countries need fall prey to the curse.

REFERENCES


The Natural Resource Curse: A Survey of Diagnoses and Some Prescriptions


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INTRODUCTION

The problems created by abundant mineral wealth—commonly referred to as the natural resource curse—are mostly political, not economic. If low-income countries were governed by wise and benevolent technocrats, their resource wealth would be an unmitigated blessing. Yet many resource rich low-income countries suffer with greater frequency than similar countries without resource wealth from three notable problems—their governments are highly undemocratic, they face unusually frequent civil wars, and their bureaucracies have trouble investing their mineral revenues productively.

I argue elsewhere that these problems can be traced to the revenues that resource wealth produces for governments, particularly their massive scale, their non-tax source, their lack of stability, and their unusual secrecy. Although this chapter focuses on revenues from oil and natural gas, which account for over 90 percent of the world’s minerals trade, most of its arguments can also be applied to nonfuel mineral wealth. ¹

The next section of this chapter describes the growing importance of mineral exports in low-income countries. The third section explains in greater detail some of the qualities that make oil revenues particularly unusual and politically problematic. The final section discusses a menu of policies that would help states mitigate these problems.

¹ Ross (2012) provides a fuller version of the arguments presented here and illustrates many of them statistically.
THE RISING IMPORTANCE OF MINERAL WEALTH

Mineral wealth plays a critical role in the economies of many developing countries. In 2009, minerals (including petroleum) made up 64 percent of total merchandise exports in Africa, 68 percent in the Middle East, 62.9 percent in the Commonwealth of Independent States, and 38.9 percent in South and Central America. The fraction of merchandise trade composed of minerals has been relatively steady over the past 70 years, as is demonstrated in Figure 3.1 (World Trade Organization, 2010).

There is also good reason to believe that petroleum exports in particular will continue to be important in the coming decades. If today’s energy policies do not change, in the next 25 years, global demand for oil and other liquid fuels will rise by an estimated 28 percent, and the demand for natural gas will rise by about 44 percent. The United States is currently the world’s leading petroleum importer, but most of the new demand will come from developing countries, led by China and India (Energy Information Administration, 2010).

This rising demand will likely boost the role of low-income countries in the global energy trade. Historically, oil has been found in countries that are already financially well-off. Since the birth of the petroleum age in the mid-1900s, middle- and upper-income countries have been about 70 percent more likely to produce oil than low-income countries, not because they have access to more petroleum, but because they have more money to invest in locating and extracting it. Today, the rich democracies of North America and Europe have attracted about 10 times more foreign direct investment in mining per square kilometer than the rest of the world (see Figure 3.2).

Figure 3.1 Fuels and Metals as a Share of Total Merchandise Trade, 1955–2008

There are signs, however, that this is changing. Production in the member countries of the Organization of Petroleum Exporting Countries (OPEC) has been more or less flat since the 1970s. Thanks to booming oil prices, companies are increasingly willing to invest in low-income countries that they previously shunned. Since 2004, Belize, Brazil, Chad, East Timor, Mauritania, and Mozambique have all become petroleum exporters. In the next few years, at least 15 new countries, all of them relatively poor and most of them in Africa, have a good chance of joining this list. By 2015, as many as 20 countries in sub-Saharan Africa could be significant oil producers. In the next few decades, the vast majority of the world’s new hydrocarbon supplies will come from developing countries (Energy Information Administration, 2010).

This means that a flood of new revenue is just beginning to hit many of the world’s low-income countries. If there were no natural resource curse, then this would be spectacularly good news; it would be a historically unique opportunity

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Countries that have the potential to become new oil or gas exporters in coming years include Ghana, Guinea, Guinea-Bissau, Guyana, Kenya, Liberia, Mali, São Tomé and Príncipe, Senegal, Sierra Leone, Tanzania, Togo, and Uganda. Indonesia and Tunisia—former exporters that had become importers—may also once again become petroleum exporters.
for these countries to escape from poverty. Yet the low-income countries that most desperately need money are also the most likely to be struck by this curse. Unless their revenues are better managed, these windfalls could end up hurting, not helping, people who live on the petroleum frontier.

WHAT MAKES PETROLEUM REVENUES DIFFERENT?

Just as people are affected by the kinds of food they eat, governments are affected by the kinds of revenues they collect. Because most governments receive the same kinds of revenues year after year, it is easy to overlook their significance. Only when there is a sharp change in these revenues, such as when oil is discovered, does their underlying importance become clear.

The revenues that governments collect from their petroleum sectors are different from other kinds of revenues in four important ways. The first is their scale, which can be massive: On average, the governments of oil-producing countries are almost 50 percent larger (as a fraction of their country’s economy) than the governments of non-oil-producing countries. In low-income countries, the discovery of oil can set off an explosion in government finances: from 2001 to 2009, government expenditures rose by 600 percent in Azerbaijan and 800 percent in Equatorial Guinea.

Most governments worry about having too little revenue, not too much. But revenue booms can be surprisingly difficult for governments to invest productively. One reason is what might be called “bureaucratic overstretch,” which occurs when a government’s revenues expand more quickly than its capacity to efficiently manage them. The result can be a drop in the effectiveness of government investments, which Gelb and associates (1988) documented after the commodity booms of the 1970s.

The size of the revenues alone is not necessarily a problem; many peaceful, democratic European countries have bigger governments than many conflict-ridden, autocratic resource exporters. The source of these revenues are often what matters, because mineral-funded governments are not financed by taxes on their citizens, but by the sale of state-owned assets, that is, their country’s subsoil wealth. This helps explain why so many oil-producing countries are undemocratic—when governments are funded through taxes, they become more constrained by their citizens; when government are funded by oil, they become less susceptible to public pressure. It is also an important reason that mineral wealth can trigger civil wars by creating a strong incentive for resource-rich regions of low-income countries to establish sovereign governments. Table 3.1 lists 16 separatist conflicts that broke out in petroleum-rich territories between 1960 and 2006.

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3 Here and elsewhere, I define oil-producing countries as those that generate at least $100 per capita in income from oil and gas, using constant 2000 dollars. In 2009, there were 56 oil-producing countries that met this definition.

4 On the antidemocratic effects of petroleum wealth, see Ross (2001), Jensen and Wántchekon (2004), Aslaksen (2010), and Tsui (2011).

5 On the effects of natural resource wealth on civil war, see Collier and Hoeffler (2004), Fearon and Laitin (2003), Lujala (2009), and Ross (2004, 2006).
Other problems can be traced to the \textit{stability}, or rather, the instability, of mineral revenues. The volatility of world commodity prices and the rise and fall of a country’s mineral reserves can produce large fluctuations in the finances of resource-dependent countries. This financial instability saddles governments with revenue-smoothing tasks they have difficulty achieving and helps explain why they often find it hard to invest their resource wealth productively. Revenue instability also aggravates regional conflicts, making it harder for governments and rebels to settle their differences.

Volatility can hurt economic growth by creating uncertainty about the future, which in turn discourages private sector investment. Volatility is more harmful for low-income states than high-income ones, partly because their financial markets are less sophisticated and hence less able to help investors hedge against risks (Loayza and others, 2007). One recent study found that natural resource exports typically have a positive direct effect on growth, but a larger negative indirect effect due to the economic volatility they create (van der Ploeg and Poelhekke, 2009).

Volatility could also make it harder for governments to productively invest their resource revenues by shortening the government’s planning horizon, which would subvert major investment projects. Government officials who anticipate this problem may cope by avoiding long-term programs altogether and instead spend their funds quickly before they disappear.

Finally, the \textit{secrecy} of mining revenues compounds these problems. Governments often collude with international resource companies to conceal their transactions and use their own state-owned companies to hide both revenues and expenditures. Secrecy is a key reason why resource revenues are so commonly lost to

\begin{table}[h]
\centering
\begin{tabular}{llll}
\hline
\textbf{Country} & \textbf{Conflict Years} & \textbf{Country Income} & \textbf{Region} \\
\hline
Angola & 1975–2007 & $1,073 & Cabinda \\
China & 1991– & $422 & Xinjiang \\
India & 1990– & $317 & Assam \\
Indonesia & 1975–2005 & $303 & Aceh \\
Iran & 1966– & $1,053 & Kurdistan \\
Iraq & 1979–1980 & $1,747 & Arabistan \\
Nigeria & 1961– & $2,961 & Kurdistan \\
Pakistan & 2004– & $438 & Niger Delta \\
Pakistan & 1971 & $275 & Bangladesh \\
Russia & 1999–2001 & $1,613 & Chechnya \\
Sudan & 1983–2005 & $293 & South \\
Turkey & 1984– & $2,091 & Kurdistan \\
Yemen & 1994 & $443 & South \\
\hline
\end{tabular}
\caption{Separatist Conflicts in Oil-Producing Regions}
\end{table}

Source: Conflict data are drawn from Gleditsch and others (2002); income data are from World Bank, World Development Indicators.
Note: These are the separatist conflicts that broke out between 1960 and 2010 in which armed groups in oil-producing regions fought for independence. \textit{Country Income} is for the year the conflict began or the closest year for which data are available. Figures are in constant 2000 dollars per capita.
corruption; why resource-fueled autocrats can remain in power, by concealing evidence of their greed and incompetence; and why insurgents are often reluctant to lay down their arms because they distrust offers by the government to share their country’s mineral revenues more equitably.6

Mineral wealth has other troublesome qualities—the extraction process might create few direct benefits and many social and environmental problems for the surrounding communities; oil and gas facilities have large sunk costs, which makes them vulnerable to extortion; and when produced in large quantities, natural resource wealth can affect a country’s exchange rates and reduce the size of the manufacturing and agricultural sectors, which in turn can shut off economic opportunities for women.

But the most important political fact about mineral wealth, and the reason it leads to so much trouble in so many developing countries, is that the revenues it bestows on governments are unusually large, do not come from taxes, fluctuate unpredictably, and can be easily hidden.

**POLICY OPTIONS**

Oil revenues can lead to rapid economic growth, but they can also cause profound political and economic problems. Fortunately, much can be done to change these properties, such as limiting the size of these revenues, making them more stable and transparent, and even altering their source.

To reform their revenues, different countries need different kinds of policies; measures that are effective in some settings will be useless in others. Rather than suggest a “one-size-fits-all” solution, this section offers a menu of options for how countries can change the size, stability, secrecy, and even the source of their oil revenues.7

**REDUCING THE SIZE OF REVENUES**

Large oil revenues help autocrats stay in power, encourage rebellions, and tend to be squandered by overstretched bureaucracies. The first question for reformers

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6 The problem of oil revenue secrecy and the corruption it facilitates is not limited to low-income countries. In the mid-1990s, a series of audits revealed that France’s national oil company, Elf-Aquitaine, had been an important source of campaign finance for political parties, especially the Gaullist Rally for the Republic. Heilbrunn (2005, p. 277) explains, “Prosecutors uncovered evidence that a few managers at Elf had embezzled approximately 400 million Euros that they used to finance campaigns, bribe foreign politicians, and enrich themselves. In 2003 trials began for thirty-seven people implicated in the scandal. The scandal embroiled several former ministers and the French constitutional council’s president, as well as former German president Helmut Kohl, Gabonese president Omar Bongo, and Congolese president Denis Sassou-Nguesso.”

7 Beyond minimizing the negative political consequences of natural resources, countries should also try to maximize their positive economic consequences. Several recent books address this issue and can be read alongside the discussion below to provide a more complete roadmap of the challenges and opportunities that confront the oil states. See Collier (2010) and Humphreys, Sachs, and Stiglitz (2007).
should be whether it would be beneficial to decrease the size of these revenues. There are at least four ways to do this: (1) Leave it in the ground, (2) use barter contracts to directly trade the oil for public goods, (3) distribute the oil revenues directly to citizens, and (4) directly transfer a portion of the money to regional or local governments. The first two methods are more appropriate for low-income countries with weak bureaucracies, and the latter two are more likely to work in middle- and upper-income countries with more sophisticated bureaucracies.

For low-income countries, the first option is to leave the oil in the ground. Countries can also extract their petroleum more slowly so that revenues do not grow more quickly than the government’s capacity to spend them effectively or more quickly than civil society is able to monitor the activities of the rapidly growing government.

Since mineral wealth is a nonrenewable asset, extracting it produces a one-time cash windfall. If wisely invested, it can raise the living standards of future generations, but if squandered, it is lost forever. Leaving oil in the ground is like saving it in a bank; it will even earn “interest” since its value will rise over time as the rest of the world’s petroleum supplies are depleted.

Deferring the revenues produced by oil extraction admittedly carries a high opportunity cost, especially in low-income countries where people urgently need food, health services, and education. Paul Collier (2010, p. 37) points out that in the world’s poorest countries, which are home to the world’s “bottom billion” citizens, the extraction of natural resources can provide a unique opportunity for rapid economic growth; the failure of these states to harness their natural assets is “the single most important missed opportunity in economic development.”

This highlights the irony of oil wealth: The greater a country’s need for additional income (because it is poor and has a weak economy), the more likely its oil wealth will be misused or squandered. For low-income countries, the risks created by oil extraction are great, but so are the costs of leaving it in the ground. Limiting the pace of extraction will help limit the danger of an oil curse, but it is a decision that cannot be taken lightly.

The second approach is to use “barter contracts”: instead of selling their oil for cash, low-income countries can trade it directly for the public goods they would ultimately like to acquire. This may sound unorthodox, but a number of countries, including Angola, Nigeria, Zambia, and Zimbabwe, have already sold petroleum and other mineral rights to Chinese-owned consortia using barter-type deals; that is, instead of receiving royalties and taxes, these governments received promises of future infrastructure and services.

It has long been common practice for petroleum companies to support their operations in host countries by building ancillary facilities like housing for workers, roads, railways, and even ports. Barter contracts go further, stipulating that companies will pay host governments with unrelated projects and services instead of cash. In 2006, Nigeria signed contracts giving Chinese companies exploration licenses for four offshore blocs in exchange for US$4 billion in investment, including promises to build a new hydropower plant, rehabilitate a decrepit railroad,
and develop programs to combat malaria and avian flu. Angola has traded oil contracts for new roads, railroads, bridges, schools, hospitals, and a fiber-optic network (Vines, Weimer, and Campos, 2009). Although Chinese companies working in Africa have pioneered barter contracts, companies from India, Malaysia, and the Republic of Korea have made similar deals (Chan-Fishel and Lawson, 2007).

Economists are rightly skeptical about contracts like these that entail a process called “bundling,” in which one transaction (the purchase of exploration or extraction rights) is tied to a second transaction (the construction of roads and bridges). Sometimes companies use bundling to gain an advantage over competitors; for example, in 1998, the U.S. Department of Justice sued Microsoft for forcing purchasers of its Windows operating system to simultaneously purchase some of its less-desirable programs that were bundled into the same software.

Bundling can sometimes be beneficial if the costs of carrying out the transactions separately are prohibitive. Barter contracts might help low-capacity governments bypass the process of collecting the revenues (when much is lost to corruption), shuffling it among government agencies (where more can be lost), and reallocating the revenues to government projects (where even more is lost to corruption, patronage, and inefficiencies). They may also relieve governments of the need to smooth out revenue fluctuations, because revenue smoothing becomes the responsibility of the company; they can help draw foreign infrastructure companies into low-income countries, which the companies might otherwise shun out of fear they would not get paid; and they can help governments make hard-to-reverse commitments to long-term projects that might not otherwise be completed.

Barter contracts are a new phenomenon in the petroleum world, and so far their record is unimpressive. According to one report on Nigeria’s experience,

> It is clear that 2–3 years down the line, there is still nothing on the ground to show for the generous treatment given to the Asian National Oil Companies (in exchange for barter contracts). At the very least, all projects are on hold. There is a strong possibility that the deals in their entirety will be cancelled . . . the Yar’Adua government has concluded that the whole arrangement was compromised from the start by the absence of transparency and due process compounded by corruption. (Wong, 2008)

Still, it might be possible to find better ways to organize barter contracts; for example, they can be awarded through competitive bidding, in which companies must offer comparable projects so that the best offer is easier to identify, and compliance with the contracts could be more carefully monitored by reliable third-party agents, with strict anticorruption measures, full transparency, and close attention to the quality of the projects. Barter contracts are still in the experimental phase, however, and we do not know how well they can work.

The third strategy is to distribute the oil revenues directly to citizens. Both the U.S. state of Alaska and the Canadian province of Alberta use direct distribution. Of these two programs, the older one—the Alaska Permanent Fund—has been in place since 1977 and is widely considered a success. The fund receives about
one-fifth of the state’s oil revenues, along with other discretionary transfers from
the state budget, and annually distributes a share of the accrued interest to all
Alaskan citizens. In 2009, the dividend was worth about $1,300. It has grown so
popular that politicians “virtually fall over one another to demonstrate to the
public their efforts to defend the program” (Goldsmith, 2001, p. 5).

Some scholars argue that direct distribution funds could help developing
countries avoid at least some facets of the oil curse, as a fund would keep at least
part of the government’s petroleum revenues away from politicians who might
otherwise steal them or use them for political advantage; it could also help hedge
against price volatility if citizens can do a better job than governments of planning
ahead, and it might give citizens a powerful incentive to monitor their govern-
ment’s use of resource revenues, creating pressures against corruption and in favor
of wise stewardship. It would initially reduce the funding available for potentially
worthy government programs, but governments could always tax back a portion
of the distributed funds, which in turn might induce citizens to demand more
government accountability.8

Direct distribution might work in Alaska, but would it work in countries with
lower incomes and more easily corrupted state institutions? Governments in low-
income countries may lack the capacity to identify, and transfer cash to, eligible
citizens in a fraud-resistant manner. If the country’s financial system is not well
developed, citizens could have trouble saving their dividends for future use. It is
unclear how a fund would affect regional grievances, since those who live closer to
the oil’s source might demand a larger dividend, yet giving larger sums to people
in one region could also lead to excessive migration among dividend seekers.9

We should also be skeptical about policies that hinge on the creation of special-
ized funds, including direct distribution funds: Often their appeal depends on the
belief that they will do a better job than the rest of the government in shielding
resource revenues from misuse. But why should a direct distribution fund be bet-
ter managed and less corrupt than the rest of the government? What if the fund
is just as ineffective or fraudulent as the government that creates it? As Chapter 6
points out, specialized resource funds work better in theory than in practice.

The fourth way to shrink a government’s oil revenues is to directly transfer a
portion of the money to regional or local governments. Most of the oil-rich coun-
tries in the Middle East are unitary states and have fully centralized revenue
systems.10 Outside the Middle East, however, a growing number of oil and min-
eral exporters are dividing resource revenues between central and subnational
governments regardless of whether they are unitary states (Colombia, Ecuador,

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8 See Birdsall and Subramanian (2004), Sala-i-Martin and Subramanian (2003), and Moss and Young
9 Migration is not a problem in Alaska, partly because the annual dividends are relatively small—they
constitute about 6 percent of the average household’s total income—and partly because potential
immigrants are deterred by Alaska’s harsh winters and geographical remoteness. Direct distribution
might not work so well in California.
10 The United Arab Emirates is a notable exception.
and Kazakhstan) or federal states (Indonesia, Mexico, Nigeria, Russia, and Venezuela) (Ahmad and Mottu, 2003).

Subnational governments should be entitled to funds that compensate them for the social, environmental, and infrastructure costs they bear when hosting oil and gas projects. Revenue decentralization, however, goes beyond mitigating costs—it entails sharing the financial benefits of resource extraction with subnational governments.

There are two broad ways to do this: Countries can allow subnational governments to levy taxes directly on the petroleum industry, or they can distribute a fraction of the central government’s revenues to subnational governments according to some formula either before or after smoothing out year-to-year revenue fluctuations.

Revenue decentralization can be an effective way to reduce the size of the national government’s discretionary windfall and may even reduce the danger that people in the extractive region will seek independence. Yet there is no a priori reason to expect local governments to make better use of these funds than central governments; local governments can be just as corrupt, opaque, and incompetent as their national counterparts. They often have less capable bureaucracies, are less able to manage revenue volatility, and have worse fiscal discipline (Ahmad and Mottu, 2003; Brosio, 2003). Oil revenues can have the same antidemocratic effects in local governments that they have in national ones—fiscal decentralization has been linked to reduced accountability in both Argentina and Brazil and to less economic reform and less investment in Russia.\(^\text{12}\)

The decentralization of oil revenues is likely to work better in countries with subnational governments that are relatively democratic, transparent, and effective at managing their budgets. The success or failure of decentralization will also depend on how it is done; policymakers can devise revenue systems that tamp down fluctuations in the volatility of subnational revenues, insist that local governments use any oil revenues to complement, not substitute for, their existing tax base, make sure that new revenues are paired with expenditure responsibilities linked to the provision of public goods, and stipulate that all shared revenue must be fully transparent and regularly audited.\(^\text{13}\)

### CHANGING THE SOURCE OF REVENUES

If key elements of the oil curse can be traced back to the nationalizations of the 1960s and 1970s, perhaps they could be reversed by privatization. Privatization would change the source of the government’s oil revenues, replacing non-tax

\(^{11}\) Local and indigenous peoples who live in the extractive region deserve special attention; their concerns should be addressed before any new project begins.

\(^{12}\) On Argentina, see Gervasoni (2010); on Brazil, see Brollo and others (2010); and on Russia, see Desai, Freinkman, and Goldberg (2005).

\(^{13}\) For more specific recommendations, see Brosio (2003), Ahmad and Mottu (2003), and Ross (2007).
revenues from national oil companies with tax revenues from private sector (and usually international) oil companies. Would this make a difference?

Although many other kinds of state-owned enterprises were privatized in the 1980s and 1990s, full privatization has been relatively uncommon in the petroleum world; only the governments of the United Kingdom (1985), Romania (1992), Poland (1999), and Argentina (1999) have fully divested themselves of any ownership in what were previously national oil companies, and Argentina later renationalized some of its petroleum assets. Privatization advocates point to a mountain of evidence that state-owned enterprises are economically inefficient.14 Skeptics suggest national oil companies are different than other kinds of state-owned enterprises in ways that can make privatization difficult. They also argue that the size and financial sophistication of international oil companies makes them exceptionally tough for governments, especially in low-income countries, to tax and regulate (Stiglitz, 2007).

When it comes to regulating large oil companies, even the U.S. government has a dismal record. In 2010, after a series of sex and drug scandals, it dismantled its Minerals Management Service, and the catastrophic blowout of BP’s Deepwater Horizon drilling rig in the Gulf of Mexico revealed how poorly it was enforcing basic safety and environmental regulations. Privatization might only replace large, secretive, and unaccountable governments with large, secretive, and unaccountable private companies.

Privatization might have modestly prodemocratic effects, but it is important to first clarify what it would not achieve. It would not bring back the pre-1970 era of smaller and steadier oil revenues. Oil revenues were relatively small before the 1970s because world prices were low by historic standards as the discovery of new reserves outpaced the world’s still-modest demands and because international oil companies were able to keep a large fraction of the profits for themselves. Both conditions have changed, and privatization would not reverse them. If privatization led to a more efficient and hence profitable industry, it could even increase a government’s petroleum revenues.

Privatization would also not make oil prices more stable. Oil prices were unusually steady from the end of World War II to the early 1970s, thanks to both the price-setting oligopoly of the Seven Sisters and the Bretton Woods system of fixed exchange rates. Both fell apart in the 1960s and early 1970s, and privatization would not revive them.

Finally, privatization might not even cause oil-rich countries to adopt democracy-enhancing forms of taxation. In many low-income oil producers, privatization would only produce a modest shift toward taxes—most of these countries have national oil companies that work closely with international oil companies through joint ventures or production-sharing contracts and already collect much of their oil revenue from these companies in taxes, royalties, and other kinds of fees.

14 For example, see Dewenter and Malatesta (2001) and Eller, Hartley, and Medlock (2010).
Some middle-income countries, like Libya, Mexico, and Saudi Arabia, have national oil companies that manage their own facilities and rely far less on international companies; for them, privatization would lead to a much larger shift toward tax-based revenues. Yet remember, as already stated, taxes are a democratizing force only when they increase public recognition of the government’s revenues. Privatization in the oil sector might simply replace non-tax revenues with levies on a handful of large, often multinational corporations and hence would provide citizens with little direct information about the size of the government’s revenues.

Still, in some cases, full or partial privatization could boost democracy by making it harder for governments to hide their oil revenues. Many governments use their national oil companies to conceal their use (and misuse) of petroleum money. Full or partial privatization can help curtail this if the resulting companies are more transparent—for example, if they are publicly listed on stock exchanges that force them to disclose their balance sheets. Even if the government remains the majority shareholder in partially privatized oil companies, such as in Brazil, Colombia, Malaysia, and Norway, public listings can be a step toward greater revenue transparency.

Some governments will find other ways to hide their oil revenues, but this hardly nullifies the benefits of public listings.

**MAKING REVENUES LESS VOLATILE**

The instability of petroleum revenues hurts private sector investment, the government’s fiscal policies, and ultimately economic growth in the oil states. Many governments try to fix these problems by setting up stabilization funds, but these funds have a dismal track record: Governments so frequently violate their own rules about moving money in and out of these funds that their benefits seem to be negligible. Are there better ways for governments to stabilize their oil revenues?

Some of the policies already mentioned would affect revenue stability. Extracting oil at a slower pace would limit a government’s reliance on oil revenues, which in turn would reduce the impact of fluctuating oil prices on the government’s overall budget. Barter contracts, if properly designed, could shift the risk of price fluctuations from governments to companies, which are typically better at managing volatility. Direct distribution could also help by making households responsible for some of the income smoothing. The consequences of decentralization and privatization are less clear; much would depend on how they were structured.

Any stabilization plan needs three elements—a way to reduce government spending when prices are high, a way to increase spending when prices are low, and a mechanism to link the two so that the money removed from the budget during booms is matched by the money added to the budget during busts.

Stabilization funds combine all three elements in a way that is economically intelligent but politically inept. Their initial funding depends on politically altruistic, even suicidal, behavior by politicians who must cut spending during booms.
when the economy is strong and citizens believe they should not make sacrifices. Even if it receives money during a boom, the fund will only survive if every subsequent ruler exercises the same selfless restraint, leaving the surplus in place until it is needed during a bust. The fund might be managed by a nominally independent government agency that by law adheres to strict guidelines about deposits and withdrawals, but highly motivated politicians typically find ways to siphon off the surplus by changing the rules, replacing the people who oversee the fund, or simply borrowing money against the savings (Eifert, Gelb, and Tallroth, 2003). Even farsighted rulers can rarely bind their successors to a course of fiscal restraint.

Under some conditions, stabilization funds are more likely to work, such as when the government is run by a wise, politically insulated autocrat or, alternatively, by a democratically elected leader whose policies are subject to more checks and balances; when corruption is low; when the public is well informed and has confidence in the government’s policies; and in democracies, when voters are relatively unaffected by campaign spending. However, none of these conditions are easy to achieve.15

Alternatively, we can try to design stabilization mechanisms that are more compatible with the myopic incentives that typically drive politicians. Political leaders benefit when they can increase spending and are hurt when they must decrease it. Stabilization funds fail because the politically painful part of stabilization (diminished spending) is both voluntary and a necessary precondition for the politically beneficial part (increased spending). A better design would place the beneficial part first and make the painful part mandatory or, at least, more costly to avoid. Because increased spending would precede increased savings, the two pieces could not be connected by a stabilization fund, since funds can run surpluses but not deficits, but they could be connected by a loan.

Here is one way it might work. When oil prices are low, oil-producing governments could borrow money from foreign banks, governments, or international financial institutions to stabilize their budgets and stimulate their economies. In the past, oil states have used loans procyclically, for example, borrowing when prices were high instead of low, which makes their economies more, instead of less, volatile. To encourage countercyclical borrowing, the World Bank or other international financial institutions could have a special credit facility for resource-dependent countries that would make loans only when prices fell below some benchmark.

The key feature of these loans would be the way they are repaid, which would depend on the current price of oil. Governments would set aside the proceeds from a fixed number of barrels of oil each month to repay their creditor until the value of the loan was fully paid off. The value of the loan would not fluctuate, only the rate at which it is paid back: If prices stay low, the loan would be repaid slowly and cost the government relatively little in revenue foregone; if prices rose,

15William Ascher’s remarkable Bringing in the Future (2009) offers an inventory of more detailed strategies to foster long-range policymaking in politically challenging environments.
so would the value of the repayment barrels sold each month and, hence, the rate at which the loan is repaid. An oil-denominated loan, offered by a special facility only when prices are low, could both increase spending when revenues are scarce and reduce spending when revenues are abundant.

Unlike a stabilization fund, which can be robbed at any time by the government that established it, foreign loans are owned by foreign banks and governments, which makes defaulting on them costly. In fact, Angola has been using oil-denominated loans for decades with little fanfare (Vines, Weimer, and Campos, 2009). Although it pays a modest premium for these loans because the lender is assuming the cost of managing oil price volatility, it has found both commercial banks and foreign governments willing to make them.\footnote{Governments can use other devices to hedge against volatility: In 2008, the Mexican government paid US$1.5 billion to insure itself against falling oil prices; when prices fell in 2009, the treasury earned a US$5 billion windfall. Still, buying insurance against falling prices also entails new expenditures during a boom, which can be politically difficult. Also see Frankel’s (2010) discussion of debt obligations linked to commodity prices.}

In a country ruled by benevolent accountants, the problem of stabilization would be easy to solve. In the real world, stabilization plans are commonly rendered ineffective by the self-interested behavior of political leaders. Better institutional design could help make stabilization policies more sustainable politically and ultimately more effective.

**LIFTING THE SECRECY OF REVENUES**

Most of the oil world is hidden from public view. In many countries, little is known about the contracts that oil companies sign; the signing bonuses, taxes, royalties, fees, and other payments they make to governments; the operations of national oil companies; the flow of oil revenues within governments; and how these revenues are ultimately spent. This secrecy helps autocrats stay in power, impedes the resolution of oil-based civil wars, and makes it harder to stop corruption. Transparency alone cannot fix all of these problems, but it should help.

Recent studies suggest that when governments are more transparent, they are also likely to have less corruption, higher levels of human development, stronger fiscal discipline, and many other desirable qualities (Bellver and Kaufmann, 2005; Hameed, 2005). It is hard to know whether transparency is causing these outcomes, but most observers believe that on balance, transparency promotes better governance.\footnote{Fung, Graham, and Weil (2007). For a skeptical view, which sensibly argues that transparency needs to be complemented by other measures, see Kolstad and Wiig (2009).}

Even if the benefits of transparency are hard to measure, it has one great advantage. Most of the other policies discussed previously—from barter contracts through the use of oil-denominated loans—have the potential to do good, but they also carry some risk of backfiring. Transparency is cheap to implement and unlikely to do harm.
Transparency begins with the disclosure of information, but it does not end there: The information released by governments must be complete and accurate, which means it should be subjected to independent audits that themselves are made public, it must be made widely available at little or no cost, and it should be presented in a format that ordinary people can understand.

A free press and well-informed civil society groups are essential to turn publicly disclosed information into a meaningful tool for better resource governance. Even these groups may have trouble evaluating government documents and policies as many technical dimensions of resource management are known to industry insiders but not to the wider public. This makes public education an essential component of transparency.

In 2009, an international group of policy experts launched a Natural Resources Charter, which offers guidelines for citizens and governments that want to maximize the beneficial use of their country’s natural resources. It is not a binding document, but rather is a standard to which all countries, rich and poor, can aspire. The charter includes 12 core precepts that offer guidelines on a wide range of issues, including whether or not to extract resources, how to negotiate contracts, how to mitigate social and environmental costs, and how revenues should be used. By distilling and publicizing the best available knowledge, the charter is designed to both inform policymakers and help citizens evaluate whether their governments are abiding by internationally recognized principles and if not, what should be changed.\(^{18}\)

There has been a lot of progress on oil sector transparency since 2000 thanks to the remarkable work of nongovernment organizations (NGOs) in scores of resource-rich countries. The key groups include Global Witness, a London-based NGO that since the 1990s has called attention to the role of natural resources in conflict and corruption around the world; a global network of NGOs that sponsors a campaign called Publish What You Pay, which encourages companies in the extractive sector to reveal what they pay to governments and governments to disclose what they receive from these companies; and the Revenue Watch Institute, a nonprofit policy, research, and grant-making institute begun in 2002 that promotes the use of oil, gas, and mineral resources for the public good. In 2002, British Prime Minister Tony Blair launched the Extractive Industries Transparency Initiative (EITI) to encourage resource-rich countries to make their revenues fully transparent. In 2007, it became an independent, Oslo-based multi-stakeholder organization; by 2010, it had 30 member countries.\(^{19}\)

Despite these initiatives, much of the petroleum world is still shrouded in secrecy. Of the 30 countries that were members of the EITI in 2010, only three (Azerbaijan, Liberia, and Timor-Leste) were certified as “fully compliant” with the organization’s transparency standards. Six others (Angola, Bolivia, Chad, Equatorial Guinea, São Tomé and Príncipe, and Trinidad) had dropped out of the

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\(^{18}\) For more on the charter, see www.naturalresourcecharter.org.

\(^{19}\) For more on these groups, see www.globalwitness.org, www.publishwhatyoupay.org, www.revenue-watch.org, and www.eiti.org.
organization or were suspended for noncompliance. A 2010 Revenue Watch Institute study of 41 oil-, gas-, and mineral-producing countries, some of them EITI members, found that three-quarters of them provided only “partial” or “scant” information about their resource revenues.

Transparency in government spending can also help. Most resource-related transparency initiatives focus on how revenues are collected, not how they are spent. Unfortunately, some countries, like Azerbaijan, have become models of revenue transparency while keeping their expenditures opaque. A 2010 study found that 74 of 94 governments surveyed had national budgets that failed to meet basic standards of transparency and accountability. Oil- and gas-producing countries were among the most opaque: Algeria, Cameroon, Chad, Equatorial Guinea, Iraq, and Saudi Arabia published virtually no information about their budgets.\(^\text{20}\)

Expenditure transparency may be even more important than revenue transparency—the more citizens know about how their money is allocated, the less likely the funds will be lost to corruption. Thankfully, a growing number of NGOs in the developing world have taken up the cause of budget and spending transparency. According to the International Budget Partnership (2010),

- In India, Mazdoor Kisan Shakarti Sangathan, an organization of small farmers and workers, pieced together budget information to uncover corruption, such as falsified payrolls and payments for work never done.
- At the urging of the Uganda Debt Network, which monitors local spending, Ugandan officials identified substandard work in school construction and evidence of corruption by local officials.
- In the Philippines, an NGO called Government Watch has used budget information to monitor the delivery of school textbooks, the construction of new schools and other infrastructure, and the distribution of disaster relief funds. Working with other groups, its efforts have dramatically reduced the cost and improved the quality of textbooks and cut the number of “no-show” contractors who failed to deliver contracted books.\(^\text{21}\)

Despite much progress, the transparency movement has a lot of work ahead. Transparency cannot magically solve the problems of resource-rich countries, but it is probably the safest and simplest way to bring about improvements.

**CONCLUSION**

Many low-income countries are highly dependent on mineral revenues and will probably remain so for many years. To improve their politics and their economies, they must find better ways to manage these resources and the revenues they generate.

\(^{20}\)International Budget Partnership (2010); see the report at www.internationalbudget.org.

\(^{21}\)Also see Reinikka and Svennson (2004).
Geology is not destiny; mineral wealth can have perverse effects because the revenues it generates for governments are abnormally large, do not come from taxing citizens, fluctuate unpredictably, and are easy to conceal from public scrutiny. Most of these qualities can be changed, which would enable citizens in resource-rich countries to enjoy the full benefits of their countries’ natural wealth.

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CHAPTER 4

Commodity Price Volatility: Impact and Policy Challenges for Low-Income Countries

HUGH BREDENKAMP AND JULIA BERSCH

INTRODUCTION

The roller-coaster experience of recent years has highlighted the fact that commodity price fluctuations are an integral part of the global economy.\(^1\) During 2007 and the first half of 2008, global food prices rose by more than 50 percent and fuel prices doubled. Then, when the financial crisis hit in late 2008, these prices plummeted by 30 and 50 percent, respectively, before rising again sharply in late 2010 and early 2011 (Figure 4.1).

Commodity price volatility matters particularly for low-income countries.\(^2\) These countries are hit by large terms of trade shocks almost six times more often than advanced economies, reflecting in part LICs’ dependence on primary commodities.\(^3\) And the consequences of commodity price shocks are typically far more severe for LICs. The two recent shock episodes highlighted the powerful impact of such shocks on external and fiscal balances, inflation, and poverty in LICs.

It has long been recognized that commodity price volatility can create large swings in LICs’ external balances. The impact on an individual country depends on its trade structure—about one-third of LICs depend on commodities for more than half their exports. Of this group, nine countries are net oil exporters, while the majority of LICs are net importers of food, fuel, or both. As a result, commodity price movements create winners and losers, both within and across countries. If food prices increase, for example, food-exporting LICs benefit from higher export receipts, while food importers have to pay higher import bills. At the same time, in the food-exporting countries, farmers are likely to see their incomes increase, while the urban poor are likely to face a significant deterioration in their purchasing power.

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\(^2\)The set of low-income countries in this chapter includes all countries eligible for concessional financing from the IMF under the Poverty Reduction and Growth Trust, except for Somalia, which has been excluded due to lack of data.
\(^3\)For a detailed analysis of macroeconomic volatility in LICs, see IMF (2011a).
In addition to the impact on trade, global commodity price shocks tend to create strong inflationary pressures in most LICs. This is because food prices are highly correlated with other commodity prices, and food accounts for nearly half of the consumption basket in LICs compared to less than 20 percent in Organisation for Economic Co-operation and Development (OECD) member countries. Even if underlying inflation pressures are contained, high “headline” inflation rates can obscure this fact, putting central banks’ credibility at risk and complicating monetary policy (Figure 4.2).

As a result of the strong inflationary impact, global commodity price surges tend to squeeze real household income and can push millions of people into poverty. Moreover, they can create food security problems and distributional shifts, such as from urban populations to rural ones.

The potentially severe social consequences of higher food and fuel prices can trigger political pressures that prompt governments to take countervailing fiscal measures. Broad-based and poorly targeted measures, such as generalized subsidies, tax cuts, or public sector wage hikes, can be very costly to the budget and, more importantly, difficult to unwind. The impact on overall fiscal balances depends on the size of new spending on the one hand and the effect on fiscal revenues on the other hand. For resource-rich countries, fiscal revenues are highly volatile, as they tend to move together with commodity prices (IMF,
While periods of high global prices can boost revenues in these countries, such windfall gains can also lead to additional spending pressures that then may be difficult to unwind when commodity prices fall again. Not only are LICs far more exposed to global commodity price volatility than most advanced countries, but they also have fewer built-in smoothing mechanisms than other economies. Their tax systems tend to be less progressive, they typically lack well-developed social safety net systems (such as unemployment insurance), domestic credit markets are undeveloped (making it harder for producers and consumers to borrow during hard times), and they have more limited access to global capital markets. Many will try to compensate by holding high levels of international reserves to self-insure against shocks, but this can be a costly strategy.

The remainder of this chapter will analyze LICs’ vulnerabilities to commodity price shocks in the current macroeconomic context, assess the impact of a possible further surge in commodity prices, and discuss policy implications. We conclude by discussing some of the steps that countries can take to increase their resilience to external shocks and volatility.

**ASSESSING LICs’ VULNERABILITIES TO COMMODITY PRICE SHOCKS**

**Macroeconomic Context and the Recent Commodity Price Shocks**

LICs have been hit by a series of external shocks, starting with the surge in food and fuel prices in 2007 and 2008. As many countries were still coping with the fallout from those price shocks, the global financial crisis intervened, triggering a...
sharp fall in exports, remittances, and foreign direct investment, thereby reducing GDP growth across most LICs in 2009. The social consequences were severe—World Bank estimates suggested that an additional 64 million people were left in extreme poverty by the end of 2010.

Throughout this period of extreme turbulence, real GDP growth remained positive in per capita terms in most LICs in contrast to many advanced economies and emerging market countries. Thanks to greatly improved policy performance over the previous decade, LICs entered the global recession in 2009 with much stronger macroeconomic buffers against shocks than in the past. Compared with previous downturns, LICs started out with smaller fiscal and current account deficits, lower inflation, stronger international reserve coverage, and—thanks in part to debt relief—lower debt burdens. As a result, most LICs were able to maintain or even increase spending despite lower revenues, allowing fiscal deficits to widen. This countercyclical response helped to keep per capita growth rates positive in most LICs, while also boosting spending on critical investments and social measures to mitigate the impact on the poorest (IMF, 2010). Beginning in early 2010, a strong economic recovery got underway in most LICs, synchronized with the rest of the world and increasingly supported by demand from new middle-income trading partners (Figure 4.3).

In late 2010 and early 2011, LICs’ economies were again confronted with a surge in global commodity prices. The macroeconomic impact of the commodity price surge appears to have been more contained this time around. With some notable exceptions, the increase in inflation has been relatively limited in most LICs and less than expected based on historical pass-through. The modest uptick in inflation reflects, in some cases, good harvests and measures adopted to limit pass-through of international prices. Since LICs were still recovering from the crisis when the current commodity price shock hit, demand pressures were likely limited, further mitigating the inflationary impact. However, inflation has displayed substantial regional variation, partly explained by regional idiosyncrasies,
such as weather and differences in consumption baskets. The international price of rice, for example, did not rise as much as prices for other food staples, which may help explain why the inflationary impact in many Asian LICs was contained. By contrast, inflation has hit double-digit rates in a number of drought-afflicted East African countries.

In the most recent upturn, greater synchronization of price increases across various commodities has contributed to mitigate the impact of the price shock on the trade balance in many LICs. Although the current commodity price surge has been comparable in scale to the one seen in 2008, it has been more broad-based across commodities. Oil exporters have clearly benefited from higher export prices, while the current account balance of net oil importers has deteriorated, but by less than in 2008. For some countries, higher export prices for other commodities such as metals and agricultural raw materials have partially offset the negative impact on imports from higher food and/or fuel prices.

The majority of LICs took fiscal measures to mitigate the social impact of the commodity price shock. The cost for the budget is estimated to have been higher than in 2008, in part because several countries have not unwound measures taken during the previous episode of higher commodity prices. Nevertheless, the commodity price shock has had a substantial impact on poverty. The World Bank estimates that in low- and middle-income countries, about 44 million people were pushed into poverty in early 2011, compared to an estimate of 105 million during the 2008 episode (Ivanic, Martin, and Zaman, 2011).

Looking ahead, LICs face a highly uncertain global outlook with elevated downside risks. And they are now less well prepared to cope with another external shock than they were prior to the onset of the crises in 2007, as fiscal and external buffers are still well below their precrisis levels. Although the most pressing and imminent risk stems from another possible global downturn, commodity prices could stay at elevated levels over the medium term and may well spike further once confidence in the global recovery returns. The analysis of the impact of a further surge in commodity prices is discussed in the next section.

**Tail Risk Scenario of Another Commodity Price Shock**

As the world’s economies have become increasingly interconnected through trade and financial flows, shocks have begun to propagate more quickly and widely across the globe. This has led the IMF to step up its focus on the associated vulnerabilities and downside risks to its member countries. In this context, we have recently launched the first “vulnerability exercise” for LICs based on a set of new analytical tools to “connect the dots” between emerging risks in the global outlook, LIC-specific vulnerabilities, and their potential repercussions for policies.4

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4 The analytical framework developed to assess vulnerabilities and emerging risks from changes in the external environment is described in IMF (2011a). It focuses on LICs’ exposure to sharp growth slowdowns in the face of external shocks. The analysis presented here is based on IMF (2011d), which reports on the results of the first vulnerability exercise for LICs, which was conducted using this new framework.
We have used this framework to examine, among other risks, the possible implications of a further global shock to commodity prices.

Using market expectations embedded in commodity futures options, we have identified the shocks that could occur if commodity prices rose to levels in the top 7 percent of the expected probability distribution. Specifically, under this scenario, food prices are assumed to increase by 25 percent in 2011 and 31 percent in 2012 relative to our baseline forecast, fuel prices by 21 percent in 2011 and 48 percent in 2012, and metals prices by 21 percent in 2011 and 36 percent in 2012 (Figure 4.4). (These shocks are somewhat larger than those observed in 2007 to 2008 or 2010 to 2011.) The effects of these shocks were then simulated on a country-by-country basis, taking into account past shock episodes and countries’ different trade structures, sectoral employment, and consumption baskets. This permitted a country-specific analysis of the impact on growth, inflation, fiscal balances, public debt, trade balances, reserve coverage, and poverty.

The analysis shows that a further commodity price spike would not cause a major slump in growth, but the social implications would be substantial, owing mainly to higher inflation. Assuming that the pass-through from global to domestic prices follows historical patterns, inflation could double to about 16 percent in 2012 for the median LIC, driven mainly by higher food prices.³

³The analysis assumes that the pass-through from global to domestic prices follows historical patterns and that, as in the past, only mild countervailing monetary policy actions are taken.
This inflation burst would likely put pressure on governments to pursue mitigating fiscal measures; consequently, fiscal balances could deteriorate by almost 1 percent of GDP, reflecting existing policy measures (such as fuel subsidies) and possible adoption of new measures (such as tax breaks, transfers, or subsidies).  

Using data on household income distribution and consumption baskets, we estimate that an additional 31 million people would be pushed into poverty under this scenario. About half of the increase in poverty would be in sub-Saharan Africa, reflecting the large population that clusters near the poverty line.

The consequences for the external balances would also be substantial. Current account deficits would widen by almost 3 percent of GDP for the median LIC. Although food prices have a larger impact on inflation than fuel prices, the opposite is true for the trade balance. Only commodity exporters, oil exporters in particular, would benefit from higher prices on balance. For noncommodity-exporting LICs, international reserves would fall, reducing the median import coverage to just over three months of imports (Figure 4.5). Under this scenario, additional external financing needs could reach US$9 billion in 2012 for LICs experiencing a negative terms of trade shock. Though much of the additional financing needs would be accounted for by a small number of large noncommodity exporters, about half of the countries negatively affected by the shock would face additional financing needs amounting to more than 2 percent of GDP in median terms.

On balance, some LICs, notably commodity exporters, would have reserve cushions and fiscal room for maneuver that would allow them to absorb, possibly fully, the impact of this shock without jeopardizing macroeconomic sustainability. Many others have partial policy space to preserve spending but may need to take actions to safeguard or eventually rebuild macroeconomic buffers after a shock. About 15 percent of LICs have fiscal and external buffers that are already quite constrained under the baseline scenario.

**Policy Responses to Commodity Price Shocks**

External volatility and, in particular, commodity price volatility complicate the conduct of fiscal and monetary policy in several ways.

In the face of increases in global commodity prices, the standard “first-best” policy advice is to pass the higher prices on to consumers while supporting the most vulnerable through well-targeted social safety net systems. This approach can prove difficult to implement in practice, however. First, political pressures on governments to provide relief do not come only from the poor. In many LICs, food and fuel prices have significant effects on household budgets even for higher income groups (see Figure 4.6). Second, LICs typically do not have established systems for providing targeted support to vulnerable groups. As a result, governments are often tempted to fall back on broad-based subsidies that are inefficient and financially unsustainable.

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6 We assume that for each percentage-point rise in oil and food prices, countries adopt similar fiscal countermeasures to those seen during the 2007–08 episode.
Another Commodity Price Shock Could Severely Erode Fiscal Room for Maneuver and Reduce the Median Reserve Coverage to about Three Months of Imports

Sources: IMF, World Economic Outlook; and IMF staff estimates.

Note: The illustrative fiscal space measure is calculated as the difference between the baseline 2012 primary balance and the constant primary balance that is needed to achieve a target public debt-to-GDP ratio of 40 percent in 2030. Simulation of fiscal space and the reserve coverage ratio after an increase in global food, metals (except gold and uranium), and fuel prices (by 31, 36, and 48 percent, respectively), relative to the 2012 World Economic Outlook baseline.
The challenge, then, especially for countries with limited fiscal space, is to find pragmatic solutions that are cost-effective. A number of countries made successful strides in that direction during the 2007–08 commodity price shocks. Specific measures adopted have included (1) well-targeted commodity price subsidies, such as the ring-fenced import duty exemptions for diesel in Liberia; (2) agricultural input subsidies, in the case of food price shocks, to stimulate domestic production, such as those used in Malawi to increase maize production; (3) ad hoc social support schemes, such as food voucher programs with proxy means testing in Burkina Faso, school-based feeding schemes and “job for food” programs in Sierra Leone, and conditional cash transfer programs targeting vulnerable groups in Ghana and Kenya; and (4) import tariff reductions on selected items consumed mainly by the poor, which provide relief while limiting the revenue loss, such as that on kerosene in Senegal.

Commodity price volatility also poses great challenges for monetary policy, particularly in LICs where the frequency of external shocks is high and their direct impact on domestic inflation is large. Commodity price shocks put policymakers in the difficult position of having to choose between accommodating higher domestic inflation, potentially undermining central bank credibility, and tightening policies, which could exacerbate the negative economic impact of the price shock (Figure 4.7).

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7 “Proxy means testing” refers to the practice of using household characteristics to identify the poor or vulnerable, rather than trying to measure income directly.
Commodity Price Volatility: Impact and Policy Challenges for Low-Income Countries

The standard policy advice, which is to accommodate the direct impact of commodity price shocks while counteracting potential second-round inflation pressures, is even less straightforward in LICs than in other countries. This is in part because the first-round effects of higher commodity prices on inflation are usually much greater than in more advanced economies, reflecting the large share of food in the consumption baskets in LICs. The good news is, however, that second-round effects appear to be less of a concern in LICs than in more advanced economies. The evidence suggests that inflation inertia is relatively low in LICs and, hence, that the impact of shocks on inflation may dissipate relatively quickly. This may in part reflect the fact that wage indexation and bargaining mechanisms are less prevalent in LICs than in other countries. Hence, while an accommodative monetary policy stance would be associated with high inflation volatility, it is unlikely to lead to persistent inflation problems.

Nevertheless, countries that have limited reserve cushions and/or high inflation prior to an adverse external price shock may not have the luxury to accommodate the price effect fully. Doing so would aggravate the pressures on the balance of payments, potentially threatening international reserves, and could jeopardize the credibility of their anti-inflation stance. Noncommodity exporters with limited reserves or high inflation may also face difficult choices in determining the appropriate exchange rate policy, as depreciation may be needed to safeguard reserves, but would aggravate inflationary pressures. In short, although some LICs

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Figure 4.7 There Is a Strong Direct Impact from Global Food Prices on Domestic Inflation, while Second-Round Effects Are Relatively Limited

Sources: IMF, World Economic Outlook; and IMF staff estimates.

Note: Full pass-through is calculated as the sum of estimated coefficients for contemporaneous and lagged change in global prices divided by (1 – coefficient of lagged inflation).

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6See IMF (2011d) and references therein.
may be able to follow the textbook monetary policy advice and accommodate external price shocks, others may need to tighten policies in support of external and price stability when the shock hits.

HOW TO INCREASE RESILIENCE

Although coping well with shocks ex post is important, there are also steps that countries can take ex ante to reduce their exposure or create space for more robust responses in the face of future volatility.

Most importantly, LICs can build up stronger policy buffers during good times by moderating deficits and debt when growth is strong or terms of trade are in their favor and by gradually building up comfortable foreign exchange reserve cushions. As earlier IMF work has shown, those LICs that had more comfortable macroeconomic buffers prior to the global crisis were able to pursue a more forceful countercyclical response than countries that had weaker buffers, with larger increases in real spending (see Figure 4.8).  

Rebuilding macroeconomic buffers has an opportunity cost, of course—resources set aside cannot be used to meet the many immediate development needs that countries face. There are a number of ways to mitigate this difficult trade-off, however, by creating additional policy space over the medium to long term.

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9For more on this topic, see IMF (2010, 2011d).
First, LICs can make their budgets more structurally robust by strengthening domestic revenues and improving their systems for managing public spending and debt. This could be done, for example, by strengthening customs and tax administrations and introducing simple, broad-based value-added taxes. Furthermore, by carefully selecting and prioritizing public investment projects, countries’ objectives in key areas such as core infrastructure, health, and education can be achieved at lower budgetary costs (IMF, 2011b).

Second, LICs can put in place more flexible and robust social safety net systems, rather than scrambling to take ad hoc measures after a shock hits, so that transfers can be channeled promptly and in a more cost-effective manner to vulnerable groups adversely affected by shocks (Gupta and others, 2007; Coady and others, 2010).

Third, over the longer term, LICs can pursue reforms to encourage domestic savings and deepen their financial sectors, which could make it easier for both the public and private sectors to finance themselves through periods of temporary turbulence.

Fourth, LICs should also explore policies that would encourage greater diversification in an economy’s production and exports so that price volatility, particularly in products, becomes less disruptive.

Finally, countries need not rely solely on “self-protection” or “self-insurance”—they can seek support from others, including international financial institutions (IFIs) like the IMF and the World Bank, but also from financial markets. IFIs have done a lot in recent years to provide more predictable and quick-disbursing financial assistance to countries hit by shocks. At the IMF, we continue to look for further reforms in this direction. A recent study by the World Bank and IMF has also explored the potential for greater use by LICs of market-hedging products, disaster insurance, and debt instruments with shock-contingent repayment terms (IMF, 2011c). These kinds of tools have been used very little by LICs so far, and there is scope for the international community to help facilitate their deployment on a wider scale. Such efforts would complement the coordinated international initiatives already underway to improve the transparency and functioning of global commodity markets, which seek to foster greater price stability for basic products that are critical to the livelihoods of people throughout the developing world.

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PART II

Macroeconomic Policy Options for Low-Income Countries
CHAPTER 5

How Should Emerging Market and Low-Income Country Central Banks Respond to Commodity Price Shocks?

RAHUL ANAND AND ESWAR S. PRASAD

INTRODUCTION

Over the last two decades, inflation targeting (IT)—in either an explicit or an implicit form—has become the monetary policy framework of choice for most advanced economies. A number of emerging market central banks have also adopted frameworks in which their priority is to maintain inflation at a target level or within a specified range. Many others have been moving toward such a system, and central banks in many low-income countries are considering the suitability of such monetary frameworks in their own institutional settings.

IT has a good track record of delivering price stability and anchoring inflation expectations. This has proven valuable in emerging markets, where high inflation is especially pernicious, as it hits the poor hard. Similar considerations are relevant for LICs. Even as its popularity has spread, however, IT has come under sharp attack in the aftermath of the global financial crisis. Central bankers in advanced economies are being pilloried for focusing too much on price stability, ignoring asset market bubbles, and failing to prevent the worst crisis seen for a generation. Many emerging markets and LICs have weathered the crisis relatively well, but those central banks among the group that target inflation also face pressure to abandon that framework. Critics argue that targeting inflation could be damaging in these economies if it means disregarding sharp exchange rate fluctuations and boom-bust cycles in equity and housing markets.

It has been argued that a narrow version of IT could pose risks if it implies that potential asset bubbles are ignored by central banks. The emerging consensus appears to be that the IT framework has delivered price stability and should be retained but that central banks should use prudential regulation and other policy tools to counteract asset price bubbles (Committee on International Economic
and Policy Reform and others, 2011). Whether or not IT is the chosen framework, central banks around the world view low and stable inflation as a primary, if not dominant, objective of monetary policy.

Even in this narrow context, academic work is only now beginning to grapple with the particular challenges facing emerging markets and LICs. For instance, the question of what price index an inflation-targeting central bank should target is based on very different considerations in low- and middle-income countries relative to advanced economies. In the former group, food expenditures account for nearly half of total household expenditures, and a large proportion of the population works in a cash economy with little access to the formal financial system. Prices for most goods and services do tend to have some rigidity, so the relative flexibility of food prices has important implications for optimal monetary policy frameworks in economies in which food expenditures constitute a large share of the average household’s consumption basket.

In this chapter, we address the question of how emerging market and LIC central banks should deal with the volatility of food prices or, more broadly, commodity prices. The key characteristic of commodity prices that is relevant from a monetary policy perspective is that these prices tend to be volatile and not sticky. In the subsequent discussion, we will focus on food prices, although the analytical arguments are relevant for prices of fuel and other commodities for final consumption.

Based on our earlier research (Anand and Prasad, 2010), which we summarize in this chapter, we argue that it is untenable for central banks in low- and middle-income countries to target just core inflation excluding food and energy prices, which is a strong implication of classical theoretical models. Intuitively, this is because food price increases feed through into broader wage pressures and inflationary expectations if food is a significant share of overall consumption expenditures. More generally, our research has demonstrated that the classical result of core IT relies heavily on the assumption of complete markets. When a significant share of the population in an economy is credit constrained, then monetary policy can improve welfare by targeting headline, rather than core, inflation.

In this chapter, we do not deal with a broader set of questions about the right level of inflation that should be targeted in emerging markets or the trade-offs between higher inflation and stronger exchange rates in dealing with pressures for real exchange rate appreciation (Blanchard, Dell’Ariccia, and Mauro, 2010). Those are important strategic issues that are beyond the scope of this research.

**LITERATURE REVIEW**

In the literature, the choice of price index has been guided by the idea that inflation is a monetary phenomenon. For instance, Wynne (1999) argues that core inflation (excluding food, energy, and other volatile components from headline CPI) is the most appropriate measure of inflation. The logic is that fluctuations in food and energy prices represent supply shocks and are nonmonetary in nature. Because these shocks are transitory and volatile and do not reflect changes in the underlying rate of inflation, they should not be a part of the IT price index (Mishkin, 2007, 2008).
Previous researchers have used models with price and/or wage stickiness to show that the choice of the core price index is consistent with a welfare maximization objective. Existing models have looked at complete market settings in which price stickiness is the only source of distortion (besides monopoly power). Infrequent price adjustments cause markups to fluctuate and also distort relative prices. To restore the flexible price equilibrium, central banks should try to minimize these fluctuations by targeting sticky prices (Goodfriend and King, 1997, 2001). Using a variant of a New Keynesian model, Aoki (2001) has shown that under complete markets, targeting inflation in the sticky price sector leads to welfare maximization and macroeconomic stability. Targeting core inflation is equivalent to stabilizing the aggregate output gap, as output and inflation move in the same direction under complete markets.

However, recent research has shown that food inflation and core inflation have very different features in advanced and developing economies. Walsh (2011) found that the behavior of the two inflation indices differs in three key respects when one compares advanced with developing economies:

1. The difference between long-run average food and nonfood inflation, which tends to be small in advanced economies, can be quite large in poor countries;
2. Food price shocks are much more persistent in developing economies than advanced economies; and
3. Although the second-round effects of high food inflation are generally small and quickly reversed in rich countries, in poorer countries they are often not reversed and can have a significant impact on nonfood prices.

Similar results have been reported by Mishra and Roy (2011) using Indian data.

Moreover, appropriateness of the core price index in standard models relies heavily on the assumption that markets are complete (allowing households to fully insure against idiosyncratic risks) so that the central bank only needs to tackle the distortions created by price stickiness. However, there is compelling evidence that not all agents in the economy may be able to smooth their consumption (Campbell and Mankiw, 1989, 1990, 1991). This observation is also consistent with the findings of a number of studies rejecting the permanent-income hypothesis. It has been shown that in the presence of credit-constrained consumers, policymakers’ welfare objectives are altered and the Taylor rule becomes too weak a criterion for stability (Amato and Laubach, 2003; Gali, Lopez-Salido, and Valles, 2004).

**SOME BASIC FACTS**

There are some key features of emerging markets and LICs that a model needs to contain to be relevant for this group of economies. These include a high share of food expenditures in total consumption expenditures of the average household, low price and income elasticities of the demand for food, and financial frictions.
Countries with lower per capita income levels typically have a higher share of expenditure on food in total household expenditure. To examine how emerging markets differ from advanced countries, in Table 5.1 we present recent data on shares of food expenditure in total expenditure for selected emerging markets and advanced economies. As expected, expenditure on food constitutes a much larger share of total household expenditure in emerging markets relative to advanced economies. Indeed, Figure 5.1 shows that, for example, food expenditure represents on average less than 5 percent of total household expenditure in the United States but about 70 percent in Tajikistan.

We present the income elasticity of food and the Slutsky own-price elasticity of food for selected emerging markets and advanced economies in Table 5.2. The income elasticity of food in emerging markets is on average twice that in advanced
TABLE 5.2

Income (Expenditure) Elasticity and Slutsky Own-Price Elasticity of Food, 1996

<table>
<thead>
<tr>
<th>Emerging economies</th>
<th>Income elasticity</th>
<th>Price elasticity</th>
<th>Advanced economies</th>
<th>Income elasticity</th>
<th>Price elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>0.79</td>
<td>−0.32</td>
<td>Singapore</td>
<td>0.42</td>
<td>−0.31</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.73</td>
<td>−0.37</td>
<td>New Zealand</td>
<td>0.39</td>
<td>−0.29</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>0.73</td>
<td>−0.37</td>
<td>Finland</td>
<td>0.39</td>
<td>−0.29</td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.72</td>
<td>−0.38</td>
<td>Sweden</td>
<td>0.36</td>
<td>−0.27</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>0.70</td>
<td>−0.39</td>
<td>Netherlands</td>
<td>0.36</td>
<td>−0.27</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.69</td>
<td>−0.39</td>
<td>France</td>
<td>0.33</td>
<td>−0.25</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.66</td>
<td>−0.39</td>
<td>United Kingdom</td>
<td>0.33</td>
<td>−0.25</td>
</tr>
<tr>
<td>Peru</td>
<td>0.66</td>
<td>−0.39</td>
<td>Belgium</td>
<td>0.33</td>
<td>−0.25</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.65</td>
<td>−0.39</td>
<td>Italy</td>
<td>0.32</td>
<td>−0.24</td>
</tr>
<tr>
<td>Venezuela</td>
<td>0.65</td>
<td>−0.39</td>
<td>Norway</td>
<td>0.32</td>
<td>−0.24</td>
</tr>
<tr>
<td>Egypt</td>
<td>0.64</td>
<td>−0.39</td>
<td>Germany</td>
<td>0.31</td>
<td>−0.23</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.62</td>
<td>−0.39</td>
<td>Australia</td>
<td>0.30</td>
<td>−0.23</td>
</tr>
<tr>
<td>Russia</td>
<td>0.62</td>
<td>−0.39</td>
<td>Japan</td>
<td>0.29</td>
<td>−0.22</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.61</td>
<td>−0.39</td>
<td>Canada</td>
<td>0.28</td>
<td>−0.22</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.59</td>
<td>−0.38</td>
<td>Switzerland</td>
<td>0.26</td>
<td>−0.20</td>
</tr>
<tr>
<td>Chile</td>
<td>0.59</td>
<td>−0.38</td>
<td>Denmark</td>
<td>0.25</td>
<td>−0.19</td>
</tr>
<tr>
<td>Poland</td>
<td>0.58</td>
<td>−0.38</td>
<td>United States</td>
<td>0.10</td>
<td>−0.08</td>
</tr>
</tbody>
</table>

Average 0.66 −0.38 Average 0.31 −0.22

Sources: U.S. Department of Agriculture, Economic Research Service, International Food Consumption Patterns Dataset; and World Bank, World Development Indicators.

Note: These country-specific income elasticity values represent the estimated percentage change in demand for food if total income increases by 1 percent (keeping real income constant). Food includes food prepared at home and consumed plus beverages and tobacco.

economies. The price elasticity of food is low. As the share of expenditure on food is high in emerging markets, the price elasticity of food is higher in these economies relative to advanced economies. However, the overall value of the price elasticity of food is much lower than what is used in the literature on IT. Low price and income elasticities of the demand for food have considerable significance for the choice of price index.

To examine the extent of credit constraints in emerging markets, in Table 5.3 we present data on the percentage of the adult population with access to formal finance (the share of the population using financial services) in emerging markets and advanced economies. On average, more than half of the population in emerging markets lacks access to the formal financial system.

Low price and income elasticities of food and low income levels make the welfare of agents in emerging markets more sensitive to fluctuations in food prices. These features imply that agents may factor in food price inflation while bargaining over wages. Through this channel, food price inflation feeds into inflation expectations. Thus, in emerging markets, even inflation-expectation-targeting central banks have to be concerned about food price inflation. When markets are not complete and agents differ in their ability to smooth consumption, their welfare depends on the nature of idiosyncratic shocks. Thus, the presence of credit-constrained consumers who are unable to use financial markets to intertemporally smooth consumption in response to shocks also has implications for monetary policy.
How Should Central Banks Respond to Commodity Price Shocks?

The Model

In this section, we sketch the main details of a model that we use to investigate the welfare implications of different monetary policy rules and then briefly discuss the key results (for more details, see Anand and Prasad, 2010). Our model builds upon a large literature that has developed and analyzed dynamic sticky price models (Woodford, 1996; Rotemberg and Woodford, 1997, 1999; Clarida, Gali, and Gertler, 1999; Aoki, 2001). The model is rendered more realistic by incorporating two features that are relevant to all economies but are particularly important for emerging markets—a fraction of consumers who are credit constrained and a subsistence level of food consumption.

The model has two sectors and two goods—one type of flexible price good (i.e., food), whose prices adjust instantaneously, and a continuum of monopolistically produced sticky price goods (i.e., nonfood), whose prices adjust sluggishly. In the subsequent discussion, we interchangeably use the term food sector for the flexible price sector and the term nonfood sector for the sticky price sector.

The economy is populated by a continuum of $1 + \lambda$ infinitely lived households, where $\lambda > 0$ is the continuum of households in the flexible price sector (food sector). Each household owns a firm and produces one good. Households provide labor to the firms in their respective sector (we assume that labor is immobile across sectors) and consume both the flexible price good (food) and all of the differentiated sticky price goods (nonfood). The representative consumer, $i$, is indexed by $f$ (flexible price sector) and $s$ (sticky price sector). Household $i$ maximizes the discounted stream of utility

$$E_0 \sum_{t=0}^{\infty} \beta^t u(C_t^i, N_t^i),$$

(5.1)
where \( \beta \in (0,1) \) is the discount factor. The utility function takes the form

\[
u(C_i^t, N_i^t) = \frac{(C_i^t)^{1-\sigma}}{1-\sigma} - \frac{(N_i^t)^{1+\psi}}{1+\psi},
\]

where the argument \( C_i^t \) is the composite consumption index of household \( i \) in period \( t \). \( C_i^t \) includes the flexible price good and the entire continuum of the differentiated goods. It is defined as

\[
C_i^t = \left[ \gamma \eta \left( C_{f,t}^i - C^* \right)^{1-\eta} + (1-\gamma) \eta (C_{f,t}^i)^{1-\eta} \right]^{\frac{1}{1-\eta}},
\]

where

\[
C_{f,t}^i = \int_0^1 c_i^t(z) \theta(z) \ dz
\]

The elasticity of substitution between the flexible price and sticky price goods is given by \( \eta \in [0,\infty] \), and \( \gamma \in [0,1] \) is the weight on food in the consumption index. The parameter \( \theta > 1 \) is the elasticity of substitution between any two differentiated goods, \( N_i^t \) is the aggregate labor supplied by household \( i \) in period \( t \), and \( \sigma \) is the risk aversion factor (inverse of elasticity of intertemporal substitution). The parameter \( \psi \) is the inverse of Frisch elasticity, and \( \phi_a \) is a scaling factor.

Because food is a necessity, households must consume a minimum amount \( C^* \) of food for survival. We assume that all households always have enough income to buy the subsistence level of food. Even though the subsistence-level food consumption does not bind, it plays a vital role by altering the elasticity of substitution between food and nonfood and the marginal utility of food and nonfood consumption.

Households in the flexible price sector (food sector) do not have access to financial markets, and they consume their wage income in each period. So these households are akin to the “rule of thumb” consumers. Each household in the sector owns one firm and produces food by linear technology in labor. Because we are interested in analyzing the effects of sector-specific shocks rather than household-level idiosyncratic shocks, we assume that all the households in the food sector face the same shock.

Households in the sticky price (nonfood) sector can buy one-period nominal bonds and smooth their consumption. Each household owns a firm and provides labor to each firm in the sector. They hold one share in each firm of the sector, where each firm uses a linear technology in labor. We assume that all households in the nonfood sector face an identical shock process.

Firms in the flexible price sector are assumed to be price takers. We follow Calvo (1983) and Woodford (1996) in modeling price stickiness by assuming
that a fraction of firms in the sticky price sector cannot change their price in each period.

We assume that the monetary authority sets the short-term nominal interest rate \( (R_t) \) according to a simple Taylor (1993)–type rule of the following form:

\[
\log(R_t / \bar{R}) = \rho_i \log(R_{t-1} / \bar{R}) + \rho_n \log(\Pi_t / \bar{\Pi}) + \rho_y \log(Y_t / \bar{Y}), \tag{5.5}
\]

where \( \bar{Y}, \bar{\Pi}, \) and \( \bar{R} \) are the steady-state values of output, inflation, and the nominal interest rate, respectively. The term \( \rho_i \) represents the central banker’s preference for interest rate smoothing; \( \rho_n \) and \( \rho_y \) are the weights on inflation and output gap assigned by the policymakers. For our policy experiments, we characterize core inflation as the inflation in the sticky price sector, \( \Pi_{st} \), and headline inflation as the overall inflation, \( \Pi_t \).

We evaluate our model under the following monetary policy regimes:

1. Strict core IT: The central bank cares only about interest rate smoothing and stabilizing inflation in the sticky price sector.
2. Strict headline IT: The central bank cares only about interest rate smoothing and stabilizing headline inflation.
3. Flexible core IT: The central bank cares about interest rate smoothing and, in addition to stabilizing sticky price inflation, also tries to stabilize output by assigning a weight to the output gap (deviation of output from trend).
4. Flexible headline IT: The central bank cares about interest rate smoothing and, in addition to stabilizing headline inflation, also tries to stabilize output.

In the literature, exclusion of food prices from the price index has been justified on the ground that shocks to food (and energy) prices represent supply shocks. To compare our model with those in the prior literature and also to highlight the role of adverse supply shocks on the choice of price index, we focus on first-order autoregressive (AR(1)) productivity shocks in both the flexible and sticky price sectors.

We follow the setting of Aoki (2001) to study the choice of price index under complete markets. In this setting, all households can completely insure one another against idiosyncratic income risks. It implies that given the same initial wealth, each household will choose an identical consumption sequence.

**Welfare Evaluations**

We are interested in the choice of policy rule that yields the highest level of lifetime utility within the class of policy rules considered. In particular, we evaluate policy rules according to the value of lifetime utility:

\[
V_i^t \equiv E_i \sum_{j=0}^{\infty} \beta^j U(C_{t+j}^i, N_{t+j}^i) \quad \text{for } i = f, s. \tag{5.6}
\]
We compute the total welfare of the economy as a weighted sum of households’ welfare, \( V_{\text{total}} = \lambda^*V_f + V_t \). Formally, we compute \( V_{\text{total}} \) associated with each policy rule and look for a policy rule that yields the highest value of \( V_{\text{total}} \).

To solve the model, we compute the second-order accurate consumer welfare measure with different monetary policy regimes as in Schmitt-Grohe and Uribe (2004). To produce an accurate second-order approximation of the welfare function, we use a second-order approximation to the policy function. The policy function is approximated using the perturbation method by employing a scale parameter for the standard deviations of the exogenous shocks as an argument of the policy function and taking a second-order Taylor expansion with respect to the state variables as well as the scale parameter. We use an approximation algorithm developed by Schmitt-Grohe and Uribe (2004) with suitable modifications.

Strict core IT is regarded as the welfare-maximizing policy rule in the literature. Therefore, we evaluate the welfare gains associated with a particular policy regime by comparing it to the strict core IT rule allocation. To evaluate the welfare implications of a particular policy regime, we calculate the fraction of a consumer’s consumption that would make the consumer indifferent between regimes. Let \( \omega \) be the welfare gain of adopting an alternative policy rule other than strict core IT. We define \( \omega \) as a fraction of additional strict core IT regime consumption process that would make a household as well off under a regime \( \alpha \) as under a strict core IT regime.

We study the choice of the optimal price index under two market settings—a complete market and an incomplete market structure characterized by the presence of “rule of thumb” consumers. We compute the welfare gains associated with the four monetary policy regimes defined above.

**RESULTS**

We now discuss the conditional welfare gains associated with each policy choice. Welfare gains are defined as additional lifetime consumption needed to make the level of welfare under strict core IT identical to that under the evaluated policy. Thus, a positive number indicates that welfare is higher under the alternative policy than under the strict core IT policy. The choice of strict core IT as a benchmark for comparison is motivated by the fact that in the literature it is considered the optimal policy choice for maximizing welfare. We present the results for three alternative policy regimes—strict headline IT, flexible headline IT, and flexible core IT.

Table 5.4 shows the welfare gains from targeting different price indices under complete and incomplete market settings. Under complete markets, the choice of targeting strict core inflation is the best policy. The strict headline IT regime results in a higher volatility of consumption and output compared to core IT. For instance, in response to a negative food productivity shock, the policy response is more aggressive under strict headline IT, which leads to a further decline in output. These results are similar to the ones documented in the existing literature on IT.
How Should Central Banks Respond to Commodity Price Shocks?

Under complete markets, following an increase in inflation, the central bank raises interest rates, reducing aggregate demand (as consumers postpone their consumption following an increase in interest rates) and thus inflation. So, under complete markets, inflation and output move in the same direction, and therefore stabilizing inflation is equivalent to stabilizing output (Aoki, 2001). It also implies that there are no additional welfare gains by adopting flexible IT. Thus, under complete markets, strict core IT is the welfare-maximizing policy choice for the central bank.

However, in the presence of credit-constrained consumers, flexible headline IT appears to be a better policy choice. Aggregate demand responds differently to monetary tightening under the two policy regimes. The central bank is able to reduce aggregate demand by increasing interest rates only when it targets headline inflation. Aggregate demand, instead of going down, goes up if the central bank follows strict core IT. Thus, headline IT (both strict and flexible) outperforms strict core IT. Because in the presence of financial frictions, inflation and output may move in opposite directions in response to interest rate changes, stabilizing output results in welfare gains. Thus, flexible headline IT is the optimal policy choice when markets are not complete.

To examine the mechanics behind this result, we look at the properties of aggregate demand under incomplete markets. In the presence of financial frictions, the consumption choices of different households vary (as opposed to under complete markets, where the consumption choice of each household is identical). While consumption demand of unconstrained households is responsive to interest rates (as they optimize intertemporally), consumption demand of credit-constrained households is independent of interest rate changes (their horizon is static and they consume their entire income each period) and depends only on their current-period wage income. Because only a fraction of aggregate demand is influenced by interest rate changes, a monetary tightening does not automatically result in the decline of aggregate demand. The response of aggregate demand crucially depends on the behavior of credit-constrained households.

Following a negative shock to food productivity, the central bank raises the interest rate, which lowers the demand of unconstrained households (as it is

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**TABLE 5.4**

| Welfare Gains from Alternative IT Rules (Percent of strict core IT consumption) |
|-----------------------------------|-----------------|----------------|-----------------|-----------------|-----------------|
|                                  | Complete markets |                |                |                |                |
|                                  | Strict headline targeting | Flexible headline targeting | Flexible core targeting | Strict headline targeting | Flexible headline targeting |
| Welfare gain                     | −0.005           | −0.011         | −0.006         | 0.271           | 0.314           | 0.076           |

**Source:** Authors’ calculations.

**Note:** Welfare gains \((w \times 100)\) are defined as the percent increase in the strict core inflation-targeting (IT) consumption process necessary to make the level of welfare under strict core IT policy identical to that under the evaluated policy. Thus, a positive number indicates that welfare is higher under the alternative policy than under the strict core IT policy. Targeting policy rules are defined in the text.
optimal for them to postpone consumption). However, it has no bearing on the
demand of credit-constrained consumers. An increase in the relative price of food
following a negative food productivity shock increases the wage income and,
therefore, the consumption demand of credit-constrained households. Thus, the
demand of the two types of households moves in opposite directions following a
negative shock to food productivity.

Which of the two demands dominates is determined by the policy regime.
Because core IT ignores food price inflation, the increase in food prices (and
therefore the wage income of the food sector households) is higher than the
increase under headline IT. This higher wage income translates into higher con-
sumption demand by credit-constrained consumers (as they consume all of their
current wage income), which more than compensates for the lower consumption
demand of unconstrained consumers. Consequently, aggregate demand rises. By
contrast, when the central bank targets headline inflation, price increases in the
food sector are much lower, and the rise in income and, therefore, the increase in
consumption demand in that sector are not enough to compensate for the decline
in the demand of unconstrained consumers. Thus, monetary intervention is
effective in achieving its objective of reducing aggregate demand only when the
central bank targets flexible headline inflation.

In the presence of financial frictions, relative prices affect aggregate demand in
addition to aggregate supply. In other words, the presence of financial frictions
implies that managing aggregate demand requires the central bank to choose a
policy regime that would limit the rise in wages of credit-constrained consumers
(and, therefore, the increase in their demand).

Thus, a key result from the model is that in the presence of financial frictions,
targeting core inflation (i.e., inflation in the sticky price sector) may not be opti-
mal. Lack of access to financial markets makes the demand of credit-constrained
consumers insensitive to fluctuations in interest rates. Because their demand
depends only on real wages, a link is established between aggregate demand and
real wages. Thus, in the presence of financial frictions, the relative price of the
good produced in the flexible price sector not only affects aggregate supply, but,
through its effects on real wages, also influences aggregate demand.

This result is at variance with the prior literature based on complete-markets
settings. For instance, in Aoki’s (2001) model, relative prices of the flexible price
sector only appear as a shift parameter of inflation in the sticky price sector.
Under incomplete markets, by contrast, the central bank cannot ignore fluctua-
tions in the price of the good produced in the flexible price sector if it wants to
affect aggregate demand. Financial frictions break the comovement of inflation
and output (as inflation and output may now move in opposite directions).
Stabilizing core inflation is no longer sufficient to stabilize output fluctuations.
Thus, in the presence of financial frictions, targeting flexible headline inflation is
a better policy choice. In related work, Catão and Chang (2010) show that when
food is imported and not easily substitutable, ignoring food prices when setting
monetary policy can reduce welfare by leading to more volatile and reduced
consumption.
Sensitivity Analysis

Our main result is that in the presence of financial frictions, flexible headline IT is the welfare-maximizing policy choice. This result is robust to changes in key parameters, such as the elasticity of substitution between food and nonfood goods, the inverse of Frisch elasticity, the degree of price stickiness, the elasticity of substitution between different nonfood goods (which determines the markup in the sticky price sector), and the proportion of credit-constrained households in the economy. We also conducted sensitivity analysis with respect to the coefficients of the Taylor rule and for various combinations of the degrees of persistence and volatility of these shocks. Our results hold true across all these different sensitivity tests. Under complete markets, core IT is the best policy choice for most values of the key parameters, whereas under incomplete markets, flexible headline IT continues to dominate other policies.

CONCLUDING THOUGHTS ON MONETARY POLICY IN LOW-INCOME COUNTRIES

In this chapter, we have argued that from a welfare perspective, flexible headline IT is preferable to core IT in economies with imperfect markets and especially those in which food constitutes an important share of overall consumption expenditures of the average household. This result is clearly of considerable relevance to LICs.

This is, of course, only one of the many challenges facing monetary policy officials in emerging markets and LICs. In these economies, the situation is complicated by the fact that globalization has made them more exposed to external shocks as their rising openness to trade and financial flow creates wider channels for cross-country spillovers of shocks. These very forces have also increased the burden on monetary policy. It is much harder now for a central bank to use instruments such as interest changes to attain domestic objectives; the large magnitudes and rapidly shifting patterns of global capital flows can create many difficulties in managing monetary policy, especially in economies with shallow financial systems. And yet, monetary policy has become even more important as a first line of defense against external shocks as it can be far more nimble than other macroeconomic policy tools.

This has generated a rich debate about monetary policy in a number of dimensions—what the right framework is for monetary policy, what the scope of a central bank’s objectives ought to be, and the optimal degree of central bank independence (see Hammond, Kanbur, and Prasad, 2009; Prasad, 2010). Even as clarity about optimal monetary frameworks has dimmed, a remarkable outcome of the crisis is that there has been a convergence in the nature of the debates about central banking in economies at very different stages of economic and institutional development. Central banks in virtually every country—advanced, emerging market, or low income—are contemplating the challenges of managing multiple mandates without erosion of their operational independence.
Such tensions are heightened in emerging markets and LICs, where central banks have traditionally been responsible for a broad array of social and economic goals in addition to price and financial stability. For instance, the mantra that a stable and transparent monetary policy focused mainly on one objective is best in the long term comes up against the harsh practical reality that surges in capital inflows and the resulting exchange rate appreciation can have permanent pernicious consequences for export market shares and can hurt the central bank’s legitimacy. As a result, ancillary objectives such as exchange rate management already complicate the conduct of monetary policy in these economies. Instruments such as capital controls have limited effectiveness and create problems of their own.

An additional problem is that in many low- and middle-income countries, central banks are among the most well managed and trusted public institutions, which makes it tempting to give them more responsibility. But this could make them less effective at the one thing they have proven to be good at—controlling inflation. The real conundrum is that a narrower set of objectives could also result in central bank independence being threatened if it looks as if the central bank is not concerned about other objectives such as growth and employment.

If a central bank does take on multiple mandates, it can create unrealistic expectations about what the institution can and cannot do with the tools at its disposal. Indeed, there is a temptation to ascribe omnipotence to monetary policy, a mandate that some emerging market central bankers take on as a matter of compulsion rather than choice. But this burden may simply be too much to bear and be doomed to eventual failure, especially in economies with weak institutional structures, limited regulatory capacity, high levels of fiscal deficits, and public debt. Even in the absence of these constraints, monetary policy by itself cannot influence an economy’s long-term growth potential or shift the unemployment rate for an extended period.

A more circumscribed view is that monetary policy can best contribute to macroeconomic and financial stability by maintaining low and stable inflation. This framework, if it operates well, defines the limits of monetary policy and provides a clear standard of accountability. The tensions among these varying perspectives feed into the debate about central bank independence.

The concept of central bank independence is a complex one, however. The conventional notion is that an independent central bank with a narrow but well-defined objective, such as maintaining low and stable inflation, has the best chance of being effective and transparent, making it less subject to political interference. Even central banks that have a clearly defined single objective in the form of an inflation target only have operational dependence to achieve that target. The government determines the target itself and the consequences of missing it. Indeed, but for the involvement of the government in setting it, the target would lack broader public legitimacy.

Even such a narrow objective could be difficult to deliver upon if the government runs profligate fiscal policy, racking up large budget deficits. Furthermore, if central banks are made responsible for financial market stability and avoidance
of asset price bubbles, they will need to be given more instruments. There is, however, a deep tension between central banks having multiple objectives and the operational independence needed to achieve the inflation target. Broader objectives invariably mean more political interference and reduced credibility in maintaining low inflation.

In short, central banks in emerging markets and LICs face a challenging landscape, and a great deal of analytical work is needed to guide the choice of optimal monetary frameworks in these economies.

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CHAPTER 6

Savings and Investment Decisions in Resource-Rich Low-Income Countries

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INTRODUCTION

Many of the poorest countries on Earth are in the throes of a double bonanza of high prices for their natural resource exports coupled with new discoveries. Over the next decade, the potential financial flows from resource exports will dwarf aid, remittances, and foreign direct investment (FDI), providing an unprecedented opportunity for development.

Directly, high prices disproportionately increase the rents available for governments. Although prices may have peaked, Asian growth seems likely to sustain them well above past levels, which is an aspect of the “new normal.” Indirectly, the high prices have triggered prospecting. Although Africa is considered resource rich, as of the millennium the value of discovered subsoil assets per square mile was only one-fifth that of OECD countries. It is unlikely that this is because there is less below the ground: Rather, there had been less prospecting. New discoveries are therefore concentrated in Africa and the other neglected, impoverished, and misgoverned parts of the world such as Central Asia. A reasonable assumption is that new searches will gradually bring discovered subsoil assets up to around the OECD level, which would be a fivefold increase.

This unprecedented opportunity requires distinctive and sometimes non-obvious economic policy responses, which will be discussed later in this chapter. The actual policy record suggests that taking the right decisions is politically difficult, so approaches that might bring policy choices closer to the theoretical ideal will be proposed.

THE DISTINCTIVE ECONOMICS OF RESOURCE DEPLETION IN LOW-INCOME COUNTRIES

Resource-rich low-income countries face common challenges and need saving and investment policies that are broadly common. Further, these common poli-
cies are distinctive relative to other countries. All resource-rich countries need policies that differ from resource-scarce countries. However, those resource-rich countries that are low income need policies that differ from those that are high income. An important implication is that there are no OECD role models. Not only are OECD countries high income, but nearly all are resource scarce. As a result, the prevailing OECD policy discourse inevitably neglects the saving and investment policies that are of fundamental importance to resource-rich LICs. Even the few OECD countries that are resource rich, such as Australia, Canada, and Norway, are inappropriate role models for these decisions. The common challenges faced by resource-rich LICs are unique to them.

Because the saving and investment challenges are qualitatively common to the entire category of countries, the design of policies that are appropriate for them is an international public good, though not a global public good. As an international public good, it is appropriately supplied by IFIs rather than by each government individually: Most resource-rich low-income country governments are ill equipped for original economic policy design. However, in providing the public good of economic policy advice, it is vital that IFIs recognize that policy in this category of countries should be distinctive. Policies that are considered sound for other categories of countries would be fundamentally unsound for resource-rich LICs. Neither staff trained in OECD macroeconomics nor those trained in development economics are adequately equipped for this task, so specific training is required.

**Rents and the Role for Government**

The economic returns on the activity of resource extraction come partly in the form of factor incomes to capital and labor and partly in the form of rents. Some of these returns accrue to nationals of the country and some to foreigners. In African LICs, relatively little of the factor income is likely to accrue to nationals: The massive capital investments required for resource extraction can be financed only by international companies, and the sophisticated skills required are possessed only by foreigners. Hence, the returns available to accrue to nationals are disproportionately rents. However, rents initially accrue to the resource extraction companies—they accrue to nationals only to the extent that the government is able to transfer them to itself through taxation in various forms. Thus, the predominant means by which the country can benefit from resource extraction will typically depend upon the efficacy of government rent capture.

An implication is that for LICs, government is central in making resource extraction nationally beneficial. The rents must accrue as public revenue; once they are accrued, the government is then inevitably responsible for spending them. Resource-rich LICs should therefore have a large and active state. This contrasts both with those LICs that are resource scarce and with those resource-rich countries that are high income. The former will develop through the expansion of industry, services, and agriculture, in all of which rents are modest and much of the factor payments accrue privately to nationals. In the latter, exemplified by the
United States, rent capture by the government is less important because factor incomes accrue largely to nationals, as do rents left with the extraction companies.

**Savings: Depletion Matters**

The extraction of mineral resources is unsustainable because endowments are not renewable. The appropriate savings rate from such natural resource revenues depends upon the horizon to depletion. For a given extraction rate, the shorter the horizon until expected depletion, the higher the savings rate should be. This follows directly from the permanent-income framework. For a given extraction rate, and hence a given annual revenue, the shorter the extraction period, the lower the present value of the resource endowment and hence permanent income, and the sustainable increase in consumption. With less consumption warranted from a given resource revenue, the higher is the savings rate.

A straightforward but important corollary is that for a given constant rate of extraction, the savings rate should rise as resources are depleted. Each year, the horizon to full depletion is shorter and so the appropriate savings rate is higher. By the final year of depletion, the savings rate out of the revenues from extraction should be 100 percent.

Applying this to Africa, because really large deposits of natural resources are easier to find than smaller deposits, those deposits that were still awaiting discovery when the present commodity boom started were disproportionately smaller than those already discovered. Evidently, smaller deposits are depleted more rapidly than larger deposits, so the time frame for depletion is liable to be shorter for recent and forthcoming discoveries than the historical norm. For example, the oil fields typically discovered in Africa usually have an economic life of only around two or three decades. Hence, the initial savings rate out of the revenues from extraction should be higher than in the Middle East, where deposits typically have a longer life.

The physical rate of extraction is seldom constant. More typically, it follows a humped pattern, rising to a peak and then tapering off. Evidently, when extraction is at its peak and set to decline, some of the volume can be sustained only briefly and so the savings rate should be higher. Conceptually, each unit of volume regularly extracted has a specific time to exhaustion and hence a distinct path of the savings rate from the revenues generated by it. In the phase of rising extraction rates, as time passes, not only is the horizon for the existing volume of extraction getting shorter, but each addition to volume has a shorter horizon than the existing volume. Both influences imply that in the phase of rising extraction, the rate of savings should rise particularly rapidly.

A final proposition on the appropriate savings rate from depleting resources is that the savings rate varies inversely with the expected long-term rate of change in the world price of natural resources. According to the Hotelling rule, the price of natural resources can be expected to increase at the world rate of interest. In practice, however, prices of natural resources do not follow this predicted path,
and it would be highly risky for the governments of resource-rich countries to assume that they would. However, to see the difference that the assumed path of prices makes, consider a scenario in which the world interest rate is 2 percent and the initial resource discovery will be depleted at a constant physical extraction rate over 50 years. In this benchmark case, in the first year of extraction, the appropriate savings rate out of the revenues from extraction would be zero—permanent income would be maintained purely by the rise in the value of resources remaining in the ground. With a constant extraction rate, the appropriate savings rate would rise linearly from 0 percent in the first year to 100 percent in the fiftieth year.

The other extreme from assuming that prices follow the Hotelling rule is to assume that they will collapse to zero next year and remain there. On this assumed price path, the appropriate savings rate is always 100 percent (the “bird-in-the-hand rule”). More generally, the more valuable that natural resources left in the ground are assumed to become, the higher the permanent income becomes that can be supported by their gradual depletion. Hence, for any given physical extraction rate, the higher is the consumption that is warranted, so that less of the revenue needs to be saved.

Whereas the Hotelling rule provides a reason to expect that natural resources will become continuously more valuable, the historical experience has been of eventual technological obsolescence. When the price of a commodity rises, there is investment in research to develop substitutes. Ultimately, the Hotelling rule gets overridden—a time is reached at which people expect the resource to become less valuable, but the remaining endowment cannot quickly be extracted and sold off because the costs of extraction would become prohibitive. Those who have gambled on continued rising prices get caught and suffer losses. The lags in technological obsolescence are long and variable, but because global technological research has intensified, they may well be shortening.

Perhaps a reasonable compromise between the cheery implication of the Hotelling rule and concerns about technological obsolescence is to assume that over the horizon of a generation, there will be no trend change in the real level of prices, but that thereafter, either physical exhaustion or obsolescence will become a serious prospect.

Savings: The Prospect of Convergence

A low-income society with significant natural resource endowments can reasonably expect that if it manages its opportunities effectively, it will gradually converge with richer societies. In effect, by appropriately saving and investing the revenues from its depletion of natural assets, the economy can rectify its initial shortage of capital, in the process enjoying a phase of growth in excess of global rates.

An important implication is that per capita consumption today is markedly lower than it will be in the future. On the usual utilitarian framework, this justifies some redistribution of consumption from the low-marginal-utility future to
the high-marginal-utility present. In other words, it justifies having a lower savings rate in the early period of resource extraction than would be warranted by an application of the permanent-income framework (Collier and others, 2010; van der Ploeg and Venables, 2011).\footnote{The utilitarian framework sees no ethical problem in a poor current generation raising its consumption at the expense of future generations by using up the national endowment of natural assets. However, although this ethic is common among economists, it is probably not shared by many ordinary citizens. In particular, many young people may feel that the generation in power has a responsibility of stewardship toward natural assets—if natural assets are exploited, an equivalent value should be passed on to future generations. As I argue in The Plundered Planet (Collier and Venables, 2011), this need not imply a reversion to the permanent-income implication of a 100 percent savings rate. In a capital-scarce economy, properly invested savings should be able to generate a return above any return earned by leaving the natural assets in the ground (the world rate of interest if the Hotelling rule were to be relied upon). For example, if the rate of return is double the world interest rate, the present generation can satisfy the obligation of passing on equivalent value to future generations with a savings rate of only 50 percent. Hence, both utilitarian ethics and the ethics of stewardship imply qualitatively the same strategy: Savings rates out of income from natural resource extraction should be above that on other income but less than 100 percent.}

Of course, this is conditional upon convergent growth and therefore depends upon the society adopting and maintaining appropriate savings and investment policies from resource depletion. However, a virtue of the assumption of convergence is that it provides a coherent policy vision: If the policies are implemented, the outcome will validate the choice of policies. The apparently more cautious policy would be to assume that either savings or investment policies will not be implemented, so that the economy will not converge, in which case the society should rationally have a higher savings rate initially. Yet planning an optimal savings policy for current revenues conditional upon other policy mistakes rapidly leads into policy confusion; for example, if it is assumed that current savings will subsequently be squandered, it is better not to save at all. The approach taken here is first to establish what an optimal policy set would look like and then propose a political economy solution to the practical challenge of these decisions being made.

The assumption of convergence justifies an initial savings rate out of resource depletion that is somewhat lower than what would be implied by a simple application of permanent income. However, the appropriate initial savings rate is still likely to be substantial. Because the justification for a lower savings rate is the prospect of convergence, the investment rate must be consistent with convergence. To date, Africa’s investment rate of around 20 percent has been considerably below that of emerging Asia, which has mostly been above 30 percent. For Africa to assume convergence with emerging Asia and yet persist with an investment rate far below that of Asia would be to place too much reliance upon achieving a rate of return on investment well above global rates. The prudent course is therefore to raise the investment rate to above 30 percent as soon as practically possible. In turn, this implies that the initial savings rate out of resource depletion should probably be no lower than 30 percent. If the onset of resource revenues yields a quantum increase in overall government revenues, the implied increase in
consumption might pose transitional problems that temporarily warrant a higher savings rate.

**Investment: Capital Scarcity and Investment Capacity**

Convergence depends upon investment that gradually rectifies capital scarcity. This has an important implication for the choice of assets acquired with the savings from resource depletion. Whereas a capital-abundant economy such as Norway should rationally acquire claims on capital, in other economies that are less capital rich, a low-income economy should acquire capital domestically.

There is an important caveat to such a policy. Whereas savings are generic, physical investment is always specific and so requires a decision process that designs, selects, and implements projects. One reason why low-income societies are capital scarce is that they do not have the capacity to manage domestic investment well. Further, if the investment rate is to be increased from around 20 percent to around 30 percent, the demand for the capacity to manage the investment process will increase by 50 percent. The likely consequence of such an increase in the demands placed upon an already weak capacity would be deterioration in the efficiency of the investment process. In turn, this would manifest itself as a decline in the rate of return on investment. This is not just hypothetical. Globally, episodes of large surges in the investment rate are not usually followed by accelerations in growth—high investment is instead dissipated in reduced returns.

Hence, a critical stage prior to an increase in domestic investment is to build the capacity to manage it. I term this process “investing-in-investing.” It has three components. The first component is the capacity to manage the process of public investment, that is, project design, appraisal and selection, implementation, and ex post evaluation. These are the capabilities assessed by the new Public Investment Management Index proposed by Dabla-Norris and others (2011). This index provides a useful benchmark to judge improvements and potentially can also be used in a decision rule as to when the return of public money held abroad is warranted.

The second component is to improve the environment for private investment. Public and private investments are complements (for example, roads and trucks), so the return on either depends upon investment in the other. The environment for private investment is already reasonably well measured by the annual Doing Business ratings of the World Bank. The government of Rwanda has demonstrated how it is possible to improve performance on this rating very rapidly, as it has now overtaken several European countries.

The third component is for policy to reduce the unit cost of capital goods for both public and private investment. In Africa, capital goods are typically expensive. Structures are costly because construction costs are avoidably high—the market for urban land is restricted, there are impediments to imports of key

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2 The Penn World Table provides some evidence of high unit costs but is not suited to benchmarking for tracking improvement.
inputs such as cement, and there has been little training in construction skills. Conceptually, government policies need to shift downward and flatten the supply curve of construction so that the large increase in demand (which is inevitable if depleting natural assets are to be converted into domestic capital) should not be dissipated in higher unit costs. It would be useful to build an international index to benchmark and monitor construction costs analogous to the Public Investment Management Index and Doing Business.

Equipment, though imported, is costly because national markets are too small to be competitive and trade barriers have inhibited the emergence of regional markets. Trade policies and behind-the-border measures could regionalize the market in capital goods, leading to lower markups. Again, a benchmarking index would be useful.

Investing-in-investing takes time, but it is concerned with a manageable set of tasks, processes, and skills. Emerging Asia was able to build its investment capacity, thereby ramping up its investment rate without the return on investment collapsing. Once policymakers recognize that investing-in-investing must precede an increase in domestic investment in the sequence of policies for development, then it should be feasible over the course of a decade. Until investment capacity is built, the increase in savings generated from resource depletion should be parked abroad in financial assets. The timescale for such saving abroad is, however, much shorter than that adopted by sovereign wealth funds (SWFs): The objective is to preserve asset value until investment capacity has expanded sufficiently for the money to be brought back and invested domestically. Hence, the asset composition should be more conservative than in an SWF.

**Absorption and Temporary Saving Abroad**

These concerns about the capacity to invest have been microeconomic. Potentially, as investment spending is ramped up, it may also generate macroeconomic effects. However, in LICs, capital spending has a high import content and so the repercussions for the domestic economy are largely limited to the construction sector. Here, sectoral policies targeted at breaking supply constraints are more appropriate than generalized macroeconomic restraint of demand such as would be achieved by increasing the proportion of savings allocated to foreign financial assets. From the perspective of asset accumulation, the rationale for an initial phase of accumulating foreign assets is fundamentally microeconomic rather than macroeconomic. It is not demand that has to be managed, but rather supply.

Macroeconomic considerations may, however, matter for the warranted increase in consumption. This will depend upon the scale of the increase and the composition of demand. Except with major discoveries, the initial increase in warranted consumption may be quite modest—even the initial savings rate out of revenues from natural resource depletion should be markedly higher than that from sustainable revenues so that the implied percentage increase in consumption will be lower than that for investment. Nevertheless, even modest increases in
warranted consumption may have substantial effects on the real exchange rate: In many low-income economies, the share of consumption met by imports is low, whereas the increase in the supply of consumer goods warranted by resource revenues consists only of imports. This is especially the case for public consumption, which is the component of consumption most likely initially to be increased by a step increase in government revenue.

Because a substantial temporary increase in the real exchange rate is liable to be disruptive to the real economy, there is therefore a good case for delaying much of the increase in consumption to provide the time for domestic production of nontradable consumer goods to increase. Evidently, such an increase in supply is predominantly a consequence of investment (public and private). This returns us to the investing-in-investing agenda. Once the capacity to invest is in place, domestic investment can scale up without reducing the efficiency of investment. In turn, this will increase the supply of consumer goods and services, enabling the demand for consumption to be increased without a substantial appreciation in the real exchange rate.

Hence, analogous to the temporary accumulation of foreign assets out of the revenues eventually to be used for domestic investment, there may also need to be temporary accumulation of foreign assets out of the revenues to be used for consumption. As domestic investment ramps up, the continuing flow of such temporary savings can be tapered out and reversed, with the accumulated savings-for-consumption repatriated.

This macroeconomic approach of countering Dutch disease by the sequencing of investment can be complemented by a sectoral policy concerned with the composition of investment. Commonly, a key policy concern is that real appreciation will damage nonresource exporters. By skewing the composition of public investment toward projects that lower the costs of nonresource exporters, the sector can even be advantaged by resource revenues rather than squeezed. An example is the active promotion of Penang as an export zone for electronics by the government of Malaysia. During the 1970s, much of government revenue still came from natural resources; this helped to finance the physical and social public infrastructure that transformed Penang (see Collier and Venables, 2011).

A further compositional policy is that between government, firms, and households. Depending on the scale of resource revenues, there is a case for transferring decisions over some spending to firms and households. In the rare cases in which a poor economy receives very large resource revenues, the case for some transfer to private households is overwhelming; otherwise, households will have an imbalance of abundant public goods and inadequate private goods. Similarly, because public capital and private capital are complements, there is a case for some transfer to firms. However, there is a good case for delaying such transfer until both public infrastructure and the policy environment for private investment have been improved (as tracked by Doing Business). Ideology-driven assumptions that the private sector is inherently better at handling the investment process are probably misplaced. For example, in Kazakhstan, a prudent government saved resource revenues abroad but permitted the banking sector to borrow heavily on
the implicit security of these public foreign assets. The banking sector thereupon channeled the resource revenues into a disastrously excessive property boom.

Instead of using the banking system, the transfer of decisions over investment from the government to firms can potentially be done through reducing taxation. However, there are two powerful political economy arguments against this: The taxation of business gives the government a stake in private sector growth, and it also provokes scrutiny. In practice, if the domestic banking system is unreliable, it may be better to induce private investment indirectly through improving infrastructure and the policy environment.

Managing Volatility

Commodity prices are volatile, and their path is deeply unknowable. For example, in January 2008, the bounds of the 95 percent confidence interval for the 12-month market-based forecast for the world oil price were around US$210 and US$65. Two features of this forecast are equally striking—its range is so wide as to make it useless for practical budgeting purposes, and the actual price, at US$37, was far outside it. What is important, therefore, is not to forecast prices as accurately as possible, but to smooth spending in the face of price volatility.

Revenues are even more volatile than prices; not only does supply naturally respond to price, but markets are not fully cleared by price. The failure of prices to clear commodity markets became evident during the collapse in demand of 2008 and 2009 when the market for commodities started to resemble that for manufactures with mines temporarily closed.

There is a very strong case to avoid revenue volatility generating corresponding volatility in expenditure. Often the costs of volatile expenditure are thought of with reference to Dutch disease. However, the fundamental reasons for expenditure smoothing in the face of volatility are microeconomic rather than macroeconomic. Large fluctuations in consumption are inefficient even in the most rudimentary single-good framework (that is, with no real exchange rate). Due to both habit formation and political costs, substantial reductions in consumption alternating with substantial increases yield less utility than a constant level around the same mean. Although volatility in investment does not face these difficulties, beyond a point, large swings in investment are liable to impair its efficiency. If investment spending faces steep unanticipated reductions, then projects will be abandoned uncompleted, and if it is increased very fast, then project selection and implementation are likely to deteriorate. Hence, the true diagnostic for managing volatility is not the real exchange rate, but the level of aggregate spending and its decomposition into consumption and investment, both public and private.

Smoothing spending in the face of unknowable volatility in revenues is necessary but costly. Were the path of fluctuations in revenues fully known, the least costly way of smoothing expenditure would be to accumulate liquid savings during periods of above-average revenue and run them down when the revenue was below average. However, because the path of revenues is not known, smoothing spending is a matter of managing risk. The appropriate way of coping with
risk is not savings, but rather insurance. In the face of price risk, governments can, in principle, either fully insure themselves by locking into long-term contracts at an agreed price or set bounds on the degree of risk through hedging.

Many governments of LICs lack the credibility to be able to commit to long-term price contracts (except at deeply discounted prices), and so the practical alternatives are saving and hedging. Markets are not yet sufficiently deep to permit hedging many years out, and so the most efficient structure is likely to be to hedge prices over a short horizon (at a minimum of the price assumed for the annual budget process), relying upon savings for the longer term. The cost of hedging is evident. The cost of liquid savings is the opportunity cost of domestic investment forgone.

Because both methods of smoothing expenditure are costly, the objective should not be literally to stabilize public spending. Rather, governments should aim to keep rates of change of spending (both increases and decreases) within manageable bounds. Politically, the key issue is to set maximum rates at which public consumption and public investment will be permitted to rise so that revenues in excess of these ceilings on expenditure will be used to smooth future spending, whether by purchasing hedges or by saving. What is manageable is itself endogenous to policy—the more public investment can be varied without damaging its efficiency, the less liquidity is needed. Public investment can potentially be designed so as to be able to cope with a degree of volatility. A high average level of investment should make fluctuations easier; for example, if investment is on average 30 percent of GDP, a 10-point swing (25 to 35 percent) is proportionately less drastic than if it averages 20 percent (15 to 25 percent). Further, in periods of low investment, project preparation can continue so that there is a shelf of projects ready for implementation as financing becomes available.

The task of smoothing public spending is essentially driven off the upper and lower bounds placed on changes in public spending. Initially, all the work is done by the upper bounds on public consumption and public investment. These bounds determine how much money is channeled into expenditure smoothing, whether by the purchase of hedges or the accumulation of savings. Until there has been a substantial phase during which the upper bounds on expenditure growth are binding, there can be no counterpart phase in which expenditures can be permitted to decline less rapidly than resource revenues are declining. Hence, with the benefit of hindsight, 2000 to 2010 was the ideal time to put such a policy in place.

Although this opportunity has gone, an equivalent opportunity still pertinent for many countries is at the onset of a resource discovery. As previously discussed in this chapter, in such circumstances, there is a case for restraining the increase in consumption until investment has increased supply to meet new demand. Rather than this being merely a transitional pot of liquidity, a first call on it can be to fund the long-term task of smoothing public spending. In other words, the transitional need to accumulate liquidity until productive capacity has been enhanced so as to avoid Dutch disease can be matched to the other transitional need to accumulate liquidity to cope with volatility.
In the steady state, the liquidity pot, combined with hedges, is judged sufficient to meet all likely calls on it. Because the path of commodity prices is not known, once the pot is being drawn down, there is an inherent risk that low prices will persist for long enough to bankrupt it. To guard against this, the bound on the maximum rate of decrease in public consumption should be endogenous to the available financing, with hedges used to limit the risk of further price declines. As the available funds are depleted, the cushioning limit on the rate of reduction in public consumption would be reduced.

The Desired Policy Package

A useful way of bringing these disparate aspects of savings and investment policy together is to think of three policy clocks. The government of a resource-rich LIC needs to be conscious of all of these clocks, each of which ticks at a different speed.

The slowest-ticking clock is that of resource depletion: over the course of a generation, natural assets should be converted into productive assets, implying the need for substantial savings out of resource revenues. As noted, the proportion saved will depend upon several assumptions, but a common feature is that the savings rate should rise over the course of depletion and rise especially rapidly in the phase during which the rate of extraction is increasing. This policy clock earmarks, year by year, the proportion of revenues appropriate for long-term asset accumulation, with remaining revenue being earmarked for warranted consumption.

The second clock is that of investing-in-investing—building the capacity to invest a high proportion of income domestically while maintaining a good rate of return. If this is given its proper priority, then this clock should run much faster than that of depletion: Perhaps it might take a decade to put in place the systems and human skills to manage the investment process well. During this phase, both the revenues earmarked for long-term asset accumulation and much of the revenues earmarked for warranted consumption should temporarily be invested in foreign financial assets. As capacity is built and the productive capital stock is increased, both of these temporary pots of foreign assets can be repatriated, financing domestic investment and consumption, respectively.

The third clock is that which rides the tiger of commodity prices. This clock has an initial phase during which revenues are being set aside to accumulate liquid assets and hedges, followed by a steady state in which spending is cushioned relative to revenues. The transition phase requires that the upper bound on the rate of increase of public consumption be set sufficiently conservatively that the revenue warranted for consumption exceeds the ceiling on expenditure for a sustained period. For the steady state to be sustainable, the maximum permitted rate of reduction in public consumption should adjust as funds are depleted.

Because these three clocks are all running in real time, the required policy dance is complicated. Sometimes one clock will be indicating a time for high savings, while another will be indicating a time to run savings down. Faced with such
complexity, ad hoc decisions taken day by day are liable to go wrong. There is a need for some policy rules, but policy rules are political—they work only if they are politically realistic.

**THE POLITICAL ECONOMY OF SAVING AND INVESTMENT DECISIONS**

There is now a large and contentious literature on the natural resource curse. As this topic has been ably and recently covered, it will not be reviewed in this chapter (see Ross, 2011). The discussion here will be on some new and disturbing direct evidence of a policy-based “resource curse” through public investment.

Whatever else the government of a resource-rich LIC does with the revenues from natural resources, one prescription is unambiguous: Over the medium term, it should accumulate public capital. Of course, all governments should accumulate public capital, but the case for resource-rich LICs is overwhelming as they start chronically short of public capital and their revenues are coming disproportionately from depleting the society’s natural capital. Yet, in general, such governments do the opposite. Bhattacharyya and Collier (2011) bring together a new international time series data set on the stock of public capital with data on resource rents. They find that by controlling for per capita income and fixed effects, resource rents significantly and substantially reduce, the public capital stock.

Faced with this gulf between the savings and investment policy appropriate for resource-rich low-income societies and that which their governments have actually implemented, it is evident that managing resource depletion has proved to be politically difficult. Instead of accelerating the accumulation of public capital, resource rents have enabled the few to plunder what should have benefited the many and the current generation to plunder what should have benefited the future.

However, such outcomes are by no means inevitable—some resource-rich societies have indeed harnessed natural resources for an accelerated transition out of poverty; examples of this are Botswana and Malaysia. Furthermore, societies can and do learn from economic policy mistakes—they are not condemned to repeat them. In many low-income societies, citizens are well aware of past plunder. This is a potential political constituency for policy change.

However, the saving and investment policies required by resource depletion in a LIC are long term: Good decisions need to persist for a generation. An episode of good savings decisions is not enough. The Nigerian experience is salutary. Following a prolonged period of plunder, in 2003, Ngozi Nkonjo-Iweala was appointed finance minister. Inheriting a fiscal deficit, she rapidly turned the budget around and accumulated large foreign savings. But after three years, she was removed from her post, and within five years of her departure, these savings had been dissipated. The lesson from this frustrating experience is that the priority for
an episode of reform is to build commitment technologies that can survive their creator.

Building commitment technologies is difficult. First, they have to be designed. The rules appropriate for resource-rich low-income societies are distinctive and so cannot simply be copied from some OECD template. IFIs have an important role here. Even well-designed new rules can easily be ignored or not survive their initiator. Three features are likely to make them more robust—legislation, an institutional champion, and broad popular support.

Legislation has the major advantage that laws are costly to reverse. Constitutional laws are particularly costly to reverse, and so ideally, the policy rules concerning resource depletion should be embedded in the constitution. In turn, getting an appropriate law adopted is a political process. However, the difficulty of reversing the legislation lends itself to a temporary big push such as is common in NGO campaigns. The cost of coordinating political pressure has fallen dramatically, and so legislation has potentially become more feasible.

A new law is inherently fragile: It can easily be overridden, ignored, or reinterpreted by the pressures of personal interest. To counter these pressures, it needs a credible existing organization within government that is tasked with implementing it. For the custodial role of natural assets, the most appropriate public institution is likely to be the central bank.

An institutional rule is likely to survive only if it has broad popular support. For this, it needs to be understood by ordinary citizens. To take a currently pertinent example from another context, Germany’s constitutional opposition to funding the fiscal deficits of other euro area countries is clearly underpinned by the strong memory that Germans have of the hyperinflation of 1923. Resource-rich Africa has already been through equivalently searing experiences of resource plunder. But social learning from mistakes is not automatic; economic events need to be appropriately interpreted. Such interpretation is a public good and has to be supplied. Small low-income societies lack the market size to support high-quality information media, and so citizens are not naturally well informed about economic issues. This is also an appropriate role for central banks.

The law-cum-institution that is most closely analogous to what is needed is the SWF. Many governments have sought to commit both themselves and their successors to prudent decisions through the creation of such funds and they are now becoming fashionable in low-income resource-rich societies. Typically, an SWF has three sets of rules. One determines the size of the flows going into the fund. A second protects the accumulated stock of its assets from being dissipated. The third concerns the composition of the stock, namely, foreign financial assets.

Such a rule structure is not appropriate for a poor country. Whereas in a capital-rich country, it is better to accumulate foreign than domestic assets, in countries that are chronically capital scarce, the investments should ultimately be domestic. Instead of an SWF, there are two rule structures that between them incorporate the three policy clocks. One is a sovereign resilience fund (SRF), and the other is a sovereign development fund (SDF).
Sovereign Resilience Funds

The purpose of an SRF is to ride the tiger of commodity price volatility. It therefore needs one set of rules for the flow of money going into the fund, one for the composition of assets, and one for the flow out of the fund. In steady state, these two flows will balance out over time.

As discussed previously, in a steady state, the rules governing the inflows should be by means of ceilings on the rate of expansion of public consumption and public investment (these ceilings should not be the same since investment needs to grow on average more rapidly than consumption). The SRF should also be used to manage the transition, such as guarding against Dutch disease by avoiding demand for consumption rising ahead of investment in supply.

The composition of the assets should clearly be conservative and liquid as the whole purpose of the fund is to liquidate its assets when times are bad. However, subject to this, the SRF should be free to manage how it meets the calls upon it by combining liquid assets with commodity hedges. Delegating this to a public organization tasked specifically with delivering resilience has a major political advantage. Although hedging is generally the best way of protecting against the risk of price changes, it is very rarely used. The reason for this is well understood: The political costs of hedging are too high. If a finance minister uses precious budget revenue to purchase a hedge, in any particular year, the chances that this will pay off are below 50 percent. As a result, the minister is exposed to the charge that money has been wasted. Because all politicians have enemies, it is a certainty that this charge will be made. Further, there is a considerable risk that if the policy is maintained, it will again fail to pay out, exposing the minister to the added charge of “I told you so.” The best prospect of hedging being adopted is therefore for it to be removed from the day-to-day political arena and delegated to an organization whose sole purpose is to use money for resilience, partly through the acquisition of foreign assets and partly through hedges. There is less political mileage in attacking professional technocrats than politicians, and in any case, the organization can reasonably defend itself on the grounds that it must be judged on its mandate, which is to protect public spending during difficult times.

The rules governing the outflows are correspondingly the maximum permitted rates of reduction in public spending on investment and consumption. As discussed previously, there is a case for endogenizing these rules on the evolving capacity to finance periods of persistent withdrawal.

In good years, an SRF top-slices the revenues from natural resources, whereas in bad years, it supplements them, providing money to sustain both investment and consumption.

Sovereign Development Funds

An SDF is a variant of an SWF. The first two rules of SDFs are the same as in an SWF—they govern flows into the fund and restrict the scope for flows out of it.

As to the flow into the SDF, the available flow is preadjusted to the commodity cycle through the SRF. In good times, the SDF has the second call on resource
revenues, whereas in bad times, it receives some of its inflow from natural resource revenues and some from the SRF.

Despite being preadjusted for the commodity cycle, the proportion of available resource revenues appropriately devoted to savings is not constant. As previously discussed, through the course of depletion, the savings rate should rise. This may prove to be one complexity too many for the rules of an implementable SDF, in which case a constant-savings approximation will need to be adopted. However, a rule of a rising savings rate is potentially very attractive for a government. Based on the idea of “God make me good but not yet,” it imposes less pain on the government that introduces the legislation than on future governments that are stuck with abiding by it. This enables the average rate out of savings over the course of depletion to be set higher than if the full burden of prudence had to be borne by the initiating government. For once, such a rule is fully justified by the underlying economics.

All moneys flowing into the SDF are irreversibly for the accumulation of assets. This is one reason why it is important to have two distinct funds rather than a single fund—the SRF has to permit withdraws to finance public consumption, whereas the SDF should expressly forbid such withdrawals. The other reason is that the asset composition is very different.

A key decision for the SDF is the balance between the accumulation of foreign financial assets and domestic investment. Whereas the liquidation of foreign assets to fund public consumption is forbidden, liquidation to fund domestic investment is permitted, subject to conditions. The guiding principles in the allocation between foreign and domestic investment should reflect the considerations discussed in this chapter; that is, the pace of implementing the investing-in-investing agenda and any remaining concerns about Dutch disease in the construction sector.

For those funds assigned to domestic investment, a fundamental part of the SDF is to police professional standards of project assessment—design, selection, implementation, and evaluation. In other words, the SDF is the agency enforcing a rising performance in the Public Investment Management Index.

A potentially effective way to strengthen adherence to the rules of the SDF and particularly to the microeconomic procedures for investment projects is to open the fund to contributions from aid donors. Most resource-rich low-income countries will continue to receive significant aid inflow to fund development, and channeling aid-for-investment through an SDF would avoid duplication and, in effect, import good economic governance into domestically financed investment.

The Roles of Central Banks

Where, then, should the SRF and the SDF be lodged within the government? The dismal experience of anticorruption commissions illustrates that small, new,

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3I am indebted to Kerfalla Yansane, Minister of Finance, Government of Guinea, for this suggestion.
and isolated-purpose-designed agencies of restraint are liable to be unsuccessful. Hence, the SRF and the SDF should not be free-standing.

In the typical small low-income society, there are few institutions that are within government but have some independence to restrain economic policy. By far, the most important is the central bank. Both the SDF and the SRF could be agencies under the umbrella of the central bank, reporting through the governor to the government.

The SRF is a natural extension of the current functions of a central bank, that is, reserve management and risk management. The SDF is an extension of this role, but is philosophically still within the overall purpose of custodianship. Just as the central bank is the custodian of the currency and of debt sustainability, in a society in which the major assets are natural resources, it is reasonable for it to have a role in the prudent management of these assets.

Further, because the typical small LIC is short of technically qualified senior public sector officials, it is important to economize on their use. If both the SRF and the SDF are lodged within the central bank, they can both draw readily upon central bank expertise and, indeed, their memberships can overlap. There is no inherent conflict of interest that requires walls between personnel. The importance of keeping the agencies distinct is that the money under their control needs to be subject to different rules and different objectives.

There is a final reason for lodging the SRF and the SDF with central banks. Recall that their authority rests ultimately upon building support among a critical mass of citizens who understand their purpose. Central banks are appropriate for building this constituency of support. As trusted public authorities, they are in a position gradually to build a critical mass of economically literate citizens (a critical mass being a group large enough for these key economic decisions to be well taken). In OECD countries, central banks have increasingly communicated directly with ordinary citizens. In Africa, where there are far fewer other sources of trusted economic information, this role is more important but less developed. The aspirations of Africa’s central banks need to extend beyond the technocratic.

International Support

Finally, the wider international community has a useful supplementary role in setting global standards. The EITI, launched in 2002, was swiftly adopted in Nigeria by Dr. Nkonjo-Iweala, becoming the NIETI. However, although the EITI’s focus on transparency in the reporting of resource revenues was the right place to start, it does not address the savings and investment decisions. The more recent Natural Resource Charter (www.naturalresourcecharter.org) covers the entire decision chain, from discovery to investing-in-investing. Already adopted by the New Partnership for Africa’s Development (NEPAD) as a flagship program, endorsed by the African Development Bank, and supported by IFIs, it is designed both for public officials and for citizens. Although the EITI and the National Resource Charter are voluntary codes, there is also potential for enforce-
ment of more ethical practices in resource extraction; a global extension of the Cardin-Lugar Amendment is surely a priority for the Group of Twenty (G-20).4

Africans are well aware of their history of resource plunder. Courageous politicians, responsible central banks, and new international standards must try to make a reality of “this time it’s different.”

REFERENCES


4The G-20 is an informal group of 20 major economies (19 countries plus the European Union) and representatives from the International Monetary Fund and the World Bank. It has met yearly in a central bank governors and finance ministers format since 1999, and in a chiefs of state and head of governments format (G-20 summits) since 2008.
INTRODUCTION

Chile, a small economy strongly integrated into world markets, is an important producer and exporter of commodities. Copper dominates its market: Chile has a one-third share in world copper production, and this represents more than half of Chile's total exports (see Table 7.1). As Chile is a very open market economy, its specialization in production of copper (and other commodities) is driven more by its rich resource endowments and private investments than by government decisions, abstracting from the fact that the largest copper-producing corporation is government-owned CODELCO.

Chile's export prices and volumes generally, and copper prices and volumes in particular, have major direct effects on government tax and non-tax revenue and, by affecting key macroeconomic variables such as GDP and the real exchange rate, exert additional indirect effects on government finances. As a small, open, and specialized economy, Chile also faces other external and domestic shocks that contribute to significant GDP (and consumption) volatility.

Over the last three decades, subsequent governments have gradually strengthened macroeconomic and financial institutions, regimes, and policies, motivated by two key objectives—to ensure government solvency and strengthen macrofinancial stability. An independent central bank, inflation targeting, and a flexible exchange rate are the pillars for a prudent conduct of monetary policy that has yielded low and relatively stable inflation during the last decade. Strong banking regulation and prudential financial oversight have contributed to the development of deep and sound banks and capital markets.

Prudent fiscal management was re-established after the resolution of the banking and debt crisis of the early 1980s and strengthened in the 1990s and 2000s, reflected in budget surpluses. Fiscal sustainability and government solvency were
attained with declining government debt levels and rising government assets. Gross government assets (including sovereign wealth funds) stand at 17.6 percent of GDP, whereas domestic and foreign government debt stands at 9.3 percent of GDP; hence, the government is a net creditor.

Chile faces high and increasing government revenue volatility due to moderate GDP volatility and very large copper price volatility. The standard deviation of output growth declined from 3.5 percent in the 1990s to 2.2 percent in the 2000s, while copper price volatility exploded from US$0.2 per pound in the 1990s to US$1.1 per pound in the 2000s.

To deal with large output and even larger copper price shocks, fiscal policy has focused increasingly on shielding government spending from large revenue shocks. Even in the absence of an explicit fiscal rule during the 1990s, short-term shocks in government revenue were reflected more by government saving than by government spending. In 2000, a new incoming administration decided to adopt an explicit fiscal rule that at the time was unique in the world. Partly consistent with a permanent-income approach, the rule restricts overall central government spending to an estimate of trend central government revenue consistent with trend estimates for GDP and the price of copper. The difference between government spending and the estimate for trend government revenue, termed “cyclically adjusted balance” (CAB), is bound to a numerical target set initially at 1 percent of GDP. The ex ante total government balance reflects

### TABLE 7.1
Central Government Accounts, Growth, and Copper Prices, 1990–2010

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<tr>
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<tr>
<td>Central government (% of GDP)</td>
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<tr>
<td>Overall revenue</td>
<td>21.7</td>
<td>23.1</td>
<td>23.0</td>
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<tr>
<td>Copper revenue</td>
<td>1.00</td>
<td>2.04</td>
<td>3.40</td>
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<tr>
<td>Noncopper revenue</td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Overall expenditure</td>
<td>18.2</td>
<td>18.3</td>
<td>18.3</td>
</tr>
<tr>
<td>Government balance</td>
<td>0.5</td>
<td>0.0</td>
<td>-0.5</td>
</tr>
<tr>
<td>Cyclically adjusted balance</td>
<td>12.6</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td>Government assets</td>
<td>13.7</td>
<td>12.6</td>
<td>17.6</td>
</tr>
<tr>
<td>Sovereign wealth funds</td>
<td>10.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Government debt</td>
<td>22.0</td>
<td>9.4</td>
<td>9.3</td>
</tr>
<tr>
<td>Net government assets</td>
<td>-8.3</td>
<td>3.2</td>
<td>8.3</td>
</tr>
<tr>
<td>GDP growth (%)</td>
<td></td>
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<tr>
<td>Average</td>
<td>6.2</td>
<td>3.7</td>
<td>5.2</td>
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<tr>
<td>Standard deviation</td>
<td>3.5</td>
<td>2.2</td>
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<tr>
<td>Committee’s average estimated future trend growth</td>
<td>4.7</td>
<td>5.0</td>
<td></td>
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<tr>
<td>Copper price (US$/lb)</td>
<td></td>
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</tr>
<tr>
<td>Average</td>
<td>1.00</td>
<td>2.04</td>
<td>3.40</td>
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<tr>
<td>Standard deviation</td>
<td>0.19</td>
<td>1.12</td>
<td></td>
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<tr>
<td>Committee’s average estimated future trend level</td>
<td>1.22</td>
<td>2.13</td>
<td></td>
</tr>
<tr>
<td>Copper production (% of world production)</td>
<td>25.8</td>
<td>34.9</td>
<td>33.7</td>
</tr>
<tr>
<td>Copper exports (% of Chile’s exports)</td>
<td>38.6</td>
<td>46.6</td>
<td>56.1</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on data from the budget directorate, Cochilco, and the Central Bank of Chile.

1 Copper-related and non-copper-related revenue for 2005–10.
ex ante estimates for GDP and the price of copper; it differs from the CAB by the estimated impact of the cyclical components of GDP and the copper price on government revenue.

Although the fiscal rule has been modified over the years to accommodate some changes in budget structure and policy objectives, it has largely remained in place and represents a major component of Chile’s strong fiscal regime. Additional elements of the institutional framework for fiscal policy have been added over the years, starting with the establishment of independent committees to provide projections for future and trend GDP and copper prices; the 2006 enactment of a fiscal responsibility law that establishes institutional requirements for the fiscal framework (related to government commitment to a fiscal framework; the start of SWFs); and the 2010 establishment of an independent commission that has evaluated the fiscal policy framework (including the fiscal rule) and proposed further reforms.

This chapter evaluates Chile’s fiscal rule and fiscal policy framework with a focus on the lessons that can be drawn from Chile’s experience for framework design and conduct of fiscal policy in commodity-exporting countries. It then assesses Chile’s institutional framework for fiscal policy in the light of international experience, explains Chile’s fiscal rule that started in 2001, and goes over its implementation, changes, and implications for government accounts during its first decade. Its fiscal and macroeconomic impact are then assessed, and the shortcomings of the rule and recommendations for improvement are discussed. The closing section draws fiscal policy lessons for commodity-exporting countries from Chile’s experience.

CHILE’S INSTITUTIONAL FRAMEWORK FOR FISCAL POLICY IN INTERNATIONAL COMPARISON

Many countries are designing and implementing major reforms of their institutional framework for fiscal policy and financial management. These reforms are motivated by different reasons. First, they reflect a growing global consensus among academics and policymakers about the economic benefits of procedures and rules that shape and limit planning and execution of fiscal policy. Second, they also respond to the political benefits of requirements in regard to transparency and accountability in the exercise of fiscal policy in a democracy. Third, they respond to the failure of previous fiscal institutions and rules in many advanced economies, as in the case of the systematic violations of the fiscal rules of the Stability and Growth Pact by many member countries of the euro area.

A modern institutional framework for the conduct of fiscal policy and financial management should aim at addressing the principal-agent problems that arise between voters and political authorities due to governments’ impatience, lack of representation of future generations, electoral competition, sensitivity to special-interest lobbies, corruption, and use of asymmetric and biased information (von Hagen, 2005; Wren-Lewis, 2010). To overcome these distortions and negative externalities, the academic literature and international experience suggest...
adoption of an institutional framework for fiscal policy based on the following components (Debrun, Hauner, and Kumar, 2009; Ter-Minassian, 2010; IMF, 2009, 2010): a fiscal responsibility law, modern financial management, a planning horizon that exceeds one year, a fiscal rule for the budget, rules for government asset and liability management, requirements in regard to accountability and public information on the government’s financial management, effective external control and auditing, and establishment of a fiscal council (FC), fiscal committees, or both.

The following is a brief review of the international evidence and a description of Chile’s development of the eight latter components of a modern institutional framework of fiscal institutions.

**Fiscal Responsibility Laws**

Several countries have adopted fiscal responsibility laws specifying budgetary procedures and rules to strengthen fiscal policy transparency, accountability, and stability. Fiscal responsibility laws establish requirements that the executive transparently state its short- and medium-term policy objectives, set short- and medium-term targets for fiscal flow and stocks, provide transparent information on budget planning and execution to the legislature, implement a fiscal policy conducive to fiscal stability and solvency, and account ex post for its fiscal policy execution and attainment of policy objectives (Lienert, 2010).

However, fiscal responsibility laws do not necessarily spell out an explicit fiscal rule. Conversely, fiscal rules are often adopted in the absence (or outside) of a fiscal responsibility law. For example, in 2008, Germany adopted a fiscal rule by constitutional amendment, not as part of a fiscal responsibility law.

Fiscal responsibility laws are often enacted as a legal tool in support of the consolidation of fiscal adjustment, which sometimes occurs under a stabilization program agreed with the IMF so that its emphasis is on budgetary control rather than effective fiscal policy. However, in other conditions, such laws are adopted with the aim of strengthening the institutional framework for fiscal policy, focusing on the above-mentioned components of a modern institutional framework, such as in Chile’s case.

A selective review of fiscal responsibility laws adopted by 13 developed and developing countries since 1998 shows that these laws specify an explicit fiscal rule in 9 countries, define escape clauses in 7 countries, and set penalties for overspending in 6 countries (IMF, 2009). The evidence on the success of fiscal responsibility laws is mixed. When the targets are realistic and there is political will for taking necessary corrective measures to achieve them, these laws have been successful (e.g., in Australia and New Zealand). However, in many emerging economies, they have been unsuccessful in meeting their quantitative targets (e.g., in Argentina, Colombia, Peru). Cáceres, Corbacho, and Medina (2010) find limited empirical evidence in support of the view that fiscal responsibility laws have had a significant effect on fiscal performance.

Chile enacted Law No. 20128 on Fiscal Responsibility in 2006 to strengthen the institutional framework for a fiscal rule adopted five years earlier by a previous
administration. This law was not adopted to enforce fiscal adjustment but to develop the institutional framework required to strengthen the links between the fiscal rule, the use of government savings, and the establishment of two SWFs. Its major provisions are the following (Rodríguez, Tokman, and Vega, 2006):

1. Legal requirement for a new government administration to define and publish the fiscal policy framework for its four-year term and its implications for the government’s structural balance.

2. Legal requirement for the administration to issue an annual report on the financial state of the government, its fiscal sustainability, and the macro-economic and financial implications of fiscal policy, as well as an estimation of its “structural” (i.e., cyclically adjusted) balance.


4. Establishment of a pension reserve fund (PRF) to finance future pension liabilities of the government. During its first 10 years of existence, the PRF accumulates funds at a yearly floor equivalent to 0.2 percent of GDP and a ceiling of 0.5 percent, where the actual figure within the aforementioned range is determined by the government. The funding sources for the floor are government revenues or government savings.

5. Establishment of an economic and social stabilization fund (ESSF), starting with the foreign resources accumulated in the former Copper Revenue Compensation Fund (which has now been abolished) and other foreign asset holdings of the government at the end of 2006. The budget surplus (after payment into the PRF) is transferred into the ESSF, and resources are withdrawn from the ESSF to finance budget deficits (including payments into the PRF).

6. Government option to execute annual capital transfers to the Central Bank of Chile (CBC) for the latter’s capitalization over five years (2007 to 2011) in an amount equivalent to a ceiling of 0.5 percent of GDP, subject to availability of a government surplus after payment into the PRF. The government holds the right to decide how to allocate the budget surplus to the ESSF and to CBC capitalization, subject to the above-mentioned conditions.

7. International investment of the resources held in the two SWFs, the PRF and ESSF, can be executed directly by the treasury (under the Ministry of Finance [MoF]) or can be outsourced to the CBC or private fund managers hired by the CBC. The law also establishes a new Financial Advisory Committee on Sovereign Funds of the MoF to advise the minister on investment regulations and decisions related to the two SWFs.

Note that that this law does not impose a particular fiscal rule on the government. It rather imposes a requirement to adopt and implement a fiscal policy aiming at fiscal sustainability and a distinction between actual and cyclically adjusted balances. This provides sufficient flexibility to new governments to define the
explicit formula for the fiscal rule they commit to at the start of their administration. In addition, the law defines new institutions—adopted in 2006 and 2007—that strengthen operation of the fiscal rule.

**Financial Management of the Budget**

International best practice in regard to budgetary management is based on the adoption by the MoF of the following core elements for an efficient financial management (Ter-Minassian, 2010):

1. Strong constitutional and legal powers for the MoF regarding legal initiatives with budgetary impact.
2. Strong political power for the MoF in adopting and implementing the budget regarding other ministries, regional and municipal governments, independent government agencies, and public enterprises.
3. High technical capacity for budgetary planning and ensuring its consistency with the government’s fiscal policy objectives.
4. Adoption of modern accounting principles.
5. Efficient process for legislative approval of the budget, limiting the possibility of legislative amendments that contradict government fiscal policy.
6. High capacity for monitoring and obtaining early information on budget execution and budget corrections of observed deviations.

International evidence shows that countries that meet these requirements achieve better performance in budget execution, stability, and sustainability of fiscal policy (Alesina and Perotti, 1996; Stein, Talvi, and Grisanti, 1998; Alesina and others, 1999; Ter-Minassian, 2010).

Chile’s strong presidential system empowers the government with budgetary initiative (not shared with congress) and strong control over budget design and negotiation of the budget with congress. The executive holds the sole power of tax initiative. Congress lacks line-item veto and is entitled only to vote for or against the government’s proposed budget bill. Congress also lacks in-house capabilities to assess and evaluate in depth current fiscal policy, projections in the budget bill, and underlying macroeconomic assumptions.

However, significant budget negotiations take place between the government, represented by the MoF, and congress before the budget comes to vote. The latter negotiations tend to focus on budget composition (i.e., spending) rather than on taxation or the overall resource constraint, not the least because of the constraints imposed by the fiscal rule on the budget’s overall resource envelope.

**Budget-Planning Horizon**

Many countries are reforming their budget planning, shifting from a one-year horizon to a multiyear horizon. This change is aimed at different objectives: (1) achieving greater transparency, consistency, and intertemporal sustainability of fiscal policy; (2) reducing government short-term bias in public spending
decisions; and (3) committing to a path of gradual correction of initially unsustainable fiscal positions.

On the one hand, there are governments that lack fiscal rules but adopt multi-annual budgeting to enhance sustainability and credibility of fiscal policy. On the other hand, there are governments that have one-year budgeting but that have adopted fiscal rules based on cyclical adjustments. The latter governments have an implicit multiannual budget horizon by distinguishing between actual and cyclically adjusted government accounts and balances. However, in the latter cases, the dissemination of explicit multiyear budgetary and fiscal targets contributes to additional potential gains in fiscal policy sustainability and credibility as well as macroeconomic stability.

Chile has a one-year budgeting framework in place. However, the aforementioned 2006 Fiscal Responsibility Law includes two items that require governments to adopt a fiscal policy that is at least in principle consistent with a horizon that exceeds one year: (1) the requirement imposed on new administrations to present their four-year fiscal policy framework and its implications for the cyclically adjusted government balance and (2) the requirement that the MoF submit annually, together with the draft budget law, a medium-term budget projection.

Moreover, by adhering to a CAB rule, governments are required to base the next year’s budget proposal on medium-term projections for GDP and the price of copper.

Chile’s government is not required to produce or commission long-term projections for government accounts and budgets based on the systematic assessment of fiscal sustainability and regular evaluation of long-term consequences of fiscal decisions with budgetary implications, like those conducted by the U.S. Congressional Budget Office and other governments in the world. However, there has been one exception to this rule, which was the commission of a technical study, required by the 2006 law, to assess the funding needs of the PRF to meet the government liabilities derived from the government pension subsidy (Pilar Pensional Solidario).

**Fiscal Rules**

The number of countries with fiscal rules at the national level has grown steadily over the past two decades, from 10 countries in 1990 to 30 in 2001 (which is also the year that Chile adopted the fiscal rule) and 51 in 2009 (IMF, 2009). Countries with fiscal rules adopted on average 2.5 active fiscal rules in 2009.

Fiscal rules are adopted to attain one or more of three objectives—sustainability of public debt, control of government size, and contribution to cyclical stability. Rules differ widely across countries in how they are defined. One category of rules comprises those that define numerical targets (targets, ceilings, or floors) for government balances, overall revenues, or expenditures that are fixed and hence independent of the business cycle. A paramount example of the latter rules is the Stability and Growth Pact ceilings on government deficit (3 percent of GDP) and debt (60 percent of GDP) for European Union (EU) member countries that were
systematically violated before 2008 and have been almost universally thereafter. A second category is the fiscal rules that focus on stabilizing CABs, allowing for cyclical changes in actual government balances, with the aim of implementing a countercyclical fiscal policy or at least avoiding a procyclical policy bias. According to the IMF (2009), 10 countries (including Chile) had such a rule in place in 2009. Among them, only Germany, Sweden, and the United Kingdom had a fiscal rule in place that defines a numerical target for the actual budget balance throughout the economic cycle.

The IMF (2009) reviews the relative advantages of different fiscal rules, their design and complementarity with other institutional changes, the institutional prerequisites and economic determinants, and the strength in design, execution, and correction of deviations. It also positively assesses the fiscal and macroeconomic effects of fiscal rules in the world.

As noted previously, Chile is among the 10 countries with a fiscal rule that aims at stabilizing government CABs. However, in contrast to the other 9 cases, Chile corrects not only for the cyclical influence of the business cycle, as reflected by GDP deviations from trend, but also for the cyclical deviations of the price of copper from trend. Therefore, Chile’s experience is unique in the world and is exemplary for commodity-exporting countries, as highlighted by the IMF (2009).

However, unlike other countries with fiscal rules in place, Chile has established neither ex ante escape clauses from the rule that would apply under prespecified conditions nor ex post sanctions for violating the rule and ex post regulations to correct deviations from the rule.

**Rules for Management of Government Assets and Liabilities**

As commodity-exporting countries benefited from significant fiscal surpluses during the extended boom in commodity prices over the last decade, many of them have started to save their surpluses in SWFs invested in internationally diversified portfolios. This has been observed in countries with and without fiscal rules. Up to late 2009, 37 countries had SWFs in place, with outstanding aggregate assets of US$3.8 trillion. In the case of Chile, the outstanding investments of its two SWFs added up to US$14.7 billion at the end of 2009.

Countries with SWFs have committed to rules for saving in and dissaving from their funds. In the case of countries with a fiscal rule in place, accumulation into and withdrawal from their funds is determined by the rule. In addition, many countries have adopted legislation and institutions that define investment policies and management principles of their funds.

As mentioned above, in the case of Chile, its two SWFs were established by the 2006 Fiscal Responsibility Law. The latter also established the Financial Advisory Committee on Sovereign Funds of the Ministry of Finance, which advises the MoF on investment policies of these funds.

However, Chile (like most countries in the world) lacks both a policy and an institution focused on consistent management of government financial assets and liabilities with explicit objectives including risk, return, liquidity, and benchmarking.
Moreover, there is no comprehensive management of the government’s total balance sheet, including financial and nonfinancial assets, as well as explicit and contingent financial liabilities.

Requirements in Regard to Budget Accountability and Provision of Information on Financial Management

Worldwide efforts are underway by governments to improve accountability of their fiscal policy and transparency in the provision of financial information. This trend responds to the growing political and academic consensus about the democratic and economic efficiency gains of fuller accountability and transparency in fiscal policy. Although there is little empirical evidence on the benefits of high levels of accountability and transparency in fiscal policy, it seems legitimate to qualitatively infer from the evidence of accountability and transparency benefits associated with monetary policy (e.g., Geraats, Eijffinger, and van der Cruijsen, 2006; Geraats, 2008).

The International Budget Partnership (2010) has compiled an Open Budget Survey, which is an international comparative database on partial and aggregate measures of global transparency and accountability of the budgets of central governments in the world. In the 2010 version of the survey, Chile ranked eighth among 94 countries (Figure 7.1 depicts ranking results for a selected subsample).

Transparency in regard to the two key budget assumptions—future GDP growth and copper prices—was ensured almost from the start of Chile’s fiscal rule, as projections for the two variables made by two ad hoc committees were made public (this is discussed in more detail later in the chapter). However, mapping of the latter projections into the actual budget calculations could not easily be replicated, particularly after several changes to the rule were introduced in

![Figure 7.1 Government Budget Transparency and Accountability, 2010](source: International Budget Partnership (2010)).
2008 and 2009. However, the 2010 Report on Public Finances for the Budget Law 2011 made significant improvements in the provision of information on the calculation of the CAB, which was coherent with the recommendations provided by the Advisory Committee on Fiscal Policy (2010, 2011).

Regarding SWFs, international heterogeneity in their management and investment accountability and transparency is very great. In the most recent international ranking of transparency in the management of SWFs, published by the Sovereign Wealth Fund Institute (2011), Chile ranked first, together with SWFs of seven other countries, including Norway’s Pension Fund (Figure 7.2). In general terms, the current state of transparency and accountability of Chile’s government accounts is varied, ranging from moderate to high.

External Control and Auditing

There are three levels of external control and auditing of government budgets and accounts—the legislature, the government’s general comptroller or auditor, and fiscal councils and committees. In most countries, congress and especially the general comptroller exercise traditional accounting, financial, and managerial control of budget execution and government accounts. More recently, countries have been adopting fiscal committees and councils, which are empowered to provide an economic assessment of fiscal policy design and execution.

In Chile, government accountability in regard to budgetary compliance is largely limited to oversight and control by the General Comptroller’s Office (Contraloría General de la República). This institution focuses on accounting, procedural, and legal compliance by the government in its implementation of fiscal policy and execution of the budget. This oversight and control function by the General Comptroller is exercised at all levels of government. In this way, the General Comptroller’s Office has contributed decisively, both in the past and today, to limiting the extent of illegal government actions and government corruption.

However, there is almost no substantive ex ante, real-time, or ex post evaluation of fiscal policy implementation and its compliance with the fiscal rule, of government spending (either mandatory or discretionary), and of the efficiency and effectiveness of government programs and tax collection efforts. There are simply very few resources spent by congress, political parties, think tanks, or academia in conducting systematic evaluation of fiscal policy and its implementation due to the absence of an independent FC and/or a think tank or institute that focuses on fiscal policy. The only exceptions in regard to this dearth of fiscal policy evaluation are some academic papers and some initiatives at the MoF to assess sporadically some partial aspects of fiscal policy.

Fiscal Committees and Fiscal Councils

Fiscal committees are temporary or permanent advisory bodies to the MoF that are entrusted with specific narrow tasks such as providing advice on institutional changes or investments of SWFs. Their recommendations may or may not be binding on the government.
Figure 7.2  Transparency of Sovereign Wealth Funds, 2011

Independent FCs (and budget offices) are permanent government or congressional agencies entrusted with much broader tasks. Their recommendations can be binding on governments, more often than those of fiscal committees.

Although fiscal committees and FCs have different tasks, the latter may include the following (Debrun and Kumar, 2007; Debrun, Hauner, and Kumar, 2009; Ter-Minassian, 2010; Calmfors and Wren-Lewis, 2011):

- Evaluation and validation of financial and macroeconomic assumptions for the budget;
- Provision of independent projections for the budget and government financial conditions, both for the base scenario and risk scenarios, for the short term and the long term;
- Provision of policy assessments and recommendations on fiscal policy and budgetary management, based on ex ante evaluation of whether fiscal policy is likely to meet its targets;
- Assessment and advice to the government and/or the legislature on the stance of fiscal policy, its long-term sustainability and optimality, and its macroeconomic effects;
- Assessment of and recommendations regarding policies for government asset and liability management;
- Monitoring of budget implementation and provision of recommendations for budgetary corrections in cases of deviations in budget execution; and
- Analysis of fiscal transparency.

Some governments (like Chile’s) have adopted advisory committees of the MoF that provide recommendations, both binding and not binding, on some aspects of the menu of possible tasks identified above.

Other governments have adopted advisory offices of the legislature to provide an independent analysis of the basis and consequences of fiscal policy and budgets of the respective governments. That is the case of the U.S. Congressional Budget Office, which was founded in 1974 (Rivlin, 2010), and the Parliamentary Budget Office in Canada, which was founded in 2008 (Levy, 2008), as well as similar offices in other countries, like Japan, the Republic of Korea, and Mexico.

Among the countries with some kind of FC are many members of the European Union (several with more than one FC), including Austria, Belgium, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, Luxembourg, the Netherlands, Portugal, and the United Kingdom (Debrun, Hauner, and Kumar, 2009). Outside the EU, Japan and Sweden have fiscal agencies in place that provide tax advice. Debrun and Kumar (2007) provide some statistical evidence in support of the notion that FCs in the EU’s 25 member countries have contributed to fiscal discipline, especially when advice in regard to this is provided by an agency mandated by an ad hoc law. Yet the more recent fiscal crisis in several euro area member countries raises doubts regarding these findings.
More recently, and partly in response to fiscal crises, a rising number of countries (including France and the United Kingdom) have adopted or are adopting stronger FCs, based on an ad hoc law that grants them substantial degrees of government independence, strengthening their capabilities to provide independent assessment and advice. This new brand of FC—as well as some of the existing councils—tends to exhibit the following features:

1. It is independent of the government.
2. It is created by a special law that defines its mandate, functions, responsibilities, corporate structure, staffing, financing, accountability, and transparency in the delivery of its studies and activities.
3. It has board members chosen by congress among respected academics or people with significant fiscal policy experience.
4. It is sometimes given the authority to propose sanctions in case of significant deviations in budget execution.

Chile lacks an independent FC, but it has in place independent fiscal committees or expert groups: the Advisory Committee for Trend GDP of the MoF (ACTG), the Advisory Committee for the Reference Copper Price of the MoF (ACRCP), and the Financial Advisory Committee on Sovereign Funds of the MoF. Their role is limited to a consulting or advisory function, as stipulated by the 2006 Fiscal Responsibility Law.

The ACTG provides the MoF with projections for the rate of growth of capital, the labor force, and total factor productivity (TFP), which are used by the MoF to generate projections of potential GDP growth and the output gap, based on an MoF methodology. The ACRCP provides the MoF with projections of the international long-term or trend copper price. Current-year projections for the next year’s output gap and trend copper price are key inputs for the structural fiscal balance rule, which, as mandated by the Fiscal Responsibility Law, is key for determining the overall government budget envelope, that is, to set the levels of government spending, structural and actual government revenue, and hence the actual and structural government balance.

The three individual projections made by each of the 16 members of the ACTG and the single projection made by each of the 12 members of the ACRCP are binding for the budget. Each member provides projections that are averaged, after elimination of the two most extreme observations, to generate the MoF’s official estimates for the four variables. However, the MoF maintains significant discretionary power in determining the methodology (i.e., the equations and parameters) for setting how the structural fiscal balance rule and the four projected variables translate into budgetary projections. Although the MoF has been increasingly transparent about the details of its method, as reflected in technical papers, the summary notes of the ACTG and ACRCP annual meetings, and the 2010 Budget Law for 2011, this information also reflects remaining discretion maintained by the MoF in defining the government’s overall resource envelope.

Independent members of both of these advisory committees are invited by the MoF to serve for one budgetary exercise. Members are selected and designated...
by the MoF among the local communities of macroeconomists (for the ACTG) and copper market experts (for the ACRCP). They attend one technical meeting held at the MoF in July or August of each year and are then invited to submit their individual projections in the following weeks. Between August and October of each year, the MoF publishes two official notes, one for each advisory committee, that report individual and averaged projections and, in the case of the ACTG, potential growth and output gap estimates. There is no formal or direct communication by any of the two committees with congress or the press.

In contrast to the two previous committees, the Financial Advisory Committee on Sovereign Funds is based on a more formal institutional setup. The committee’s six independent members are selected by the MoF from among the local community of macroeconomists and financial experts, and their overlapping tenure is two years. The committee is composed of its chair (a president), a vice-president, and four additional members. The committee meets on average every six weeks at the MoF. Members are remunerated for their attendance at committee meetings. The secretariat of the committee is the international financial directorate of the MoF. Its head acts as secretary of the committee, and his staff (also present at committee meetings) prepares technical reports on international financial conditions and financial performance of SWF investments for each meeting. Committee members discuss financial developments and their implications for the performance of the funds, evaluate fund management by the CBC and meet occasionally with bank managers of the funds, and issue recommendations about fund investment policy and regulation to the MoF. It is very important to note that committee recommendations, in contrast to the projections submitted by the two aforementioned committees, are not binding on the MoF.

The committee issues a press communiqué after each meeting and publishes an annual report on the funds’ financial results and the committee’s investment policy recommendations to the MoF.

CHILE’S FISCAL RULE

The Rule

Chile’s fiscal rule for the central government budget was developed in 2000 and implemented in 2001 by Finance Minister Nicolás Eyzaguirre and his main advisors. Although the rule has been subjected to several changes, its main features have remained unaltered. Therefore, it is now in its twelfth year of operation through three different administrations—the governments of presidents Lagos (2000 to 2006), Bachelet (2006 to 2010), and Piñera (since 2010), who is committed to its continuation through the 2010–14 term.

Chile’s fiscal rule aims at contributing to two policy objectives—fiscal sustainability and fiscal/macroeconomic stability. Fiscal stability is ensured by committing to a target level for the government’s CAB that is consistent with government saving needs (net of government investment). Fiscal (and possibly
macroeconomic) stability is attained by committing to a government spending path that is consistent with cyclically adjusted government revenue.\(^1\) Therefore, Chile's CAB rule combines a partial application of the permanent-income theory to government spending with a target level for long-term government saving. Hence, the rule’s aim is to save during high-revenue periods in order to withdraw from the latter savings in bad times, over and above saving or dissaving a fraction of government revenue over the cycle, that is, the CAB.

Chile's largest sources of government cyclical volatility (i.e., the budget's largest sensitivity to cyclical variables) are nonmining tax revenue and mining tax and transfer revenue. The business cycle reflected in the cyclical component of GDP largely determines the cyclical behavior of nonmining tax revenue, whereas mining tax and transfer revenue is largely determined by the cyclical component of the prices of copper and molybdenum.\(^2\)

Chile's government spending, compared to that of other OECD countries, is relatively insensitive to the business cycle because of the small size of automatic stabilizers on the expenditure side, such as government-financed unemployment benefits or institutionalized public employment programs during cyclical downturns. Hence, the fiscal rule distinguishes between actual and cyclically adjusted government revenue, but not between actual and cyclically adjusted government expenditure.

Therefore, the fiscal rule is embedded in the following equation for the cyclical component of the government balance, that is, the difference between the CAB and the actual balance of the central government. This difference boils down to the difference between cyclically adjusted and actual government revenue, which is determined by the difference between cyclically adjusted and cyclical nonmining tax revenue and social security receipts (driven by the output gap), and between cyclically adjusted and cyclical differences in private mining tax revenue, CODELCO (the government-owned copper corporation) copper transfers to the budget, and CODELCO molybdenum transfers to the budget:

\[
B_t^* - B_t = (R_t^* - G_t) - (R_t - G_t) = NMTR_t^* - NMTR_t + MTR_t^* - MTR_t + CR_t^* - CR_t + MR_t^* - MR_t ,
\]

\((7.1)\)

\(^1\)The rule is only partly consistent with a permanent-income approach, namely, making government spending consistent with cyclically adjusted government revenue. Therefore, other sources of differences between temporary and permanent revenue—such as temporary changes in taxes or interest rates—are not considered in adjusted revenue estimations due to the political and economic difficulty of doing so. This partial approach to permanent-revenue estimation, limited to cyclical adjustments of government revenue and balance, is adopted by all other countries that adjust government accounts or adopt fiscal rules to account for temporary deviations of relevant budget variables.

\(^2\)Copper tax and transfer revenue dominates that from molybdenum by far. Mining tax revenue is paid by private mining companies, whereas mining transfers to the central government are paid by the large public mining corporation CODELCO.
where

\[ B_t^* = \text{government CAB}, \]
\[ B_t = \text{actual central government balance}, \]
\[ R_t^* = \text{cyclically adjusted central government revenue}, \]
\[ R_t = \text{actual central government revenue}, \]
\[ G_t = \text{actual central government expenditure}, \]
\[ NMTR_t^* = \text{cyclically adjusted net nonmining tax revenues and social security receipts}, \]
\[ NMTR_t = \text{net nonmining tax revenues and social security receipts}, \]
\[ MTR_t = \text{actual tax revenue from private mining companies}, \]
\[ MTR_t^* = \text{cyclically adjusted tax revenue from private mining companies}, \]
\[ CR_t = \text{actual transfers from CODELCO copper sales}, \]
\[ CR_t^* = \text{cyclically adjusted transfers from CODELCO copper sales}, \]
\[ MR_t = \text{actual transfers from CODELCO molybdenum sales}, \]
\[ MR_t^* = \text{cyclically adjusted transfers from CODELCO molybdenum sales}, \]
\[ t = \text{time period subscript}. \]

Simple reordering of the identity part of equation (7.1) shows that the fiscal rule boils down to limiting actual government spending to cyclically adjusted revenue net of the CAB:

\[ G_t = R_t^* - B_t^*. \]  \hspace{1cm} (7.2)

Cyclically adjusted (i.e., trend or long-term) variables are nonobservable, and therefore estimates of them are required for implementation of the fiscal rule. As discussed previously, estimates of nonobservables are outsourced annually to private sector commissions in preparation of the submission of the budget law and are finally approved by congress. Implementation of fiscal policy during the subsequent budget (i.e., calendar) year abides by the budget law and the fiscal rule.

There are three key elasticities in the fiscal rule. The first one is the output gap elasticity of nonmining tax revenue, which is explicitly reflected in equation (7.1). Until 2008, the MoF fixed this parameter at a value of 1.05, which implicitly assumes that nonmining government revenue varies almost proportionately to cyclical GDP. This aggregate elasticity was replaced in 2009 by separate elasticities for different categories of tax revenue, varying between 1.0 and 2.4 (Rodríguez, Escobar, and Joratt, 2009).

The second and third elasticities are the copper and molybdenum price elasticities of the three mining revenue items in equation (7.1). There are no explicit values attached by the MoF to the two latter elasticities. Instead, the Budget Office of the Ministry of Finance (DIPRES) produces annual estimates for mining tax and transfer receipts at actual and trend prices for both minerals.

**RULE IMPLEMENTATION, CHANGES, AND BUDGET PERFORMANCE**

Let’s now look at how the rule was implemented, the changes that were introduced to its definition and implementation, and the budget performance under the rule.
Although the fiscal rule has been in place since January 2001, several institutional and methodological additions and changes have subsequently been introduced (Velasco and others, 2010; Advisory Committee on Fiscal policy, 2011). During the initial phase, the following refinements were made:

- The ACTG of the MoF was invited to submit growth projections (August 2001).
- Methodology for CAB was published (September 2001).
- The ACRCP of the MoF was invited to submit long-term copper price projections (August 2004).
- Government statistics were changed from a cash basis to an accrual basis in 2004, following the 2001 IMF methodology (February 2004).

The following methodological changes were introduced into the fiscal rule in regard to the treatment of mining revenue:

- Inclusion of cyclical adjustment of private mining tax revenue (August 2005);
- Inclusion of cyclical adjustment of the price of molybdenum in the revenue paid by the state mining company CODELCO (December 2005);
- Inclusion of cyclical adjustment of the new royalty tax on mining (January 2006);
- Inclusion of cyclical adjustment of the additional tax on mining (December 2006); and
- Amendment to the cyclical adjustment of the royalty tax on mining (considering monthly provisional payments) (December 2007).

The following changes were introduced into the fiscal rule, extending the principle of cyclical adjustment to other variables (beyond GDP and prices of minerals) and to temporary tax changes:

- Inclusion of cyclical adjustment of interest revenue on government assets (September 2008);
- Inclusion of adjustments to nonmining tax revenue considering temporary tax cuts (January 2009); and
- Inclusion of cyclical adjustment to operational income and property income on nonfinancial government assets (January 2010).

On advice of the Advisory Committee on Fiscal Policy (2010, 2011), the three latter changes were reversed by the government in 2010. Therefore, these partial attempts to extend the fiscal rule from a CAB rule to a structural rule based on an estimate of permanent government income—introducing adjustments to all variables with temporary components, including tax rates and, eventually, expenditure items—reverted to the methodology that defined the rule in 2001 through 2007. Hence, following international best practice adopted by the OECD, the IMF, and the European Commission (Ter-Minassian, 2010), Chile’s fiscal rule was limited to cyclical adjustments. However, in contrast to that in most other
countries, the rule adjusts for the cyclical component not only of the GDP, but also of Chile’s key commodity prices, that is, copper and molybdenum.

The independent ACTG of the MoF provides annual growth projections (six years ahead) for production factors, which are then used by the MoF to generate potential GDP growth and output gap projections. The most recent (August 2010) potential GDP growth and output gap projections by the MoF, based in part on committee input projections, are reported in Figure 7.3. These projections determine the resource envelope for the 2011 budget. Note that these figures are ex post (August 2010) estimates of Chile’s current and past output gap estimates and hence are not the actual output gap estimates used in implementing the fiscal rule in previous years (i.e., 2001 to 2010). For example, 2010 backcasts of 2001–09 potential growth rates are significantly lower than MoF potential growth rates estimated in previous years, which were at 5 percent and above. As time has passed, this has implied a significant upward correction of output gap estimates and hence a downward correction of budgeted government expenditure; that is, ceteris paribus, a contractionary fiscal policy.

The projection method and the variables projected by the committee have been refined over the years. The most recent MoF actual and potential growth methodology (Ministerio de Hacienda, 2009) is based on a simple Solow-type growth decomposition equation, based on a Cobb-Douglas Harrod-neutral production function, with capital services (capital stock adjusted by utilization), labor services (hours worked adjusted by educational attainment of the labor force), and residual total factor productivity. Trend growth is generated by filtering actual growth projections. It is important to note that the MoF, not the independent committee, estimates the levels of actual and trend output and hence the output gap.
Figure 7.4 Committee’s Projections, Average Actual Future GDP Growth, and Actual GDP Growth, 2002–10 (Percent)

Source: Author’s calculations based on data published in the 2011 report of the Advisory Committee for Trend GDP.

Note: Committee’s projected average trend gross domestic product (GDP) growth is the average of all future projections made by the committee at the corresponding year. Average actual future growth is average GDP growth from a rolling window from year $t$ through year $t+4$.

Figure 7.4 depicts for any given year current GDP growth, the ACTG’s long-term growth projection, and, to show implicit forecast errors, actual average future growth between the subsequent year and 2010. The gap between committee growth forecasts and actual average future growth rates grows from 2005 through 2009.

As noted previously, a second committee, the ACRCP, provides a point estimate for the world (London Metal Exchange) copper price over the subsequent decade. Figure 7.5 depicts for any given year the current copper price, the ACRCP’s long-term copper price projection, and, to show implicit forecast errors, the actual average future price of copper between the subsequent year and 2010. As the actual copper price has risen over time, the committee’s future trend price estimate has been adjusted upward significantly, but the gap between projected and average actual future prices through 2010 (a measure of the forecast error) has remained roughly constant over the decade. Yet the major upward correction of the long-term copper price has meant an upward correction of budgeted government expenditure, that is, ceteris paribus, an expansionary fiscal policy.

How much do current observations of GDP growth and the copper price affect the committees’ forecasts? Certainly a lot, as reflected by the high correlations between current or lagged growth and growth projections and between current or lagged copper price and copper price projections, which range from 0.63 to 0.77 (see Table 7.2).

A key policy variable is the target value for the CAB $(B^\circ)$. For the first seven years of the fiscal rule, the CAB was set at a positive 1 percent of GDP. The rationale behind this very conservative fiscal policy was the need for positive central
government saving to finance government pension liabilities, recapitalize the CBC, and finance several government contingent liabilities, including the government pension subsidy.

For 2008, the CAB was reduced to 0.5 percent of GDP based on recommendations of fiscal sustainability studies (Engel, Marcel, and Meller, 2007; Velasco and others, 2007). In the face of a domestic recession due to the international crisis in January 2009, the CAB was further reduced to a balanced (0 percent of GDP) CAB in 2009. These two figures were based on the methodological

TABLE 7.2

| Correlations between Committee Projections and Actual Future Variables, 1990–2010 |  |
|---|---|---|
| Actual copper price $(t - 1)$ and projected copper price $(t)$ | 0.77 |
| Actual copper price $(t)$ and projected copper price $(t)$ | 0.63 |
| Actual GDP growth $(t)$ and projected GDP growth $(t)$ | 0.64 |
| Actual GDP growth $(t - 1)$ and projected GDP growth $(t)$ | 0.76 |

Sources: Reports of the Advisory Committees for Trend GDP and for the Reference Copper Price, and Central Bank of Chile.

Note: Boldface indicates statistically significant correlations.
changes introduced between September 2008 and January 2010, which were subsequently reversed.

Using the current methodology for the fiscal rule (returning to the principles applied between 2001 and 2007), the actual CAB ratios stood at –0.6 percent of GDP in 2008 and –3.0 percent of GDP in 2009. The new 2010 administration prepared a medium-term fiscal policy framework that implies a gradual correction of the large negative CAB recorded in 2009. The CAB was raised to –2.0 percent of GDP in 2010 and a budgeted –1.8 percent of GDP in 2011. The administration is committed to further fiscal adjustment toward attaining a CAB of –1.0 percent of GDP in 2014.

Figure 7.6 depicts the ratio of the CAB to GDP, the ratio of the actual balance to GDP, and their difference (the ratio of the cyclical balance to GDP) during the 1990s (without a fiscal rule) and the 2000s (with the fiscal rule in place).

The data support the following policy conclusions:

- Cyclical shocks to the government budget (reflected by the ratio of the cyclical balance to GDP) are very large.
- Cyclical shocks to the budget are dominated by the volatility of copper prices, not by the volatility of GDP, as reflected by the larger cyclical components recorded in the 2001–10 period.
- The fiscal rule allows for large government saving flows during cyclical booms.

---

4 The CAB and cyclical balance ratios depicted in Figure 7.6 for 1990–2000, when there was no fiscal rule in place, are counterfactual estimations based on the fiscal rule methodology applied since 2001.
Even without a fiscal rule, fiscal policy was conservative during most of the 1990s, but during domestic cyclical downturns (the 1998 and 2009 recessions), the fiscal rule provides insufficient space for a stronger countercyclical policy, leading to significant downward adjustments of the CAB. In 2008, the fiscal rule was effectively suspended by substituting for the 0.5 percent ex ante ratio of the CAB to GDP a −0.6 percent ex post ratio of the CAB to GDP, which was further reduced to a −3.0 percent ex post ratio of the CAB to GDP in 2009.

Figures 7.7 and 7.8 depict the behavior of the ratios of government revenue and expenditure to GDP and growth rates, respectively, during the 1990s (without a fiscal rule) and the 2000s (under the fiscal rule). Government revenue growth strongly reflects the copper price and domestic GDP cycles. The upward correction in long-term copper price forecasts (dominating the downward correction in trend GDP forecasts) and the downward adjustment in CAB targets explain the large rise of government expenditure growth, from 1.6 percent in 2003 to 17.8 percent in 2009. The average government spending increase attained 10 percent during the Bachelet administration (2006–09), when GDP growth was 2.7 percent. This large fiscal expansion was reflected in a 24.8 percent share of government expenditure in GDP in 2009, the largest ratio of government spending to GDP recorded in several decades. The current administration’s commitment to gradually raise the CAB toward −1.0 percent in 2014 is likely to entail government expenditure growth below GDP growth, hence reducing the...
share of government spending in GDP, as observed in 2010. Figure 7.9 reflects the mining and nonmining component of government revenue since 2005, confirming the greater volatility of mining revenue. Figure 7.10 shows the increase in net government assets during recent years.

Correlations between budget variables and GDP growth and the price of copper for 1990–2010 and the subperiods before and during the fiscal rule reflect the following (see Table 7.3):

- A large increase in the correlation between the price of copper and overall government revenue in the 2000s due to the larger share of mining revenue and larger volatility of copper prices observed in the 2000s
- A large increase in the correlation (when quarterly data are used) between the price of copper and the actual government balance (see Table 7.4)
A reversal of a large negative correlation between the price of copper and net government assets (at −0.4 in the 1990s) to a large positive correlation between the two latter variables (at +0.9 in the 2000s)

These results suggest that adoption of the fiscal rule has made a difference for fiscal policy in Chile—a copper price shock is more likely to be saved and reflected in higher government assets than before the fiscal rule was adopted.
TABLE 7.4

Correlations between Macroeconomic Variables, 1990–2010
(quarterly data)

<table>
<thead>
<tr>
<th></th>
<th>Copper price</th>
<th>EMBI</th>
<th>Real exchange rate</th>
<th>GDP growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper price</td>
<td>0.33</td>
<td>−0.22</td>
<td>−0.47</td>
<td>0.59</td>
</tr>
<tr>
<td>EMBI</td>
<td>−0.44</td>
<td>0.37</td>
<td>0.24</td>
<td>−0.29</td>
</tr>
<tr>
<td>Real exchange rate</td>
<td>−0.61</td>
<td>0.46</td>
<td>0.3</td>
<td>−0.81</td>
</tr>
<tr>
<td>GDP growth</td>
<td>−0.14</td>
<td>0</td>
<td>0.07</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on Chilean budget directorate and Central Bank of Chile data.

Note: The upper triangular matrix reports correlations between Hodrick-Prescott-filtered series of the logs of copper price, real exchange rate, and real gross domestic product (GDP) and Hodrick-Prescott-filtered Emerging Markets Bond Index (EMBI). The lower triangular matrix presents correlations between growth rates of copper price, real exchange rate, and real GDP and the change in EMBI. The diagonal reports correlations between Hodrick-Prescott-filtered series and rates of growth or changes. Boldface indicates statistically significant correlations.

EVALUATION OF THE FISCAL RULE AND ITS MACROECONOMIC IMPACT

Several studies have provided qualitative arguments or quantitative estimates about the fiscal policy benefits and macroeconomic effects of Chile’s fiscal rule. The main fiscal policy consequences of the CAB rule, which implies an acyclical government expenditure path, have been the following: a reduction of procyclical bias in fiscal policy, delinking government expenditure from cyclical shocks and strengthening the role of government saving in buffering cyclical shocks (Larraín and Parro, 2006; Rodríguez, Tokman, and Vega, 2006; Kumhof and Laxton, 2009; Velasco and others, 2010; Frankel, 2010; Marcel, 2010; IMF, 2010; Ter-Minassian, 2010; Schmidt-Hebbel, 2010; OECD, 2010), and gains in fiscal sustainability and credibility, reflected in lower sovereign risk premiums (Fiess, 2004; Larraín and Parro, 2006; Lefort, 2006; Rodríguez, Tokman, and Vega, 2006; Kumhof and Laxton, 2009; Velasco and others, 2010; Marcel, 2010; IMF, 2010; Ter-Minassian, 2010; Schmidt-Hebbel, 2010; OECD, 2010).

Simulation studies for Chile’s fiscal rule show the following:

- The rule performs well if the policymaker puts a small weight on output volatility relative to inflation volatility in his or her objective function, and a more aggressive countercyclical fiscal rule can attain a lower output volatility, but at the cost of a higher volatility in fiscal variables and in inflation (Kumhof and Laxton, 2009, using a dynamic stochastic general equilibrium model for Chile); and

- The efficiency frontier derived from countercyclical government spending dominates the frontier attainable when spending is cyclically neutral, as it is under the current fiscal rule. The major welfare gain of a countercyclical rule is due to lower output volatility, while spending volatility rises (García, 2011, using a dynamic stochastic general equilibrium model for Chile).

- Government spending volatility is increased by a broader government objective function that puts a positive weight on countercyclical spending and is lowered by a broader government objective function that puts a negative
weight on large changes in government spending (Advisory Committee on Fiscal Policy, 2011, using a generalized government objective function in partial equilibrium).

Other studies argue that the rule has implied—or they have measured—the following macroeconomic effects:

- Generally, lower macroeconomic uncertainty and volatility (Fiess, 2004; Larrain and Parro, 2006; Rodríguez, Tokman, and Vega, 2006; Kumhof and Laxton, 2009; Velasco and others, 2010; Marcel, 2010; IMF, 2010; Ter-Minassian, 2010; Schmidt-Hebbel, 2010; OECD, 2010);
- A reduction in GDP volatility by 32 percent (Larrain and Parro, 2006);
- Lower interest rate volatility (Rodríguez, Tokman, and Vega, 2006);
- Lower exchange rate volatility and less real exchange rate appreciation during booms (Velasco and others, 2010);
- Less dependence on foreign financing during downturns (Rodríguez, Tokman, and Vega, 2006; Velasco and others, 2010);
- Better protection of social spending during cyclical downturns (Rodríguez, Tokman, and Vega, 2006; Velasco and others, 2010).

Has the response of fiscal variables and selected macroeconomic and financial variables to a copper price shock changed since the start of the fiscal rule? This question can be answered by simulating impulse responses of key fiscal, financial, and macroeconomic variables to a copper price. For this purpose, we can estimate vector autoregressions for the Chilean economy using quarterly data for 1990 to 2010 for the variables (from most exogenous to most endogenous): copper price growth, change in Emerging Markets Bond Index (EMBI) Chile sovereign risk spread, real exchange rate growth, change in actual fiscal balance ratio to GDP, and GDP growth (see Table 7.4 for correlations between these variables). Vector autoregression estimations are performed for the full 1990–2000 period and separately for the subsample before the fiscal rule (1990–2000) and since the start of the rule (2001–10).

The impulse response functions for a temporary 10 percent copper price shock (which dies off quickly one-quarter after it occurs) are depicted in Figures 7.11, 7.12, and 7.13 for the three periods, and the contrasting results for 1990 to 2000 and 2001 to 2010 are compared.

During 1990–2000, the copper price shock does not have any impact on the sovereign risk premium and the fiscal balance, but it contributes to a temporary real exchange rate appreciation and a temporary decline in growth.

Very different results are observed for the same copper price shock in 2001–10. Now it causes a decline in the sovereign debt premium by 20 basis points, which is consistent with a rise in the government balance by an average 1 percentage point during five quarters, which leads to higher SWFs (not included in the simulation). The real exchange rate appreciates by 3 percent for one quarter,
which is consistent with the EMBI-induced reduction in the cost of foreign financing. GDP growth now responds positively with a delayed increase by 0.7 percentage points in the third quarter after the copper price shock.

Therefore, the fiscal rule has made an effective and significant contribution to isolate government spending from cyclical copper price (and GDP) shocks. Government savings in SWFs has taken the role of the key buffer variable, contributing in this way to stabilizing output and the exchange rate.

Last but not least, the fiscal rule has strengthened the political economy of fiscal policy and government spending, making budget management more resilient to pressures from lobbies and interest groups to spend cyclical government revenue stemming from temporary copper windfalls and domestic income booms.
By and large, Chile’s fiscal rule has proven to be a successful instrument for strengthening fiscal sustainability, reducing the procyclical bias in fiscal policy and spending, contributing to macroeconomic stability, and strengthening the political economy of fiscal policy. Yet several shortcomings are still observed in the design and implementation of the fiscal rule and in Chile’s institutional framework that governs fiscal policy. Hence, the Minister of Finance of the new Piñera administration, Felipe Larraín, convened an Advisory Committee for the Design of a Fiscal Policy Based on a Second-Generation Structural Balance for Chile to assess shortcomings and propose reforms of the rule and the fiscal institutions. The committee was formed in May 2010 and met through January 2011, delivering a

**SHORTCOMINGS OF CHILE’S FISCAL RULE AND PROPOSALS FOR REFORM**

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**Figure 7.12** Estimated Impulse Responses to a Copper Price Shock, 1990–2000 (before Fiscal Rule)

Source: Author’s simulation.

Note: The quarterly impulse response functions are based on vector autoregression estimations described in the text. The temporary copper price shock is a 10 percent rise in the first quarter, which is partly reversed in the second quarter (plus 2 percent) and statistically fully reversed from the third quarter onward. The figures show impulse response functions and their corresponding 90 percent confidence bands. EMBI: Emerging Markets Bond Index; GDP: gross domestic product.

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On the general methodology of the fiscal rule, the committee made the following recommendations:

1. Define a rule based on the definition of the CAB limited to cyclical adjustments in revenue due to cyclical shocks to GDP and world prices of copper and molybdenum without considering other sources of deviations of current revenue from permanent revenue. This recommendation has been applied since 2010, reversing the changes in the rule that were introduced between late 2008 and early 2010.

2. Supplement the rule of the CAB with an expenditure component that allows for an ex ante countercyclical policy. This expenditure component could be a negative function of the ex ante projected output gap.

Figure 7.13  Estimated Impulse Responses to a Copper Price Shock, 2001–10 (during Fiscal Rule)

Source: Author’s simulation.
Note: The quarterly impulse response functions are based on vector autoregression estimations described in the text. The temporary copper price shock is a 10 percent rise in the first quarter, which is partly reversed in the second quarter (plus 2 percent) and statistically fully reversed from the third quarter onward. The figures show impulse response functions and their corresponding 90 percent confidence bands. EMBI: Emerging Markets Bond Index; GDP: gross domestic product.
3. Supplement the rule with a partial adjustment mechanism for expenditure in response to large changes in the projections of trend GDP growth and long-term copper and molybdenum prices to avoid large changes in expenditure like those observed in 2006 through 2009.

4. Define ex ante escape clauses to the rule that apply in exceptional circumstances that require an exceptional fiscal expansion or adjustment that is not feasible without a temporary suspension of the rule. Invocation of such clauses would avoid a de facto suspension or ad hoc modification of the rule, as was observed in 2008 through 2009. Invocation of the escape clauses would proceed under certain institutional conditions and would require a policy commitment to converge back to full application of the rule within a reasonable time horizon.

5. Maintain institutional coverage of the rule over the CAB of the consolidated central government level, that is, not extending the rule to the general government for practical reasons. However, complement the rule with measures to prevent the risk of quasi-fiscal operations in support of decentralized government agencies, public enterprises, and municipalities.

6. Maintain the rule for the overall balance of the central government (without adjusting for the interest on government financial assets and liabilities) in the short term. However, after a transition period in which both indicators are calculated, define the rule for the primary balance of the central government, which has the following benefits: (1) it avoids the effect of temporary changes in interest rate on the CAB, (2) it eliminates the procyclical bias caused by the accumulation into and withdrawal from net financial assets, and (3) it establishes a direct link with the standard analysis of long-term fiscal sustainability.

7. Choose a target level for the CAB determined by long-term fiscal solvency objectives. This requires engaging in systematic assessments of the values of contingent liabilities of the government (pensions, health, education, etc.) over time. Similar studies should be devoted to the time profile of government assets (such as the decline in mining assets of state company CODELCO).

On the methodology for estimating the cyclically adjusted revenue associated with GDP and the methods for estimating trend GDP, the committee made the following recommendations:

1. Maintain the role of the ACTG but extend the minutes of the committee to include explicitly its estimates for the level of trend GDP and the corresponding output gap measure.

2. Maintain the revenue elasticities to GDP at the values presented in Velasco and others (2010), except set the elasticity of health insurance contributions at 1.17.

3. Avoid any cyclical adjustments to revenues and to the CAB due to temporary tax measures except for provisional payments of taxes that shift resources between years.
On the methodology for estimating the cyclically adjusted revenue associated with mining prices and the methods for estimating long-term prices of copper and molybdenum, the committee made the following recommendations:

1. Maintain the role of the ACRCP, but provide the members of the committee with better information on world copper markets and prices.
2. Delegate preparation of molybdenum trend price forecasts (which are now prepared by the budget directorate) to a new committee or Cochilco (the government copper analysis agency).
3. Simplify and make public the calculation of the cyclically adjusted mining revenue, possibly in line with IMF (2010).

Regarding the institutional framework, international best practice in recent years suggests that fiscal policies and the adoption of fiscal rules are strengthened by the establishment of agencies that audit fiscal projections, assess the achievement of fiscal policy objectives, and promote policy transparency. In this regard, the committee recommended adoption of an FC with a mandate and tasks defined by a statutory law, supported by council members, staff, and consultants. The FC’s main tasks would comprise the following:

1. Assess the methodology of the fiscal rule;
2. Provide binding assumptions and projections for the cyclical adjustment variables required to estimate the CAB, based on the forecasts made by the ACTG and ACRPC;
3. Evaluate fiscal policy, including implementation of the fiscal rule and the sustainability of medium- and long-term fiscal policy;
4. Issue a technical report on any changes in accounting principles and methodologies used in preparation of the budget;
5. Evaluate the relevance of invoking escape clauses and the convergence strategy to the target level of the CAB; and
6. Express a position on the government’s report on contingent liabilities and the impact of the latter on the CAB target.

Finally, the committee made recommendations to strengthen transparency, accountability, and consistency of fiscal policy in Chile, among which the following are the most important:

1. Communicate publicly any changes in the methodology used in calculating the CAB before their adoption;
2. Establish as legal requirement the convening of both the ACTG and the ACRPC and the publication of the minutes of their meetings;
3. Improve publication of information required in replicating or checking fiscal, macroeconomic, and mining revenue calculations for the CAB;
4. Provide more detailed information in the annual presentation of medium-term financial projections for the budget;
5. Establish as legal requirement the publication of the *Annual Report on Public Sector Financial Management* and updating of fiscal projections, including assessment of expected budgetary deviations and discussion of actions for corrections;

6. Expand the coverage of information provided in the *Annual Report on Contingent Liabilities*;

7. Establish as legal requirement the regular delivery of actuarial long-term fiscal projections; and

8. Improve assessment and information provided in the financial reports of new laws.

**FISCAL POLICY LESSONS FOR COMMODITY-EXPORTING COUNTRIES**

Fiscal policy and macroeconomic performance of commodity-exporting economies are often strongly affected by commodity price booms and busts. Weak government institutions, an underdeveloped fiscal policy framework, and the absence of a fiscal rule lead to procyclical fiscal policy bias. Commodity price booms lead to excessive public and private spending, undersaving and overborrowing, excessive credit growth and leveraging, domestic asset price bubbles, and exchange rate overappreciation. Conversely, when the international commodity price booms are halted and end in price busts, fiscal and private sector spending is curtailed, sometimes dramatically, as a result of foreign and domestic lending reversals, leading to a domestic recession, firm bankruptcies, and job losses. The latter effects are compounded by a financial crisis such as some combination of a banking crisis, government and external debt default, and major nominal and real exchange rate depreciation.

Weak political and fiscal policy institutions have adverse effects that go well beyond Dutch disease and financial crises in commodity-exporting countries. Opaque budgetary management and external control, lack of transparent fiscal policies and budgets, and poor budgetary accountability lead to ineffective and inefficient government spending, misuse of government resources, and corruption.

Adoption of a modern institutional framework for fiscal policy can make a major contribution to lessening the adverse impact of commodity price bubbles and strengthening efficiency and good use of government resources. Such a framework is instrumental for the dual goal of fiscal policy—attaining and maintaining fiscal solvency (or budgetary sustainability) and contributing to cyclical and macroeconomic stabilization.

A large body of empirical international research shows that fiscal (and monetary) procyclicality is more likely in countries with poor fiscal governance, high levels of corruption, low fiscal credibility, domestic financial underdevelopment, and weak integration into world financial markets (Ilzetzki and Végh, 2008;
Calderón and Schmidt-Hebbel, 2008; Calderón, Duncan, and Schmidt-Hebbel, 2010).

One effective way to break out of fiscal procyclicality—in both commodity-exporting and other economies—is to reform fiscal policy institutions, including by adopting a fiscal rule. Certainly this is much easier than tackling domestic and external financial underdevelopment and means working at improving fiscal governance and fiscal policy and, eventually, reducing corruption.

The international experience and Chile’s case suggest that both economics and the political economy of fiscal policy are strengthened by the following reforms of fiscal institutions and policies.

**Strengthening the Institutional Framework of Fiscal Policy**

Developing the institutional framework for fiscal policy and budget planning and execution comprises five components:

- **Fiscal responsibility law:** Adopt a legal framework, specifying budgetary procedures and rules to strengthen fiscal policy transparency, accountability, and stability. Fiscal responsibility laws establish requirements for governments to state transparently their short- and medium-term policy objectives, to set short- and medium-term targets for fiscal flows and stocks, to provide transparent information on budget planning and execution to the legislature, to implement a fiscal policy conducive to fiscal stability and solvency, and to account ex post for fiscal policy execution and attainment of policy objectives.

- **Financial management of the budget:** The core elements for efficient budgetary management by the MoF comprise granting strong powers to the MoF on legal initiatives with budgetary impact and in budget decisions regarding other ministries and government levels, commanding a high technical capacity for budgetary planning, adopting modern accounting principles, ensuring an efficient process of legislative approval of the budget that limits the possibility of congressional amendments, and developing a large capacity for monitoring budget execution.

- **Budget planning horizon:** Extend budgetary planning from one-year to multiyear horizons.

- **Fiscal policy accountability and transparency of budgetary information:** For both economic efficiency and political legitimacy goals, accountability of fiscal policy and transparency in provision of information of government accounts should be improved significantly.

- **External control and auditing:** Countries should strengthen external control and auditing functions of fiscal policy, budget execution, and government accounts at three levels—congress, the government’s general comptroller or auditor, and fiscal councils and committees.
Adoption of a Fiscal Rule

Adoption of a fiscal rule based on a CAB is the key reform required to avoid a procyclical bias in fiscal policy and government spending. For noncommodity exporters, cyclical adjustment may be limited to domestic GDP shocks; for commodity exporters, however, it is key to add cyclical adjustments to price shocks for their commodities. As is the case in Chile, for most commodity exporters, the largest source of government revenue volatility is precisely the price volatility of their commodity exports, not domestic GDP volatility. Moreover, domestic GDP volatility is likely to be lowered (as has been the case in Chile) by adoption of a rule that accounts for both GDP and commodity price volatility.

A successful fiscal rule will have a positive impact on the stability of government spending and government programs, fiscal policy sustainability and credibility, and overall macroeconomic stability. To achieve success, the fiscal rule should satisfy the following conditions:

- Based on calculations and formulas that are relatively stable over time;
- Based on assumptions and calculations that should be made public, together with the relevant budgetary information, to be replicated by outsiders; and
- Part of an institutional environment that supports independent or unbiased provision of key economic and financial forecasts (such as that by independent committees or councils).

The actual formula for the fiscal rule will be country specific, and so will be the budget balance for which it is defined (total or primary), the government level to which it applies (central or general government), the degree of spending acyclicity or countercyclicality, and the target level for the CAB.

Establishment of a Sovereign Wealth Fund

Fiscal rules that target CABs require an SWF in which government savings are deposited during booms and withdrawn during downturns. Such funds are particularly important in commodity-exporting countries, where they are typically invested in foreign currency investments that are held abroad as government revenue comes also in foreign currency from the revenue obtained by commodity-exporting firms.

SWFs should satisfy the following conditions:

- Effective and transparent corporate governance;
- Transparent information on the transfers between the budget and the SWF;
- Portfolio composition determined by maturity concerns (length of commodity price and GDP cycles) and the government’s degree of risk aversion; and
- Efficient portfolio management set according to transparent guidelines and closely monitored by the government and the public.
Establishment of Government Committees and a Fiscal Council

Specialized government or MoF committees set up with narrow tasks, such as provision of independent forecasts of key variables for the budget or a board for the SWF, and staffed by independent members are an efficient way to bring expertise and independence to the government, thereby strengthening fiscal institutions.

Moving beyond the latter committees, several advanced economies have put in place or are establishing independent FCs that have broader mandates to improve the quality of fiscal policy assessment, budget planning, and monitoring of budget execution. It appears that no commodity-exporting country has established an FC to date. However, FCs are particularly needed in countries with weaker fiscal institutions, where such councils could make a major difference. Among their potential tasks are the following:

1. Evaluation and validation of financial and macroeconomic assumptions for the budget
2. Provision of independent projections for the budget and government financial conditions
3. Provision of policy assessments and recommendations of budgetary corrections
4. Advice on the stance of fiscal policy, its long-term sustainability and optimality, and its macroeconomic effects
5. Recommendations on policies for government asset and liability management
6. Monitoring of budget implementation and provision of recommendations on budgetary corrections in cases of deviations in budget execution
7. Recommendations to improve fiscal transparency

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APPENDIX: ALTERNATIVE IMPULSE RESPONSES FOR VECTOR AUTOREGRESSION ESTIMATIONS BASED ON MEASURES OF CYCLICAL DEVIATIONS OF VARIABLES

Figure 7A.1  Estimated Impulse Responses to a Copper Price Shock, Full Sample, 1990–2010

Source: Author’s simulation.

Note: The quarterly impulse response functions are based on vector autoregression estimations described in the text. The temporary copper price shock is a 10 percent rise in the first quarter, which is partly reversed in the second quarter (plus 2 percent) and statistically fully reversed from the third quarter onward. The figures show impulse response functions and their corresponding 90 percent confidence bands. EMBI: Emerging Markets Bond Index; GDP: gross domestic product.
Figure 7A.2  Estimated Impulse Responses to a Copper Price Shock, 1990–2000 (before Fiscal Rule)

Source: Author’s simulation.

Note: The quarterly impulse response functions are based on vector autoregression estimations described in the text. The temporary copper price shock is a 10 percent rise in the first quarter, which is partly reversed in the second quarter (plus 2 percent) and statistically fully reversed from the third quarter onward. The figures show impulse response functions and their corresponding 90 percent confidence bands. EMBI: Emerging Markets Bond Index; GDP: gross domestic product.
Figure 7A.3  Estimated Impulse Responses to a Copper Price Shock, 2001–10 (during Fiscal Rule)

Source: Author’s simulation.

Note: The quarterly impulse response functions are based on vector autoregression estimations described in the text. The temporary copper price shock is a 10 percent rise in the first quarter, which is partly reversed in the second quarter (plus 2 percent) and statistically fully reversed from the third quarter onward. The figures show impulse response functions and their corresponding 90 percent confidence bands. EMBI: Emerging Markets Bond Index; GDP: gross domestic product.
PART III

Inclusive Growth Policies in Low-Income Countries
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CHAPTER 8

What Is Inclusive Growth?

ELENA IANCHOVICHINA AND SUSANNA LUNDSTROM GABLE

INTRODUCTION

The purpose of this chapter is to define the meaning of the term “inclusive growth.” It is often used interchangeably with a suite of other terms, including “broad-based growth,” “shared growth,” and “pro-poor growth.” Many times it is unclear what people have in mind when they define growth as inclusive and how this type of growth relates to the widely discussed extensive and intensive growth patterns.

We clarify the distinctions and similarities between these related terms and outline the defining characteristics of inclusive growth (IG); we also argue that IG analytics has a distinct character focusing on both the pace and pattern of growth. Traditionally, poverty and growth analyses have been conducted separately. In this chapter, we describe the conceptual elements for an analytical strategy aimed at integrating these two strands of analysis and to identify and prioritize the country-specific constraints to sustained and inclusive growth.

DEFINING INCLUSIVE GROWTH

Rapid and sustained poverty reduction requires IG that allows people to contribute to and benefit from economic growth.¹ Rapid pace of growth is unquestionably necessary for substantial poverty reduction, but for this growth to be sustainable in the long term, it should be broad-based across sectors² and

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¹This statement is in line with the OECD Development Assistance Committee’s policy statement on pro-poor growth. However, a difference between pro-poor and inclusive growth is that the pro-poor approach is mainly interested in the welfare of the poor, whereas inclusive growth is concerned with opportunities for the majority of the labor force, poor and middle class alike.

²Imbs and Wacziarg (2003) showed that countries diversify as they develop. Countries start specializing quite late in the development process, and the turnaround point occurs at a robust level of income per capita (around constant 1985 US$10,000). They conclude that increased sectoral specialization applies only to high-income economies. It is important to note that some countries may not broaden their economic base as they develop due to their specific economic conditions (e.g., small states).
inclusive of a large part of the country’s labor force. This definition of IG further emphasizes the importance of both extensive and intensive growth. Rapid pace of growth and employment can be achieved through extensive growth, which requires expansion of the quantity of inputs, but for this type of growth to be sustainable in the long term and for employment to be productive, there must be periods when growth is intensive and occurs because of productivity improvements, technological breakthroughs, and other innovations rather than capacity expansion.

This definition of IG implies also a direct link between the macroeconomic and microeconomic dimensions of growth. The macroeconomic dimension is in line with the vast literature, which relies on Solow-Swan-type balanced growth models (Solow, 1956; Swan, 1956) and typically disregards the dramatic sectoral reallocation of labor experienced by fast-growing economies. The microeconomic dimension captures the importance of structural transformation for economic diversification and competition, including creative destruction of jobs and firms. The reallocation process, often called “structural change,” has been documented by researchers such as Kuznets (1957) and Chenery (1960), but this literature ignores the Kaldor properties related to balanced growth. A more recent paper by Kongsamut, Rebelo, and Xie (2001) brings together these two strands of the literature by putting forward a theoretical model consistent with balanced growth and the dynamics of sectoral labor reallocation.

IG refers to both the pace and pattern of growth, which are considered to be interlinked and therefore need to be addressed together. The idea that both the pace and pattern of growth are critical for achieving a high, sustainable growth record, as well as poverty reduction, is consistent with the findings in The Growth Report: Strategies for Sustained Growth and Inclusive Development (Commission on Growth and Development, 2008). This report notes that inclusiveness—a concept that encompasses equity, equality of opportunity, and protection in market and employment transitions—is an essential ingredient of any successful growth strategy. Here we emphasize the idea of equality of opportunity in terms of access to markets, resources, and unbiased regulatory environment for businesses and individuals. The Commission on Growth and Development (2008) considers systematic inequality of opportunity “toxic,” as it will derail the growth process through political channels or conflict.

Encouraging broad-based and inclusive growth does not imply a return to government-sponsored industrial policies, but instead puts the emphasis on policies that remove constraints to growth and create a level playing field for investment.

Romer (1986) and Lucas (1988) introduced endogenous growth models that reflected the critical role of human capital, innovation, and knowledge spillovers for economic growth but preserved their balanced growth properties.

According to the report of the Commission on Growth and Development, a persistent, determined focus on inclusive long-term growth by governments is one of the ingredients of a successful growth strategy. Yet there is limited analytic work integrating the literature on growth and productive employment.
The IG approach takes a longer-term perspective, as the focus is on productive employment rather than on direct income redistribution as a means of increasing incomes for excluded groups. In the short term, governments could potentially use income distribution schemes to attenuate negative impacts on the poor of policies intended to jump-start growth, which may be relevant for a number of reasons in a specific country context. However, the IG approach includes the analysis of inclusion through productive employment as transfer schemes cannot be an answer in the long term and can be problematic also in the short term. In poor countries, such schemes can impose significant burdens on already stretched budgets, and it is theoretically impossible to reduce poverty through redistribution in countries where average income falls below US$700 per year. According to a recent OECD study, even in developed countries, redistribution schemes cannot be the only response to rising poverty rates in certain segments of the population (OECD, 2008).

The IG definition is in line with the absolute definition of pro-poor growth, but not the relative definition. Under the absolute definition, growth is considered to be pro-poor as long as poor people benefit in absolute terms, as reflected in some agreed measures of poverty (Ravallion and Chen, 2003). In contrast, under the relative definition, growth is pro-poor if and only if the incomes of poor people grow faster than those of the population as a whole; that is, inequality declines. However, while absolute pro-poor growth can be the result of direct income redistribution schemes, for growth to be inclusive, productivity must be improved and new employment opportunities created. In short, IG is about raising the pace of growth and enlarging the size of the economy, while leveling the playing field for investment and increasing productive employment opportunities.

By focusing on inequality, the relative definition could lead to suboptimal outcomes for both poor and non-poor households. For example, a society attempting to achieve pro-poor growth under the relative definition would favor an outcome characterized by average income growth of 2 percent in which the income of poor households grew by 3 percent over an outcome in which average growth was 6 percent, but the incomes of poor households grew by only 4 percent. Although the distributional pattern of growth favors poor households in the first scenario, both poor and non-poor households are better off in the second scenario. There is broad recognition that when poverty reduction is the objective, then the absolute definition of pro-poor growth is the most relevant (DfID, 2004). Under the absolute definition, the aim is to increase the rate of growth to achieve the greatest pace of poverty reduction.

IG analysis focuses on sources of and constraints to sustained high growth, and not only on one group, that is, the poor. The analysis looks at ways to raise the pace of growth by using more fully the parts of the labor force trapped in low-productivity activities or those completely excluded from the growth

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6The term “shared growth” can be misunderstood as implying a focus on income distribution schemes, which is why “inclusive growth” is preferred.
What Is Inclusive Growth?

Process. This is in contrast to the pro-poor growth literature, which has traditionally focused on measuring the impact of growth on poverty reduction by tracking various poverty measures. Box 8.1 summarizes the discussion and the key features of IG.

Policies for IG are an important component of most government strategies for sustainable growth. For instance, a country that has grown rapidly over a decade but has not seen substantial reduction in poverty rates may need to focus specifically on the inclusiveness of its growth strategy, that is, on the equality of opportunity for individuals and firms (Ianchovichina and Lundstrom, 2009). Other examples can be drawn from resource-rich countries. Extractive industries usually do not employ much labor, and the nonresource sectors typically suffer contractions associated with Dutch disease effects during boom periods. These cases may call for analysis of constraints to broad-based growth with a particular emphasis on the nonresource sectors in the economy (Ianchovichina and Gooptu, 2007). Moreover, in countries starting at a very low income level and low growth, an IG approach would be very close to an approach for speeding up the pace of growth, as the main focus should be on getting the fundamentals for growth right.

**BOX 8.1 What Is Inclusive Growth About?**

1. Inclusive growth (IG) focuses on *economic growth*, which is a necessary and crucial condition for poverty reduction.
2. IG adopts a long-term perspective and is concerned both with the *pace* and *pattern* of growth. High pace of growth is important, but how growth is generated is critical for growth *sustainability* and for accelerating employment creation and poverty reduction.
   - Rapid pace of growth and employment can be achieved through *extensive* growth, which requires expansion of capacity, but for this type of growth to be *sustainable* and for employment to be productive, there must be periods when growth is *intensive* and accompanied by productivity improvements and innovation.
   - For growth to be sustainable in the long term, it should be *broad-based* across sectors. Issues of structural transformation for economic diversification therefore take front stage. However, some countries may be an exception and continue to specialize as they develop due to their specific conditions (e.g., small states).
   - It should also be *inclusive* of the large part of the country’s labor force, where inclusiveness refers to equality of opportunity in terms of access to markets, resources, and unbiased regulatory environment for businesses and individuals.
3. IG strategies must be tailored to *country-specific* circumstances.
4. IG focuses on *productive employment* rather than income redistribution. Hence, the focus is not only on employment growth, but also on productivity growth.
5. IG focuses not only on the firm, but also on the *individual* as the subject of analysis.
6. IG is in line with the *absolute definition of pro-poor growth*, not the relative one.
7. IG is *not* defined in terms of specific targets such as employment generation or income distribution. These are potential outcomes, not specific goals.
8. IG is typically fueled by *market-driven sources of growth*, with the government playing a facilitating role.
WHAT DOES THE LITERATURE TELL US?

The report of the Commission on Growth and Development (2008) reviewed 13 cases of high sustained growth in the postwar period.\(^7\) Four of the thirteen countries are the newly industrialized countries in East Asia—Hong Kong Special Administrative Region (China), Republic of Korea, Singapore, and Taiwan Province of China. Young (1995) showed the fundamental role played by factor accumulation in explaining the extraordinary postwar growth of these four economies. Participation rates, education levels, and investment rates rose rapidly in all four economies in the postwar period. Once Young (1995) accounted for the steep rise in factor inputs, he found estimated TFP growth rates that were comparable to the historical TFP growth rates in OECD and Latin American economies. He concluded that the unprecedented growth in the newly industrialized countries was associated with unprecedented extensive growth rather than unprecedented intensive growth. This finding underscored the view that a successful IG strategy must have both extensive and intensive growth components and that the mix between these two varies across countries and time periods.

A high pace of growth over extended periods of time is a necessary and often the main contributing factor in reducing poverty, as found by a sizable body of literature, including Deininger and Squire (1998), Dollar and Kraay (2002), White and Anderson (2001), Ravallion (2001), and Bourguignon (2003). In a frequently cited cross-country study, Kraay (2004) shows that growth in average incomes explains 70 percent of the variation in poverty reduction (as measured by the headcount ratio) in the short term and as much as 97 percent in the long term. Most of the remainder of the variation in poverty reduction is accounted for by changes in the distribution, with only a negligible share attributed to differences in the growth elasticity of poverty. Lopez and Servén (2004) suggested that for a given inequality level, the poorer the country is, the more important is the growth component in explaining poverty reduction.

Sustained high growth rates and poverty reduction, however, can be realized only when the sources of growth are expanding, and an increasing share of the labor force is included in the growth process in an efficient way. This process is typically accompanied by the massive reallocation of labor from agriculture into manufacturing and services in a process called structural change and labor productivity changes. Duarte and Restuccia (2010) found that productivity catch-up in industry explains 50 percent of the gains in aggregate productivity across countries, whereas low productivity in services and the lack of catch-up explain all experiences of growth slowdowns and stagnation.

From a static point of view, growth associated with progressive distributional changes will have a greater impact in reducing poverty than growth that leaves distribution unchanged. Evidence in White and Anderson (2001) suggests that in

\(^7\)These 13 cases were Botswana, Brazil, China, Hong Kong Special Administrative Region (China), Indonesia, Japan, Malaysia, Malta, Oman, Republic of Korea, Singapore, Taiwan Province of China, and Thailand.
What Is Inclusive Growth?

a significant number of cases (around one-quarter), distribution has been as important as growth in explaining the income growth of the poor.\footnote{White and Anderson (2001) constructed the data set using the Deininger and Squire database. They identified 143 growth episodes in all, of which about half are from developing countries. Coverage of Africa was weak, with only Zambia appearing from sub-Saharan Africa. Data for the countries of the former Soviet Union and eastern Europe were only up to the 1980s, thus predating the large increases in inequality that took place in the early 1990s.}

Some policies may have a positive effect on both growth and inequality. The empirical cross-country literature suggests that growth has neither a positive nor a negative effect on inequality (see Deininger and Squire, 1996; Ravallion and Chen, 1997; Easterly, 1999; and Dollar and Kraay, 2002) and that the impact of inequality on growth is ambiguous.\footnote{Alesina and Rodriguez (1994) and Alesina and Perotti (1996) found a negative relationship, Li and Zhou (1998) and Forbes (2000) found a positive relationship, and Barro (2000) and Lopez (2004a) found no relationship.} These results do not imply the absence of links when looking at a specific policy or a specific country. Lopez (2004b) surveyed the empirical literature and concluded that macroeconomic stability related to inflation, as well as education and infrastructure-related policies, seem to be win-win or “super pro-poor” policies that have both a positive effect on growth and a negative effect on inequality.

Moreover, asset inequality rather than income inequality may matter for growth outcomes. Deininger and Squire (1998) used land distribution as a proxy for asset inequality and showed that high asset inequality has a significant negative effect on growth. Controlling for initial asset inequality, Birdsall and Londono (1997) showed that income inequality does not seem to play a role in expanding growth outcomes.

The cross-country literature on both growth and pro-poor growth has been criticized for not giving enough guidance to policymakers. Much of the pro-poor growth agenda has been focusing on aggregated income and poverty statistics, measuring to what extent growth has been poverty reducing and analyzing whether and why poverty was reduced in an absolute or relative sense.

In the early 2000s, however, a new wave of literature emerged focusing on the importance of the context and ex ante analysis of constraints to future economic development.\footnote{Analyses of sources of growth, such as growth decomposition and poverty decomposition, are important to our understanding of country-specific context and past sources of growth.} Several cross-country studies have shown that growth determinants are highly dependent on initial conditions such as levels of income, poverty, and asset inequality, but also a host of other factors such as geography, demography, governance, politics, social considerations, and the set of existing policies. These differ not only between countries, but also over time within the same country.

One key example of the post-1990s literature is the volume *Economic Growth in the 1990s: Learning from a Decade of Reform* (World Bank, 2005). It concludes that although the necessary fundamentals for growth, such as a
stable macroeconomic environment, enforcement of property rights, openness to trade, and effective government, are key factors in the growth process, they are not the whole story. This work and the work of the Commission on Growth and Development (2008) highlight the diverse ways in which the fundamentals can interact with policies and institutional setups in different country contexts.

An important insight from this stream of research is that numerous distortions exist at any time in a given country and that some are more important than others. Moreover, as posited in the theory of the second best, it can actually be welfare reducing to institute reforms that remove some distortions as long as other distortions remain, which is the case in all real economies.11

Targeting the distortion associated with the biggest multiplier,12 and therefore the largest direct welfare impact, is a good alternative because the second-best effects are typically hard to estimate with accuracy. Other options include targeting all distortions at once (a strategy sometimes associated with the Washington Consensus approach), which is often an infeasible option due to financial and capacity constraints, especially in low-income countries. But targeting the biggest distortion or a number of distortions may not lead to a welfare improvement because of the possibility of large second-best effects.

It is against this background that Hausmann, Rodrik, and Velasco (2005) developed a heuristic approach to identifying the most binding constraint to growth, that is, the one with the largest shadow price so as to increase the chance of a positive welfare effect. They use a decision tree framework based on the Euler equation or Keynes-Ramsey rule, which captures many of the most important factors affecting growth of an economy in the short term:13

$$\frac{\dot{k}}{k} = \frac{\dot{c}}{c} = \sigma(c_t)(r_t(a_t, \theta_t, x_t)(1 - \tau_t) - \rho),$$

and holds in the case of balanced growth equilibrium. In this equation, $c$ is consumption per capita; $k$ is capital per worker, $a$ is technological progress; $q$ is an index of externality; $x$ is availability of complementary factors of production.

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11 In formal terms, $du/d\tau_i = -\lambda_i + \sum_j \lambda_j \partial (\mu_i - \mu_i^s) / \partial \tau_j$, where $u$ is welfare, $\tau_i$ is a distortion in activity $i$, $\lambda_i$ is the Lagrange multiplier corresponding to the constraint associated with the distortion in activity $i$, $\mu_i^s$ represents the net marginal valuations of activity $i$ by society $s$, and $\mu_i^p$ by private agents. The direct effect is always welfare improving, but the indirect effect may not be, implying a possibility that welfare may decline if the indirect effect is negative and larger than the direct effect.

12 The distortion associated with the biggest multiplier effect is the binding constraint.

13 This is the Hamiltonian for the simplest Ramsey-type optimal growth model, which assumes that households have perfect foresight and need to decide how much labor and capital to rent to firms and how much to save or consume by maximizing their individual utility subject to their budget constraint. Firms maximize profits at each point in time and produce a single good. In their production function, technology is exogenous and so are the complementary factors of production and the index of externality. The government spending requirements are assumed to be fixed exogenously; the government imposes a tax on the rental price of capital, so the after-tax return to capital is $r(1 - \tau)$. 
such as infrastructure or human capital; $\tau$ is the tax rate; $\rho = z + n$ is the real interest rate; $n$ is population growth; $z$ is the rate of time preference; and $\sigma$ is the inverse of the negative of the elasticity of marginal utility. If the cost of capital $\rho$ is high for any return on investment, investment is low and the economy is considered to be “liquidity constrained.” If the rate of return $r$ is low, for any cost of capital, investment is low and the economy is “considered inefficient.”

There are important lessons to be learned from this approach, including that development policy is country specific and may involve just a few reforms that can be optimally sequenced to relax binding constraints, leading to large positive welfare impacts. However, finding the binding constraints requires careful thinking. Some of the criticisms of this approach emphasize that (1) it is impossible to estimate shadow prices in practice, (2) it is very difficult to reject constraints as not binding, and (3) the analysis is focused on the short term and therefore ignores factors important to sustainable growth such as human capital accumulation.

The analysis has also been undertaken at an aggregate level, offering little insight about constraints affecting different sectors, types of firms, or the obstacles to economic transformation in the long term. And as argued, economic transformation is fundamental for sustained, broad-based growth because it allows economies to catch up and sustain high growth rates over extended periods of time (Romer, 1990; Aghion and Howitt, 1992; Aghion and others, 2005; Duarte and Restuccia, 2010). Empirical evidence shows that not a single country has been able to achieve significant income growth and poverty reduction without structural transformation and economic diversification (Imbs and Wacziarg, 2003). For low-income countries and countries with small domestic markets, structural transformation entails export diversification as access to foreign markets enables countries to realize economies of scale (Hausmann, Hwang, and Rodrik, 2007).

It is important to point out that structural transformation is a necessary but not a sufficient condition for growth sustainability, especially in those cases in which it is achieved with the help of government subsidies and other interventions and the new industries are unable to compete without them. In addition, some countries may continue to specialize as they grow due to their specific circumstances, such as their small size.

Finally, the Hausmann, Rodrik, and Velasco framework also abstracts from conditions affecting the ability of individuals to engage productively and

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14 The cost of finance $\rho$ may be high because the country has limited access to external capital markets or because of problems in the domestic financial market. A country may have difficulties accessing external capital markets for a variety of reasons including high country risk, unattractive FDI conditions, vulnerabilities in the debt maturity structure, and excessive regulations of the capital account. Bad local finance may be due to low domestic saving, poor domestic financial intermediation, or both. Return to capital $r$ may be low due to insufficient investment in complementary factors of production, such as infrastructure and human capital, low land productivity due to poor natural resource management, or low private returns to capital due to high taxes, poor property rights, corruption, labor-capital conflicts, macro instability, and market failures, such as coordination externalities and learning externalities negatively affecting the country’s ability to adopt new technologies.
contribute to economic transformation. It includes human capital as a likely constraint from the perspective of firms, but does not look at whether skills limit the ability of certain economic actors—be they the poor, residents of a specific region, or women or other excluded groups—to engage in economic development and the constraints limiting investment in human capital.

THE INCLUSIVE GROWTH APPROACH

The framework is just one among many approaches to IG analytics. It is particularly relevant in cases where income level, growth, and investments are low. Against this background, the Hausmann, Rodrik, and Velasco framework is an appropriate framework for studying issues of IG since growth is the main driver of poverty reduction. In cases in which growth is concentrated in a few sectors or specific types of economic actors, the framework should be modified and supplemented with analysis of constraints to growth in the slow-growing and emerging sectors and constraints to individuals to contribute and benefit from growth. The appropriate framework will depend on country- and time-specific factors.

In cases in which growth is high but poverty reduction stagnates, the analysis could be carried out using an IG analytics framework15 (Ianchovichina and Lundstrom, 2009) that is eclectic in spirit. It blends the diagnostic approach with different techniques applied to time series, firm, and household survey data and cross-country benchmark comparisons to answer questions about trends, constraints to, and sources of sustainable, broad-based growth. The economic agent in an IG analytics framework is the individual rather than the firm, but individuals employed in firms earn returns to their employment, either as self- or wage-employed. The analysis does not need to be limited to the poor, but could be conducted from the perspective of different groups in the labor force, such as people living in a lagging region, migrants, or women. If one defines the income of any individual $i$ as

$$y_i = w_{ij}E_j\omega_i + \ldots + w_{ji}E_j\omega_j,$$

where $w$ and $E$ are the prices and endowments of each of the economy’s factors and $\omega_i$ is the share of the $j$th factor owned by individual $i$. Then, dividing each side by total income and summing over the poor individuals, one obtains

$$\psi_P = \lambda_i\omega_{pi} + \ldots + \lambda_j\omega_{pj},$$

where $\psi_P$ is the share of income received by the poor, $\lambda_i$ is the share of factor $i$ in total income, and $\omega_{pj}$ is the share of factor $j$ owned by the poor. This identity indicates the variables that affect the income share of the poor.

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15This framework was inspired by the framework of the “Integrated Economic Analysis for Pro-Poor Growth” (Sida, 2006).
What Is Inclusive Growth?

The main instrument for a sustainable and inclusive growth is assumed to be productive employment. Employment growth generates new jobs and income for the individual—from wages in all types of firms or from self-employment, usually in micro firms—while productivity growth has the potential to lift the wages of those employed and the returns to the self-employed. After all, in many low-income countries, the problem is not unemployment, but rather underemployment. Hence, IG is not only about employment growth, but also about productivity growth, that is, not only about extensive growth, but also about intensive growth. In other words, there is no preconception or bias in favor of labor-intensive industry policies. Indeed, the self-employed poor need improvements in productivity and leveling of the business environment to raise their incomes and to allow family members, for instance, to leave family farms and get employment elsewhere. So the analysis covers not only wage-employment, but also self-employment, which means that returns to capital, land, and other assets matter in regard to the income potential of the focus group as shown in the identity above.

The ability of individuals to be productively employed depends on the opportunities to make full use of available resources as the economy evolves over time. The IG analysis, therefore, tries to identify ways to strengthen the productive resources and capacity of the individual on the labor supply side as well as ways to open up new opportunities for productive employment on the labor demand side.

If the main problem is lack of employment opportunities for a particular group of individuals due to limited supply of certain types of labor skills, the constraints are related to the productive resources and capacity of individuals rather than the environment in which they can use these resources. This situation calls for an in-depth employability analysis that will shed light on the resources of the individuals, such as the individuals’ education and health and the other productivity attributes they bring to a job. If the main problem is low labor productivity or lack of employment opportunities for the individuals due to limited demand for labor, an analysis of the bottlenecks in the business environment is necessary (the Hausmann, Rodrik, and Velasco approach being one example).

The analysis distinguishes between self- or wage-employed and further looks at employment by sector, size of firm, rural/urban, formal/informal, and other relevant characteristics. A disaggregated look is necessitated by our main objective to identify the incidence of growth across the income distribution and the bottlenecks to the productive employment of individuals. If the focus is on the poor, in the case of the self-employed, we undertake business environment analysis through the lenses of the small enterprises and micro firms. In the case of the wage-employed, we undertake an employability analysis as well as a business

\(^{16}\) According to the Commission on Growth and Development report (2008), sustained high growth requires rapid incremental productive employment.
environment analysis through the lenses of a representative firm, potentially one that is employing the poor.\textsuperscript{17}

An important question is the extent to which the current employment status of an individual has a potential for future income growth, or if moving out of a low-income situation means finding another type of employment or employment in another sector. The analysis therefore looks at external factors explaining the country’s growth and poverty reduction pattern, the overall productivity dynamics in the country, the major challenges and opportunities, and possibilities for economic transformation and diversification. The analysis also considers constraints to those sectors with opportunities for productive employment, constraints affecting the ability to gain employment in these sectors, and constraints affecting labor mobility across sectors and regions.

The IG approach takes a longer-term perspective. This is necessary because of the emphasis on improving the productive capacity of individuals and creating a conducive environment for employment rather than on income redistribution as a means of increasing incomes for excluded groups. Due to this longer-term perspective, there is an explicit focus on structural transformation and internal migration in the IG analytics framework. In developing countries, a significant part of growth is generated through reallocation of labor from low-productivity to high-productivity sectors (Duarte and Restuccia, 2010).

With this longer-term perspective, it is important to recognize the time lag between reforms and outcomes. A good example is the lag between the time when investments in education are made and the time when returns from improved labor skills are collected. This implies that the analysis must identify future constraints to growth that may not be binding today, but that may need to be addressed today in order to ensure sustainable and inclusive growth. In short, IG analytics is about policies that should be implemented in the short term but for sustainable IG in the future. The goal is to identify a bundle of binding constraints rather than the binding constraint and then sequence these constraints to enhance prospects for high, sustained IG in a country over a period of time.\textsuperscript{18}

\section*{CONCLUDING REMARKS}

In this chapter, we have defined the meaning of IG and presented the argument that a focus on IG has a distinct character emphasizing both the pace and pattern of growth. Rapid pace of growth is unquestionably necessary for substantial poverty reduction, but for this growth to be sustainable in the long term, it should be increasingly broad based across sectors and inclusive of the large part of the country’s labor force. This definition of IG emphasizes the importance of both extensive and intensive growth and implies a direct link between the macroeconomic

\textsuperscript{17}Note that the analysis of labor skills as a potential constraint for the self-employed is captured in the business environment analysis where it is analyzed as a constraint to growth of the small firm.

\textsuperscript{18}This does not mean we go back to the “laundry list” approach, but rather to a limited set of constraints. Sequencing of these constraints, however, may require further in-depth studies of the feasibility and costs of specific policies.
and microeconomic determinants of growth and captures the importance of structural transformation for economic diversification and competition.

IG is about raising the pace of growth and enlarging the size of the economy, while leveling the playing field for investment and increasing productive employment opportunities. It focuses on ex ante analysis of sources of and constraints to sustained high growth, and not only on one group; that is, the poor. The analysis looks for ways to raise the pace of growth by more fully using parts of the labor force trapped in low-productivity activities or completely excluded from the growth process.

Policies for IG are an important component of any government strategy for sustainable growth, and the frameworks for IG analytics are eclectic in spirit. The main instrument for a sustainable and inclusive growth is assumed to be productive employment. Employment growth generates new jobs and income for the individual—from wages in all types of firms, or from self-employment, usually in microfirms, whereas productivity growth has the potential to lift the wages of those employed and the returns to the self-employed. The ability of individuals to be productively employed depends on the opportunities to make full use of available resources as the economy evolves over time. The analysis therefore looks at ways to strengthen the productive resources and capacity of the individual on the labor supply side as well as ways to open up new opportunities for productive employment on the labor demand side.

The IG approach takes a longer-term perspective. With this longer-term perspective, it is important to recognize the time lag between reforms and outcomes. IG analytics is about policies that should be implemented in the short term but for sustainable IG in the future.

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CHAPTER 9

Inclusive Growth in Natural Resource–Intensive Economies

ANDREW M. WARNER

INTRODUCTION

Lack of structural change, unsustainable growth, and noninclusive growth are frequently mentioned features of natural resource–intensive economies. There is renewed interest in these issues after the new wave of commodity booms over the past 10 years. It is often stated that the challenge is to leverage the billions of dollars in natural resource–related rents to achieve growth, diversification, and inclusive sustainable development. Yet based on theory and evidence from earlier years, the risk of such hopes being thwarted by a recurrence of the natural resource curse is well recognized. The perceived risk encompasses not only the possibility of disappointing growth, but also the possibility that growth will be noninclusive, with disappointing wage and employment growth and a widening dispersion of incomes.

This chapter examines the cases of Saudi Arabia and Azerbaijan, two countries in which the available data permit some empirical assessment of the related issues of diversification, sustainability, and noninclusive growth. Saudi Arabia experienced a boom in the 1970s, and Azerbaijan has had a recent boom. Both permit some analysis of diversification of output across economic sectors. Achieving diversification away from the natural resource sector is the near-universal objective of natural resource–intensive economies and is sometimes viewed as the key to achieving sustainable growth. Saudi Arabia is one of the few highly natural resource–intensive economies that publishes value-added data by economic sector over a long time period, that is, since 1970. It thus enables analysis of diversification during booms and busts as well as the long quieter period since the mid-1980s. Azerbaijan has experienced one of the most dramatic natural resource booms in the past decades. It permits a comparison with the earlier Saudi Arabian

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boom and also permits an examination of the inclusive growth issue because it is one of the few resource-intensive economies for which one can obtain employment and wage data.

To be specific about the subject, the natural resources being discussed are hydrocarbons and minerals rather than agriculture. The distinguishing feature is that hydrocarbons and most minerals yield high economic rents once they are extracted and produced. They are typically mined after an uncertain search process, which means that countries and companies can experience major windfalls once discoveries are made. World prices are also highly volatile, which adds to the large swings in revenues and periods of high rents.

Inclusive growth as defined here refers to relatively fast growth in incomes of lower-income groups or in which significant social groups are not left out of the growth process. The concept is continuous and thus does not lend itself to strict absolute standards. In a labor market context, growth would be more inclusive the faster the growth in labor incomes or the faster the growth of low-income labor. A benchmark could be to compare the growth in wages with that of per capita GDP, with inclusive growth defined as growth in which the former exceeds the latter. Growth that diminished an unemployment problem would also be considered inclusive growth.

Empirical examination of the degree to which resource-led development has been or is likely to be inclusive faces a number of issues. Data on incomes, wages, and employment are scarce in the highly natural resource-intensive economies, and thus the analysis must adapt to the available evidence. Of the data that are available, GDP by sector is the most common, followed by employment and wage levels. What can we know deductively and what requires data? It may be plausible to believe—through deductive reasoning that gains in the natural resource sector itself will not be widely dispersed because we know that the property rights (usually controlled either by private firms or the state) are concentrated. But this is not enough to settle the inclusive growth question; the full picture requires analysis of the rest of the economy. Whether or not resource-led development is inclusive hinges on sustainable increases in labor productivity outside the resource sector and whether such increases translate into higher earnings or improved employment conditions.

This directs us to the data on GDP by sector in search of evidence of lasting productivity changes. The critical evidence can come from something as simple as the identity of sectors themselves; for example, if a rise in GDP in public administration accompanies a resource boom, it is likely to reflect rent sharing rather than a sustainable rise in productivity. Critical evidence may also be found in the comovement of prices and quantities, because demand and productivity changes will cause these to covary in different ways. This chapter explores how much mileage can be obtained from (inevitably) limited data on these issues.

The chapter therefore is a combination of empirical examination of GDP by sector for information on potentially lasting productivity changes and examination of wage and employment data where available.
THE SAUDI ARABIAN CASE

Changes in natural resource income dominate aggregate GDP in the highly resource-rich economies. A rather obvious point, although one that is sometimes not heeded, is that a rise in aggregate GDP driven by resource discoveries or price windfalls is not necessarily a reliable indicator of economic progress. Saudi Arabia provides a simple illustration of why it is critical to go behind the veil cast over the economy by the natural resource sector. Figure 9.1 shows real GDP per capita for the whole economy and in the oil sector between 1970 and 2009. A naïve observer might conclude that the economy was highly successful during the early 1970s, when in fact the growth was mostly a function of the boom in the oil sector. For this reason especially, but also because economic mechanisms are likely different in the resource sector and the rest of the economy, it is helpful to separate the natural resource sector from the rest of the economy. In addition, it is potentially helpful to distinguish boom periods from more normal periods. Even though growth may be noninclusive during the boom periods, it may still be inclusive over the long term if the seeds for higher productivity are sowed during the boom period.

Hence, this chapter will examine the inclusive growth issue separately for the resource-intensive sector and the other sectors. We first consider the resource sector itself. There are several reasons to think that natural resource discovery and production will have noninclusive features. Property rights to natural resource wealth are usually held by the state or ceded to private enterprises in exchange for exploration. The immediate effect of discoveries is to enrich those with property rights or residual claims over the resource. Even if concessions to explore for

![Figure 9.1 Saudi Arabia: GDP in the Whole Economy and the Oil Sector (Thousands of Saudi Arabian riyals, 1999 prices)](source: Saudi national accounts.)
natural resources are offered competitively to investors in a transparent manner so that ex ante expected profits are normal, ex post profits to the lucky investors can still be enormous. This outcome may be inevitable given the uncertain nature of natural resource exploration and production and the need to motivate exploration. The scope for altering revenue-sharing contracts between states and private companies is constrained by the economic incentives of taxation, as too high a tax rate can discourage the investment required to discover natural resources in the first place. Another channel through which natural resource–driven growth can be noninclusive is through powerful interest groups gaining preferential access to rents from natural resources. Such first-order impacts are likely to be significant in determining the inclusive nature of resource-driven development during booms.

Next, consider the rest of the economy. Resource wealth can either be consumed or invested, at home or abroad, and the full impact on inclusive growth depends on a number of factors. These include (1) what sectors the greater spending falls in, (2) the degree to which sectors produce traded or nontraded products or services, (3) the efficiency of the investments, (4) the presence and nature of unemployment, and (5) the labor intensity of expanding and contracting sectors. Whether such second-order impacts are beneficial is governed in part by the efficiency of state-directed investment and the institutional structure under which those decisions get taken. What happens in the labor market is also an important channel governing the inclusiveness of resource-driven growth. As a resource-driven spending boom raises demand for low-income workers, it will show up in some combination of wage increases or employment changes. Skill shortages or other labor supply constraints can govern the extent to which the impact is felt on the wage side or the employment side. The extent to which greater inclusiveness of growth can be achieved through directed public expenditures can also be constrained by supply conditions. If governments decide to boost health expenditures in an environment of limited supply of health professionals, the higher demand would raise salaries with little impact on employment of health professionals and the total supply of health services.

**Diversification**

Diversification, sustainable growth, and inclusive growth are often linked. Diversification out of the natural resource sector helps sustainability of GDP growth because production in other sectors is not as susceptible to booms and busts as is the natural resource sector. Diversification also helps inclusiveness because production in other sectors is believed to be more inclusive than in the natural resource sector. This section offers a note of caution on the link between diversification and growth. It will be shown that Saudi Arabia did indeed diversify in the long term. On that score, it has done well. However, this diversification has not been associated with overall positive real GDP growth per capita over the very long term. Desirable though it is, the benefits of diversification can be overplayed. The Saudi Arabia case illustrates that diversification, even if apparently successful, is not sufficient for successful development.
Saudi Arabia is a major country that both experienced a boom and has some data on economic activity by sector that goes back to the boom period. Figure 9.2 shows per capita real GDP in total and then subdivided into in that for the oil sector and all other sectors. In 1970, it can be seen that the two subsectors were the same size, indicating that the oil sector was half the economy in terms of generation of value added. By the end of the period, the non-oil sector was about twice the size of the oil sector, indicating that the non-oil sector had grown at the expense of the oil sector. At first pass, this evidence suggests that there were indeed investments made during the boom period that paid off in terms of higher output in the rest of the economy but not overall, because total GDP per person was not higher in 2009 than it was in 1972.

On further examination, the growth in the rest of the economy was highly concentrated in a few sectors. Over the full 39 years (1970–2009), real growth per capita in the non-oil economy averaged 1.6 percent per year. Much of the long-term rise, however, occurred in four key sectors. Figure 9.3 shows the same graph with the non-oil economy further subdivided into two parts. One part is the sum of four sectors: construction, trade and hotels, finance and real estate, and government services. The second part is the rest of the economy, which comprises agriculture; manufacturing; electricity, gas, and water; transport and communications; and all other services.

As Figure 9.3 shows, much of the reaction of the non-oil sector to the oil boom occurred in the three real estate–related sectors plus government services. The construction, trade and hotels, finance and real estate, and government services series shows a rise and decline that appears to be a lagged image of the boom in the oil sector. In contrast, the rest of the economy barely moved at all in
Inclusive Growth in Natural Resource–Intensive Economies

response to the oil boom—the rest of economy series is extremely flat and shows little sensitivity to the oil boom. Over the full 39-year period, real growth per capita in the rest of the economy (agriculture, manufacturing, services, etc.) grew by an average of 1.9 percent per year.

The Saudi Arabia data afford the opportunity to analyze, with the perspective of 30 to 40 years of hindsight, the net impact of the oil boom between 1970 and 1986. Note that the forcing variable, the oil boom, was roughly symmetric in the size of the boom and the bust. The net effect by sector is summarized in Table 9.1. In this table, the oil sector is shown under the “Mining and quarrying” heading. By 1976, oil value added had increased from 1970 levels by 13,999 Saudi Arabian riyals (SRIs) per person (all figures are in constant 1999 prices). By 1986, it had fully reversed this trend, dropping by 14,625 SRIs per person compared to 1980 levels. As for the other sectors, most of the impact was felt in four key sectors: finance, insurance, and real estate; construction; government services and trade; and restaurants and hotels, in that order. Although these sectors bore the brunt of the boom and bust, they also experienced some long-term increase in GDP once the dust settled, as they came down in the bust by less than they had gone up in the boom. GDP in two of the sectors rose substantially during the boom and partially fell back during the bust (construction and finance and real estate); in the other two sectors, GDP rose and then did not decline much (trade, hotels, and government services). The full impact of the boom and bust, shown in the last column, was that four sectors were higher than before, and the major winner was government services, followed by finance and real estate, construction, and manufacturing. In fact, most sectors, except mining, construction, and real estate, kept growing at modest rates even during the bust period.

Figure 9.3   Saudi Arabia: GDP in the Whole Economy; the Natural Resource Sector; the Construction, Trade, Real Estate, and Government Sectors; and the Rest of the Economy (Thousands of Saudi Arabian riyals, 1999 prices)

Source: Saudi national accounts.
To what extent was structural change achieved? To answer this question, consider a comparison of shares of GDP by sector at the start of the period (1970) with those at the end (1986).

As shown in Table 9.2, the Saudi Arabian economy was significantly more diversified in 1986 than in 1970. During this period, the oil share of GDP was cut almost in half, from 50 percent to 26 percent. Many sectors gained at the expense of the oil sector, notably trade, finance, and government services. Nevertheless, on a per capita basis, GDP was not much greater than in 1970; the implied average

#### TABLE 9.1

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<td>Agriculture, forestry, and fishing</td>
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<td>579</td>
<td>860</td>
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<td>Mining and quarrying</td>
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<td><strong>GDP</strong></td>
<td><strong>30,720</strong></td>
<td><strong>–18,762</strong></td>
<td><strong>11,958</strong></td>
</tr>
</tbody>
</table>

Source: Author’s calculations using Saudi Arabian National Accounts.
Note: SRIs: Saudi Arabian riyals.

#### TABLE 9.2

<table>
<thead>
<tr>
<th>Sector</th>
<th>Share in 1970</th>
<th>Share in 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, and fishing</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>50%</td>
<td>26%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Electricity, gas, and water</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Construction</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>Wholesale and retail trade, restaurants, and hotels</td>
<td>2%</td>
<td>8%</td>
</tr>
<tr>
<td>Transport, storage, and communication</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Finance, insurance, and real estate</td>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>Community, social, and personal services</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Producers of government services</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>GDP</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Per capita GDP (in 1999 SRIs per person)  

Average annual GDP growth per capita  

Source: Author’s calculations using Saudi Arabian National Accounts.
Note: SRIs: Saudi Arabian riyals.
annual growth rate over this period was just 1.5 percent, not a high rate compared to that in many other developing countries over the same period.

To see what has happened over the full time period, consider Table 9.3, which compares the growth rates of the economy by sector over three periods: the boom, the bust, and the period since 1986. The simple growth rate of value added by sector can be a misleading indicator of the drivers of an economy because small sectors may have high growth yet contribute little to the overall increase in GDP because of their small size. To correct for this, the table also shows the contribution of each sectors’ growth to the overall growth rate, calculated as \( g \times s \), where \( g \) is the average annual sector-specific growth rate and \( s \) is the sector’s share in GDP at the beginning of the period. One can see, for example, that during the

<table>
<thead>
<tr>
<th>TABLE 9.3</th>
<th>Annual Growth and Contribution to Growth by Sector and Time Period, Saudi Arabia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate (%)</td>
<td>Contribution (%)</td>
</tr>
<tr>
<td>Agriculture, forestry, and fishing</td>
<td>6.6</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>10.1</td>
</tr>
<tr>
<td>Crude petroleum and natural gas</td>
<td>10.1</td>
</tr>
<tr>
<td>Other</td>
<td>12.7</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7.9</td>
</tr>
<tr>
<td>Petroleum refining</td>
<td>3.0</td>
</tr>
<tr>
<td>Other</td>
<td>14.3</td>
</tr>
<tr>
<td>Electricity, gas, and water</td>
<td>11.1</td>
</tr>
<tr>
<td>Construction</td>
<td>20.3</td>
</tr>
<tr>
<td>Wholesale retail trade, restaurants, and hotels</td>
<td>19.9</td>
</tr>
<tr>
<td>Transport, storage, and communication</td>
<td>10.3</td>
</tr>
<tr>
<td>Finance, insurance, and real estate</td>
<td>16.4</td>
</tr>
<tr>
<td>Ownership of dwellings</td>
<td>17.1</td>
</tr>
<tr>
<td>Others</td>
<td>15.0</td>
</tr>
<tr>
<td>Community, social, and personal services</td>
<td>9.7</td>
</tr>
<tr>
<td>Imputed bank service charge</td>
<td>18.6</td>
</tr>
<tr>
<td>Subtotal</td>
<td>12.0</td>
</tr>
<tr>
<td>Producers of government services</td>
<td>9.0</td>
</tr>
<tr>
<td>Total</td>
<td>11.6</td>
</tr>
<tr>
<td>Import duties</td>
<td>2.7</td>
</tr>
<tr>
<td>GDP growth</td>
<td>11.5</td>
</tr>
<tr>
<td>Population growth</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Source: Author’s calculations using Saudi Arabian National Accounts.
1970–80 boom period, the mining sector contributed 5.1 percentage points to the overall 11.5 percent growth in GDP over this period, a contribution to overall growth of approximately 44 percent (5.1 out of 11.5 percent).

What is noteworthy from the table is that several sectors experienced high growth rates, yet contributed little to overall growth. For example, agriculture, a sector with fairly high growth, never contributed more than 0.3 percentage points to overall economic growth. Significantly, nonpetroleum manufacturing also experienced very high growth, yet also contributed little to overall growth. The second noteworthy fact is that despite the fast growth in several of the non-oil sectors in Saudi Arabia, the overall growth in the economy over the full period, on a per capita basis, has been negative. GDP declined 3.7 percent per year during 1980–86, while the population was rising by 5.1 percent per year; GDP grew 3.0 percent per year during 1986–2009, while the population was rising 3.2 percent per year.

In summary, by some of the conventional measures of diversification, Saudi Arabia is an apparent success. The share of the economy in petroleum production has been cut in half, from 50 percent in 1970 to 24 percent in 2009. Value added in many non-oil sectors has grown, sometimes dramatically. Exports of manufacturers grew on average 13.6 percent per year in dollar terms for a very long period; that is, between 1980 and 2009. Nevertheless, overall economic growth since 1970 on a per capita basis has been only 0.51 percent per year. Growth per capita since 1972 has actually been negative. Growth in the non-oil economy per capita has been only 1.6 percent per year. At the very least, the simple formula—that diversification is sufficient to escape the curse of oil—is not supported by these results. Whether these results say more than that cannot be determined definitively, but they are suggestive. One hypothesis that is consistent with these data is that the drive for diversification has been achieved at the cost of inefficient investments, which although effective in the microgoal of growing certain industries, has come at the expense of overall efficient use of resources for the whole economy, resulting in disappointing growth.

THE CASE OF AZERBAIJAN

The Azerbaijani data can be compared to those of Saudi Arabia during its boom in the 1970s. There is a close similarity in terms of the sectors affected by the boom. But the data from Azerbaijan offer a better opportunity to assess the inclusive growth issue because employment by sector and some wage data are available. The Azerbaijan data will be examined with two purposes in mind: first, to determine if there is evidence for the kind of diversification and/or long-term productivity improvements that would support sustainably higher incomes, and second, to shed light on the degree to which any productivity gains were reflected in either employment growth or wage growth.

Table 9.4 shows the concentration of the output boom by sector. Most of the real output growth was in only four sectors apart from mining: construction; wholesale and retail trade and repair of motor vehicles; service of hotels and
Inclusive Growth in Natural Resource–Intensive Economies

One of the major reasons why resource-driven growth can be disappointing is that demand booms run up against supply constraints, bidding up prices with relatively little real output gain. The data show that in Azerbaijan, at the aggregate level, the boom has not been dissipated entirely by price increases. Over the period in question (2000–08), real output growth in Azerbaijan averaged 12 percent outside of the mining operations (15 percent for the whole economy), while price growth averaged 14 percent per year. This is roughly a 50/50 split between price and real output increases; supply constraints were evidently not a major limiting factor in Azerbaijan. A casual examination of data by sector suggests that if this has occurred in Azerbaijan, it has occurred in only some of the sectors, possibly health, education, manufacturing, and real estate. On the other hand, construction, hotels, and transport have increased output dramatically.

Using Changes in GDP Deflators and Output to Understand Sources of Growth

Before turning to the data on prices and output by sector, an analytical framework would be helpful. A model has been developed and is presented in this chapter’s appendix, drawing from the classic nontraded model but adapted and used to interpret co-movements in prices and quantities under different kinds of driving forces. Critical points from the model are described below.

The model emphasizes the role of four factors that interact with each other. They are, first, whether the forcing variable is demand related (for example, natural resource income) or supply related (for example, a positive productivity

<table>
<thead>
<tr>
<th>Sector</th>
<th>Annual growth in GDP at constant prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, hunting and forestry, fishing, fish breeding</td>
<td>6%</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>21%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>8%</td>
</tr>
<tr>
<td>Production and distribution of electricity, gas, and water</td>
<td>4%</td>
</tr>
<tr>
<td>Construction</td>
<td>27%</td>
</tr>
<tr>
<td>Wholesale and retail trade; repair of motor vehicles, personal and household goods</td>
<td>13%</td>
</tr>
<tr>
<td>Service of hotels and restaurants</td>
<td>28%</td>
</tr>
<tr>
<td>Transport, storage, and communication</td>
<td>15%</td>
</tr>
<tr>
<td>Financial intermediation</td>
<td>7%</td>
</tr>
<tr>
<td>Real estate, renting, and business activities</td>
<td>6%</td>
</tr>
<tr>
<td>Public administration and defense; social security</td>
<td>5%</td>
</tr>
<tr>
<td>Education</td>
<td>3%</td>
</tr>
<tr>
<td>Health and social work</td>
<td>3%</td>
</tr>
<tr>
<td>Other community, social and personal service activities</td>
<td>4%</td>
</tr>
<tr>
<td>GDP (at market prices)</td>
<td>15%</td>
</tr>
</tbody>
</table>

improvement in one sector), and second, whether price setting in some of the sectors in the economy is endogenous (as would be the case with nontraded goods and services) or not (traded goods).

A general point illustrated by the model is that changes in output can provide misleading signals about the source of productivity improvements. A productivity improvement in a nontraded sector will not necessarily increase employment in that sector, and it may not increase output, either, because of offsetting forces on the demand and supply side. Hence, the lack of employment growth in one sector, or the lack of fast output growth, does not rule out that the sector was an engine of growth. What is important is to distinguish traded and nontraded sectors. In the case of a nontraded sector, the relative price will decline strongly, and this provides a way to identify such cases in the data. In contrast, if the same productivity improvement occurs in a traded sector, there will be a strong positive increase in employment and even more so in value added. In this case, value added in the other sector will decline, and there will be no impacts on prices. When an increase in demand is the forcing variable, in the case of a nontraded good, both relative prices and employment in that sector will increase together, with the split between the two governed by supply conditions, and employment and value added must decline in the other sector. In the case in which all sectors are traded, the same increase in demand would have no necessary impact on output or employment because any additional demand can be satisfied through imports.

Figure 9.4 shows growth in both price and output on the horizontal and vertical axes, respectively (figures graphed are average annual percentage changes between 2000 and 2008). This kind of data allows one to narrow the range of possible explanations, even if a definitive conclusion is not possible. Of the sectors shown, financial services shows an unusually high growth in prices for its rather moderate growth in real value added. This is a pattern consistent with a nontraded service with supply constraints—prices rose rapidly with relatively modest output growth. Financial services may also represent a special case in which there was a shift to higher-priced foreign-affiliated financial services as the boom started. Mining is a special case of a traded good with an exogenously determined price rise; it is a prime mover due to the hydrocarbon boom in both discoveries and world prices.

Of the other sectors, what is noteworthy is that the four rapid-growth sectors also exhibit lower-than-average price growth. This is especially the case for construction and transport, in which price growth averaged only about 5 percent per year between 2000 and 2008. The low price growth suggests some combination of (1) productivity gains, (2) price discipline due to the traded nature of some of the goods and services covered by these categories, and (3) nontraded goods and services with elastic supply conditions that allow output to grow with moderate pressure on prices. To the extent that the boom is real estate related (as seems plausible from the sectors being construction, hotels, transport, etc.), some

1The prices are GDP deflators at the sector level, but will be referred to as prices.
combination of (1) and (3) seems the more likely explanation. It is also possible that domestic price changes are due to changes in regulation or changes in world prices. Productivity shocks originating outside the country can also be relevant drivers of prices for traded goods, as occurred in regard to computers and cellular telephones. However, there is little evidence that these are dominant influences on the sectors in Figure 9.4, which were probably aggregated sufficiently to mask these effects.

Four other sectors (health and social work, manufacturing, education and real estate, and renting and business activities) exhibited moderate output growth and high price growth. This pattern is consistent with these sectors being nontraded goods and services for which strong demand growth was coupled with supply constraints.

INCLUSIVE GROWTH THROUGH THE LENS OF THE LABOR MARKET: AZERBAIJAN

Labor market adjustments are part of the picture on inclusive growth. If demand pressures are high during a boom period and labor supply constraints bind, it is possible that the boom will bid up wages and improve labor’s position at the expense of profits. In this section, we examine the degree of labor productivity improvement by sector and the degree to which this found its way into higher wages. We also examine the degree to which labor gained on the employment or wage side.
The official employment data in Azerbaijan suggest that if labor gained, the gains were primarily on the wage side, not on the employment side. Data on total official employment indicate that employment stood at 3.7 million in 2000 and rose to 4.1 million by 2008, an average annual growth of 1.1 percent. Over the same period, population growth was at 1.2 percent, so the employment-population ratio changed only slightly, remaining at approximately 47 percent of the population. These data provide little evidence that greater demand, better working conditions, or higher wages induced a higher fraction of the population to enter into formal employment. Without additional data, we cannot say what happened to informal employment.

Although the data do not point to a rise in formal employment as a share of the population during the boom period, they imply that labor productivity—value added per employed person by sector—has risen dramatically, setting the stage for substantial wage gains. Table 9.5 shows value added per employee between 2003 and 2008. It shows a huge change in mining that dwarfs that in all the other sectors. There was significant growth in labor productivity in the four sectors that had high output growth, and there was also relatively fast labor productivity growth in manufacturing (7.2 percent per year). Wage gains thus appear to be the main channel for inclusive growth. (Note that Table 9.5 shows GDP divided by population, starting in 2000, and GDP divided by employment, starting in 2003; employment by sector is available only starting in 2003.)

Did these labor productivity changes translate into higher wages? If so, to what extent? To investigate this, we consider the two sectors with data on average wages, mining and manufacturing. In both sectors, average monthly wages are reported in nominal terms. These were multiplied by 12 and deflated by the GDP
Inclusive Growth in Natural Resource–Intensive Economies

Deflator (2005 = 1) to compare with the labor productivity data, which are expressed as annual value added per employee in 2005 prices. The figures discussed below plot wages against productivity (in logs) on an annual basis between 2003 and 2008.

Figure 9.5 shows that the average wage was not strongly related to average productivity in the mining sector. Over the period 2003 to 2008, a 1 percent increase in labor productivity was associated with only a 0.27 percent rise in average wages. This is the expected result when worker skills are highly substitutable and thus wages are held down by competitive pressures. During this period, productivity in mining soared because of the rise in the world price and the rise in production under conditions of increasing returns to scale. Another way to put this is that wages in mining were a function of national labor market conditions rather than conditions in the mining sector, as the labor was substitutable and the mining sector was a small employer.

In contrast, wages in manufacturing show a strong and positive relation with labor productivity. Over the period 2003 to 2008, labor productivity in manufacturing increased by approximately 35 percent, while the average wage increased by 32 percent—a relationship of slightly less than one-for-one. Note that the data in both Figures 9.5 and 9.6 are measured in logs so that percentage changes can be read directly off the axes. It is also apparent in Figure 9.6 that there was a slight lag in the adjustment of wages to productivity. Initially, between 2003 and 2005, labor productivity (horizontal axis) rose strongly with little positive movement in wages. But wages caught up strongly between 2005 and 2008, rising even more rapidly than labor productivity.

When comprehensive wage data are not available, labor productivity data can serve as a rough proxy for wage data, shedding some light on the inclusive growth issue. This is based on the theoretical link between real wages and the marginal

\[ y = 0.2697x + 5.5433 \]

\[ R^2 = 0.693 \]
value product of labor, should be subject to the usual cautions that the relation holds better for long periods and large changes, and refers to the marginal, not average, productivity. To check the empirical support for this relation, we can refer to manufacturing in Azerbaijan, a sector that happens to have both wage and labor productivity data. The data shown in Figure 9.6 do provide empirical support for the view that there is a positive association between wages and average labor productivity. This provides empirical support for using productivity trends as a proxy for wage trends.

On the basis of this assumption, the data suggest that rapid wage growth was experienced by a relatively small fraction of the Azerbaijani labor force. Of the officially measured labor force of 3.704 million persons in 2000, the majority were either in agriculture (41 percent) or wholesale and retail trade (17 percent). As shown in Table 9.6, labor productivity growth in these two sectors was 5.5 percent and 12.4 percent, respectively, per year. Although these are fast rates of growth, they fall short of one natural benchmark, namely, the 16 percent real per capita growth reported for the whole economy.

We may also estimate wage growth for the entire economy (outside of mining). The table shows that the four rapid-growth sectors (construction, trade, hotels, and transport) accounted for 26 percent of total employment in 2000 (956,000 out of 3.704 million). Using employment shares, we can derive estimates for overall wage growth during the period 2000 to 2008 in Azerbaijan. Assume, for illustration, that labor productivity gains in mining did not accrue to domestic labor (this is backed up by the lack of statistically significant association between wages and labor productivity shown in Figure 9.5). Assume further that wage growth in all other sectors tracked labor productivity growth one for one (backed up by the observed wage behavior in manufacturing). These assumptions imply that on a weighted-average basis, wage growth was 6.8 percent, as shown in the figure.

Figure 9.6 Logarithm Wages and Productivity, Manufacturing

in the last row of Table 9.6 (with weights equal to employment shares). Alternatively, if wage growth were instead assumed to be 80 percent of labor productivity growth, the weighted average would fall slightly to 5.5 percent per year.

Hence, this estimate indicates that labor productivity growth was 6.8 percent per year during 2000–08, using as weights employment shares at the beginning of the boom period. If this is a good proxy for actual wage growth, it would represent rapid wage growth by almost all absolute standards. But in the context of Azerbaijan, with GDP per person growth in excess of 15 percent, it means that wages lagged growth in value added by a substantial margin during the boom period.

An additional manner in which labor could have improved its position was by migrating to higher-than-average-productivity sectors after 2000. Is there evidence that this took place? The Azerbaijani data on employment do not suggest that there was strong migration of labor from certain sectors toward other sectors during the boom period, because there are no sectors with negative net employment growth. Instead, it appears that new employment simply found its way to a select group of sectors. Table 9.7 shows that total employment increased by 351.5 thousand persons between 2000 and 2008. Of this, the largest increase was in construction (72.5), followed by transport (41.5) and real estate and business activities (41.4).

Did workers tend move to higher-productivity and higher-wage sectors? To some extent, yes, but this was not a dominant fact. In Figure 9.7, it is shown that the simple association between net employment changes and labor
productivity is not particularly strong. Labor productivity in 2000 is measured on the vertical axis, and the increase in employment is measured on the horizontal axis. The sector with the largest employment gain, construction, was not an unusually high-labor-productivity sector in 2000. Two sectors that were, electricity and financial services, experienced some of the smallest employment gains. Overall, there is neither a strong positive nor a strong negative relation

### TABLE 9.7

<table>
<thead>
<tr>
<th>Employment Shifts across Sectors during the Boom Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment (thousands)</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Agriculture, hunting and forestry</td>
</tr>
<tr>
<td>Fishing, fish breeding</td>
</tr>
<tr>
<td>Mining</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
<tr>
<td>Electricity, gas, and water supply and distribution</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Wholesale and retail trade; repair of motor vehicles, personal and household goods</td>
</tr>
<tr>
<td>Rendering of services by hotels and restaurants</td>
</tr>
<tr>
<td>Transport, storage, and communications</td>
</tr>
<tr>
<td>Financial activity</td>
</tr>
<tr>
<td>Real estate, renting, and business activities</td>
</tr>
<tr>
<td>Public administration and defense; social security</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Rendering of health and social services</td>
</tr>
<tr>
<td>Other community, social, and personal service activities</td>
</tr>
<tr>
<td>Extraterritorial organizations activity</td>
</tr>
<tr>
<td><strong>Total economy</strong></td>
</tr>
</tbody>
</table>


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between initial productivity and subsequent employment increases. Note that to avoid possible problems with reverse causality because employment changes can affect labor productivity, Figure 9.7 shows productivity in 2000 before any employment changes took place. Nevertheless, would use of a later year make a difference? The answer turns out to be no; the evidence in the figure is not altered greatly if labor productivity in the final year, 2008, is used instead of labor productivity in 2000.

The lack of a strong relation between labor productivity and migration across sectors means that labor migration induced by the resource boom did not exert a huge influence on average wages. Nevertheless, there was some effect, and it was not trivial because a sizable number of workers moved to construction and transport, both of which have higher-than-average productivity. To see this, consider average labor productivity in 2000 (outside of the mining sector) and assess how the average would have changed if labor productivity in each sector stayed the same but the 2008 employment distribution prevailed rather than the 2000 employment distribution. Measured in 2000 prices, average nonmining labor productivity in 2000 was 86 Azerbaijan manat per employee. If the 2008 employment distribution prevailed in 2000, average nonmining labor productivity would instead have been 102 manat per employee. Hence, the changed employment distribution can account for a rise from 86 to 102 in average labor productivity. Over the eight years of 2000–08, this rise represents an annual growth rate of 2.2 percent. This calculation indicates roughly that structural changes in employment can account for 2.2 percent of the wage growth during the boom period.

In sum, this section has considered evidence for inclusive growth by looking at labor market developments during Azerbaijan’s boom period of 2000 to 2008. Determining the inclusive nature of resource-driven growth is not a simple matter of determining who gets the resource-related rents or whether the resource sector itself is or is not labor intensive, because demand effects can cause the boom to have large impacts on sectors that are not closely related on the production side. Also to be considered is whether labor is shifting to labor-intensive sectors or migrating to high-wage sectors.

The evidence suggests that mining does have low employment, and there is evidence that little of the productivity gains in mining found their way into increased average wages for production workers. Outside of the mining sector, what evidence we have is in manufacturing, which does show a strong empirical relation between wage growth and labor productivity growth. Using this relationship as justification for basing estimates of wage trends on labor productivity data, our estimates suggest that employment-weighted wage growth was 6.8 percent per year, far below GDP per capita growth over this period and far below nonmining GDP per capita growth. On the employment side, there is little evidence of labor incomes improving through increases in labor force participation.
APPENDIX: A GUIDE TO INTERPRETING CHANGES IN PRICE AND OUTPUT DATA AT THE SECTOR LEVEL

Motivation

This model offers a framework for keeping track of several factors that are important in interpreting changes over time in data on value added, employment, and prices by sector. The two major factors highlighted interact with each other. They are, first, whether the forcing variable is demand related (for example, natural resource income) or supply related (for example, a positive productivity improvement in one sector), and second, whether price setting in some of the sectors in the economy is endogenous (as would be the case with nontraded goods and services) or not (traded goods).

The conclusions that will be demonstrated are the following:

• When there is a positive productivity improvement in one sector and if the output is not traded, then employment will not necessarily increase in that sector. The relative price of that sector will decline strongly. Value added in that sector will also not rise necessarily, but will rise to a greater extent than employment.

• If the same productivity improvement occurs in a traded sector, there will be a strong positive increase in employment and even more so in value added. Value added in the other sector will decline, and, of course, there will be no impact on prices from the productivity improvement.

• When an increase in demand is the forcing variable, in the case of nontraded goods, both relative prices and employment in that sector will increase together, and employment and value added must decline in the other sector.

• When all goods and services are traded, the increase in demand has no necessary impact on output or employment because any additional demand can be satisfied through imports.

This is intended as a guide to empirical work. Examination of how value added, prices, and employment move over time and move relative to each other, together with a knowledge of the economy, can help in interpreting whether the structural changes observed in the data are likely to signal demand-side or supply-side causes. The latter are more likely to underpin sustainable development, improvements in labor productivity, wages, and inclusive growth.

Description of the Model

The model has two sectors and a third natural resource sector, which, to avoid unnecessary complexity, does not employ domestic resources. One of the sectors will be called agriculture; it produces output according to

\[ Q_a = \psi L_a. \]
The second sector, denoted manufacturing, produces output according to

\[ Q_m = \theta L_m^a. \]

The price of manufacturing relative to agriculture is \( p = \frac{p_m}{p_a} \). At the optimum, employment is distributed across sectors according to

\[ \psi = p \alpha \theta L_m^{-1}, \]

and total labor supply must be employed in one of the two sectors:

\[ L = L_a + L_m. \]

On the demand side, consumers maximize log utility

\[ U = \beta \ln(C_a) + \ln(C_m) \]

so that at the optimum, consumption of the two goods follows

\[ C_a = \beta p C_m. \]

It is important to consider the demand side and not just production when analyzing structural change because demand will play a critical role when some of the goods cannot be traded. When goods are not traded internationally, local demand must equal supply:

\[ C_m = Q_m; \]

\[ C_a = Q_a. \]

Alternatively, when goods can be traded internationally, total international payments must balance (accumulation of foreign assets is not examined in this model). In the following equation, \( R \) stands for production of the natural resource. To simplify without losing the ability to address important points, natural resource production is assumed to be sold entirely internationally without using any domestic labor or other resources:

\[ C_a + p C_m = Q_a + p Q_m + R. \]

**Distinguishing Demand and Productivity Shocks When Some Goods Are Not Traded**

The essential equations of the model when the output of one sector is not traded internationally are the four equations below, which determine \( L_m, p, C_m, \) and \( C_a \):

\[ \psi = p \alpha \theta L_m^{-1}; \]


\[ C_a = \beta p C_m; \]

\[ C_m = Q_m; \]

\[ C_a + p C_m = Q_a + p Q_m + R. \]

After substitution to eliminate the consumption variables \( C_m \) and \( C_a \), the model reduces to two equations in two unknowns, simultaneously determining the relative price and employment in manufacturing:

\[ p = \frac{\psi L_{m}^{1-a}}{a \theta}; \]

\[ \psi L + R = \beta p \theta L_{m}^{a} + \psi L_{m}. \]

The graphical solution to the model is presented in Figure 9A.1.

Once \( p \) and \( L_{m} \) are determined, other variables in the model can be solved for by substitution back into the equations above. Note that impacts on GDP can be determined from the model since non-natural-resource GDP, measured in units of the agricultural good, is given by \( \psi(L - L_{m}) + \rho \theta L_{m}^{a} \), and total GDP is given by \( \psi(L - L_{m}) + \rho \theta L_{m}^{a} + R \).

A natural resource boom will cause national income and demand to rise for both goods. The increased demand in the nontraded sector must be satisfied.
domestically. This is achieved in part by labor flowing into that sector from agriculture and in part by relative prices for the sector rising to dampen demand as shown in Figure 9A.2.

This first kind of impact from a natural resource boom is well known: Resource sector output rises, output shifts to nontraded sectors, and relative prices rise in nontraded sectors. The impact on nonresource GDP is composed of both an impact on $p$ and impacts on $L_m$. When GDP is measured at constant, preboom prices, the impact through $p$ is of course held constant. In this case, the observed impact on constant price nonresource GDP depends only on the impact through $L_m$. Due to the envelope theorem, the impact through $L_m$ will be approximately zero for small resource booms. But it will be significant if the resource boom is large, and in particular, nonresource GDP will decline. This is from the fact that the resource boom shifts more output toward the nontraded sector than would be efficient in the absence of a boom. In effect, the boom temporarily distorts incentives in the nonresource economy and causes it to operate inefficiently from the perspective of the prices that prevailed before the boom or will prevail after the boom is over. When nonresource GDP is measured at constant prices of a period before the boom, it will show a decline. Thus, for large changes in $R$, provided there are no productivity-raising investments in nonresource sectors and if prices are constant, the model predicts a decline in nonresource GDP.

This tells us what we should expect to observe when the demand boost from a resource boom is the dominant event. What should we expect to observe if instead a productivity boost in the nontraded manufacturing sector is the

![Figure 9A.2](source: Author's calculations.)
dominant event? A rise in \( \theta \), the productivity term in the nontraded sector, would shift both schedules down, as shown in Figure 9A.3.

The upward-sloping schedule shifts to the right because the higher productivity draws labor into the manufacturing sector. The downward-sloping schedule shifts downward because a price decline is necessary to induce consumers to consume more of the nontraded good. The net impact on employment in the nontraded sector happens to be zero in this model, as the two effects exactly offset one another, but the impact on the relative price of the nontraded product would be a decline. To summarize, determining the full impact of a productivity increase on nonresource GDP would in general require attention to three effects—the direct productivity effect, the induced price change, and the indirect effect through employment shifts, \( L_m \). Note that even though the net impact on employment is zero in this model, in a more general setting, it would be ambiguous.

**Demand and Productivity Shocks When All Goods Are Traded**

When both sectors produce traded goods, the equations of the model are as follows:

\[
\psi = \rho \alpha \theta L_m^{1-\alpha};
\]
Inclusive Growth in Natural Resource–Intensive Economies

Because prices are set internationally, the distribution of employment is determined uniquely by the first equation, as illustrated in Figure 9A.4.

Here, a rise in productivity has a large increase in employment in the sector in which it occurs, unlike in the nontraded case, where it is ambiguous. This also implies that employment and output must decline in the other sector, again unlike in the nontraded case.

Furthermore, once employment is determined as illustrated above, consumption in the two sectors is determined by the latter two equations, as illustrated in Figure 9A.5.

Now what is noteworthy is that a demand increase from a natural resource discovery (increase in $R$) serves to increase consumption in both sectors (Figure 9A.6). However, by the fact that $R$ does not enter into the equation in Figure 9A.4, the resource boom does not have any impact on the distribution of employment or value added across sectors.
Figure 9A.5
Source: Author’s calculations.

Figure 9A.6
Source: Author’s calculations.
INTRODUCTION

In the long term, sustained growth is central to poverty reduction. The rapid growth seen in much of the world over the past few decades—notably, but not only, in China and India—has led to an unprecedented reduction in poverty. And in general, increases in per capita income tend to translate into proportionate increases in income of the poor. As Dollar and Kraay (2002) memorably put it, “Growth is Good for the Poor.” This is all the more reason, then, to place sustainability of growth at the center of any poverty reduction strategy.

The recent global crisis—and the impact this is having on economic activity, jobs, and the poor—is thus rightly spurring a renewed focus on the drivers of growth, including possible links between income inequality, crises, and growth sustainability. Piketty and Saez (2003) underscored the sharp rise in income inequality in the United States in the past two decades and its return to levels not seen since the late 1920s. A number of analysts have investigated how this may have contributed to the crisis. Rajan (2010) pointed to the political and economic pressures that led high-income individuals to save, low-income individuals to sustain consumption through borrowing, and financial institutions and regulators to encourage the process. Meanwhile, recent events in Egypt, Tunisia, and elsewhere in the Middle East underscore the importance of better understanding the complex relationship between growth, income distribution, and crises.

Some inequality is integral to the effective functioning of a market economy and the incentives needed for investment and growth (Chaudhuri and Ravallion, 2006), but too much inequality might be destructive to growth. Beyond the risk that inequality may amplify the potential for financial crisis, it may also bring political instability that can discourage investment. Inequality may make it harder for governments to make difficult but necessary choices in the face of shocks, or inequality may reflect lack of access of the poor to finance and thus fewer opportunities to invest in education and entrepreneurial activity.

Earlier analyses have recognized the complex linkages among income distribution, growth, and policies to counter inequality. In this chapter, we ask whether
growth can in fact be sustained in the face of a highly uneven income distribution. Does less inequality help to increase the duration of growth? Are inequality and unsustainable growth two sides of the same coin or largely unrelated issues?

This chapter draws on earlier work (Berg, Ostry, and Zettelmeyer, 2012) that looked at growth in a way that emphasizes the turning points in countries’ growth trajectories and especially what determines when a long period of growth, that is, a “growth spell,” comes to an end. Here the focus is squarely on the relationship between income distribution and the length of growth spells and the relation of the empirical findings to the political and economic narratives of specific cases. We then review the earlier empirical literature on growth and distribution, relating it to the stylized facts of growth, and discuss the role of income distribution, and other determinants such as institutions, education and health, globalization, and macro policy, in growth duration. Finally, we propose some tentative policy implications.

THE HILLS AND VALLEYS OF GROWTH

By the late 1990s, many researchers had examined empirically the relationship between income distribution and growth. Following the broader growth literature, the typical approach was to relate a country’s income distribution at the beginning of a long sample (say, 1965–85) and the growth rate during that period, controlling for a few key variables such as initial per capita income. An empirical consensus had emerged that countries with more equal income distributions tended to grow faster (e.g., Alesina and Rodrik, 1994), though the evidence was admittedly not robust (Deininger and Squire, 1998; Barro, 2000).

Subsequently, attention turned to analysis of panel data to examine how changes in income distribution affected the growth rate in a subsequent medium-term (usually five-year) period. Forbes (2000) found that an increase in inequality tended to raise growth during the subsequent period. Banerjee and Duflo (2003) found an even more complex relationship between inequality and growth in which changes in inequality in either direction lowered growth in the subsequent five-year period. They interpreted this finding as supportive of the notion that redistribution hurts growth, at least over short- to medium-term horizons.

For significant poverty reduction, the key is to achieve rapid growth over long periods of time. For these purposes, the long-term growth regressions of Barro (2000) and similar studies would seem the most relevant. However, these analyses, and perhaps common perceptions, assume implicitly that development is like climbing a hill; the development is more-or-less steady increases in real income, punctuated by fairly small bumps (i.e., business cycle fluctuations), perhaps with the occasional takeoff as poor countries become integrated into the global economy. Figure 10.1a shows the level of real per capita income in a couple of advanced economies, with a pattern consistent with this idea of growth. If this were indeed the common pattern, the most interesting question—indeed the only important question about growth—would be how to explain why some countries grow faster than others do over long periods.
Figure 10.1a  The Hills of Growth

Source: Penn World Table, Version 6.2.
Note: Real GDP per capita is measured in logs, so a straight line implies a constant growth rate.
Figure 10.1b shows the level of real per capita income in a group of developing countries. In contrast to the visual impression from the advanced economy graphs, what strikes the eye here is the variety of experience. Looking at such pictures, Pritchett (2000) and others have been struck with the idea that an understanding of growth must involve looking more closely at the turning points, that is, not the ups and downs of growth over business cycle horizons, but rather why some countries are able to keep growing for long periods of time while others see growth downbreaks after just a few years, followed by stagnation or decay. To get a handle on this question, this chapter focuses on growth spells, defined as the time interval starting with a growth upbreak (the takeoff) and ending with a downbreak (or the end of the sample). The goal is to examine trends, not temporary events such as recoveries from recessions or the impact of sharp increases in the price of a principal export commodity. It follows that the object of inquiry (the growth spell) cannot be too short: In practical terms, we set its minimum length at eight years.1

The question of how to sustain a growth spell is particularly interesting for two reasons. First, looking at the broad cross-country evidence, igniting growth is much less challenging than sustaining growth (Hausmann, Pritchett, and Rodrik, 2005). That is, even the poorest of countries have managed to get growth going for several years from time to time. Where growth laggards differ from their more successful peers is in the degree to which they could sustain growth for long periods of time. Second, in recent years, a large number of countries have been enjoying the fruits of sustained growth spells—more indeed than at any time in the last 30 years or so. The higher incidence of growth spells is most dramatic in sub-Saharan Africa, where many countries had a takeoff in the mid-1990s. Thus, the following questions emerge: “Are these ongoing spells likely to persist?” and “How can they be kept going?”

Growth: Easy to Start, Hard to Keep Going

A first observation about growth breaks and growth spells is that both upbreaks and downbreaks are quite common, reflecting the notion that growth is not smooth. As Table 10.1 shows, upbreaks tend to be fairly spread out across regions and decades. A key message from the data is thus that the initiation of growth is not necessarily the hard part of achieving a long-term rise in per capita incomes. Latin America and Africa, for example, do not seem to suffer from an unusual dearth of growth spells. Rather, the real problem seems to stem from the inability to sustain growth over long periods. For example, almost all growth spells in industrial countries and emerging Asia last at least 10 years, but only about two-thirds of Latin American and African spells are this long (Table 10.2). Sustained

1 Berg, Ostry, and Zettelmeyer (2012) also look at five-year minimum lengths to gauge the sensitivity of the results. To also take account of economic significance of the spells, a growth spell (1) begins with a statistical upbreak followed by a period of at least 2 percent average real per capita growth and (2) ends either with a statistical downbreak followed by a period of less than 2 percent average growth or with the end of the sample.
Figure 10.1b  The Hills, Valleys, and Plateaus of Growth

Sources: Penn World Table, Version 6.2; Berg, Ostry, and Zettelmeyer (2012); and authors’ calculations.

Note: Vertical dashed lines represent statistically significant growth downbreaks; solid lines represent upbreaks. Real GDP per capita is measured in logs, so a straight line implies a constant growth rate.
TABLE 10.1

Growth Breaks by Region and Decade

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>Average break size</th>
<th>1950s–60s</th>
<th>1970s</th>
<th>1980s</th>
<th>1990-2000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Upbreaks</td>
<td>78</td>
<td>6.9</td>
<td>17</td>
<td>13</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>Industrial countries</td>
<td>11</td>
<td>5.0</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Emerging Asia</td>
<td>19</td>
<td>5.6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Latin America</td>
<td>11</td>
<td>4.0</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>22</td>
<td>10.3</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Other developing</td>
<td>15</td>
<td>7.4</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total Downbreaks</td>
<td>96</td>
<td>–6.3</td>
<td>7</td>
<td>48</td>
<td>30</td>
<td>11</td>
</tr>
<tr>
<td>Industrial countries</td>
<td>21</td>
<td>–5.3</td>
<td>0</td>
<td>15</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Emerging Asia</td>
<td>15</td>
<td>–6.0</td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Latin America</td>
<td>13</td>
<td>–4.6</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>26</td>
<td>–8.0</td>
<td>3</td>
<td>12</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Other developing</td>
<td>21</td>
<td>–6.9</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

Sources: Berg, Ostry, and Zettelmeyer (2008); and authors’ calculations.

1 Percentage-point change in real per capita GDP growth before and after the break.
2 Includes Hong Kong SAR, Japan, Republic of Korea, Singapore, and Taiwan Province of China.
3 Cyprus, Caribbean countries, Middle East, North Africa, and Turkey.

Note: A growth break is a statistically significant change in the per capita real GDP growth rate that persists for at least eight years.

growth over many years or decades seems to be what separates growth miracles from growth laggards.

Beyond the duration issue, another salient feature of the data relates to the rate of growth both within and outside of growth spells. As Table 10.2 shows, all regions’ spells involve fairly fast growth, with those in Africa actually the most rapid. In contrast, there are big differences following the end of spells. Soft landings have tended to follow the end of growth spells in advanced economies and Asia, whereas African spells have tended to end in deep collapses.

INCOME DISTRIBUTION AND GROWTH SUSTAINABILITY

To what extent is the duration of growth episodes related to differences in country characteristics and policies, including income distribution? It has long been recognized that the quality of economic and political institutions, an outward orientation, macroeconomic stability, and human capital accumulation are all important determinants of economic growth, and much work has gone into understanding the mechanisms and policy implications of these relationships. In this chapter, we argue that income distribution may also, and independently, belong in this “pantheon” of critical growth determinants.

Why Income Distribution?

To set the stage, Figure 10.2 presents a simple correlation between length of growth spells and the average income distribution during the spell for a sample of...
TABLE 10.2
Characteristics of Growth Spells

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of countries</th>
<th>Number of spells</th>
<th>Mean duration (years)</th>
<th>Frequency and duration</th>
<th>Percentage of spells lasting at least</th>
<th>Average growth before, during and after</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 years</td>
<td>16 years</td>
</tr>
<tr>
<td>Total (including incomplete spells)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial countries(^1)</td>
<td>37</td>
<td>11</td>
<td>24.4</td>
<td>100.0</td>
<td>63.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Emerging Asia</td>
<td>22</td>
<td>16</td>
<td>24.2</td>
<td>87.5</td>
<td>56.2</td>
<td>-0.3</td>
</tr>
<tr>
<td>Latin America</td>
<td>18</td>
<td>7</td>
<td>15.7</td>
<td>71.4</td>
<td>42.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>43</td>
<td>18</td>
<td>13.6</td>
<td>66.7</td>
<td>22.2</td>
<td>-4.0</td>
</tr>
<tr>
<td>Other developing(^3)</td>
<td>20</td>
<td>12</td>
<td>13.5</td>
<td>66.7</td>
<td>33.3</td>
<td>-2.1</td>
</tr>
</tbody>
</table>

Complete spells

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of countries</th>
<th>Number of spells</th>
<th>Mean duration (years)</th>
<th>Percentage of spells lasting at least</th>
<th>Average growth before, during and after</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 years</td>
<td>16 years</td>
</tr>
<tr>
<td>Industrial countries(^1)</td>
<td>37</td>
<td>2</td>
<td>13.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Emerging Asia</td>
<td>22</td>
<td>3</td>
<td>18.0</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Latin America</td>
<td>18</td>
<td>5</td>
<td>14.4</td>
<td>60.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>43</td>
<td>3</td>
<td>8.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other developing(^3)</td>
<td>20</td>
<td>7</td>
<td>10.7</td>
<td>42.9</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Source: Berg, Ostry, and Zettelmeyer (2008); and authors' calculations.

1. Real per capita GDP growth, in percentage points.
2. Includes Hong Kong SAR, Japan, Republic of Korea, Singapore, and Taiwan Province of China.
3. Cyprus, Caribbean countries, Middle East, North Africa, and Turkey.

Note: A growth spell is a period between a growth upbreak and a growth downbreak, as long as per capita real growth is above 2 percent during the spell and falls to below 2 percent after the downbreak. Breaks are at least eight years apart. na: not available.

countries. The measure of inequality is the Gini coefficient, which varies from 0 (all households have the same income) to 100 (all income received by one household). The correlation coefficient between these two series is –0.56 and is statistically significant.

There is a pattern here: More inequality seems to be associated with less sustained growth. What are the possible channels through which income inequality affects growth sustainability?

- Credit market imperfections: Poor people may not have the means to finance their education. A more equal distribution of income could thus increase investment in human capital and hence growth. In the data used here, there is a negative correlation between some indicators of human capital (notably secondary education achievement) and income distribution, even with per capita income controlled for. This echoes the arguments in Wilkinson and Pickett (2009) that more unequal countries suffer from relatively poor social indicators.
Political economy: In more economically unequal countries, political power may be distributed in a more egalitarian fashion than economic power. Efforts to use this political power to effect redistribution, say, through the tax system, may create disincentives to investment and result in lower or less durable growth (Alesina and Rodrik, 1994). Meanwhile, efforts by economic elites to resist this redistribution (e.g., through vote buying and other corrupt behavior) could be distortionary and wasteful and thus also detrimental to growth (Barro, 2000).

Political instability: Income inequality may increase the risk of political instability, and the resulting uncertainty could reduce incentives to invest and hence impair growth. Rodrik (1999) argued that inequality and political instability may hamper countries’ effectiveness in responding to external shocks. Similarly, Berg and Sachs (1988) found that unequal societies tended to experience relatively severe debt crises in the 1980s. The International Institute for Labour Studies (2010) highlighted links between unemployment and social unrest.

Against the background of these mechanisms, the question is whether the data lend support to the notion that societies with more equal income distributions have more durable growth.

Many Hazards to Growth

Growth is an inherently complex phenomenon, and many factors are likely to play a role in the duration of growth spells. In this section, the relationship between duration and inequality, and other key potential determinants, is examined more systematically. It goes almost without saying, given the nature of statistical relationships, that what follows should be interpreted as highlighting associations rather than causation, suggesting tentative stylized facts that seem to emerge from the data.
The approach here borrows from the medical literature that aims to gauge, for example, how long someone might be expected to live conditional on certain factors such as whether the person is a smoker and his or her weight, gender, and age (time “in the spell”). In our context, the probability that a growth spell will end depends on its current length and various hazards to growth. The analysis distinguishes between initial conditions at the onset of the spell and changes during the course of a growth spell. The latter are most interesting for the question of what policies might be able to extend the life of an ongoing spell.2

Unfortunately, there are not nearly enough data to test all the main growth theories, and hence candidate variables, at once. There are simply too few spells and too many candidates to disentangle everything. So the strategy is to look at possible determinants of duration one at a time and then try to synthesize the findings. The variable-by-variable analysis suggests that the following are correlated with longer growth spells:3

- Better political institutions: Many have argued that political institutions that constrain the executive and secure political accountability help to sustain growth. We also find that several measures of better political institutions are correlated with longer spells.
- Increases in education, health, and physical infrastructure: One strong effect is of within-spell improvements in primary education. In addition, both the initial level and increases in child mortality reduce the expected duration of a spell, though with mixed significance and magnitude.
- Financial development: Consistent with the arguments of many economists, measures such as increases in the ratio of bank deposits to GDP during the spell seem to have a protective effect.
- Trade liberalization: There is a significant and large effect of trade liberalization, consistent with the notion that mechanisms such as increased market size, promotion of competition, and transmission of know-how may link trade openness and growth and make growth more durable.
- International financial integration: Depending on the nature of the capital flow, FDI seems to help duration, whereas growth of external debt seems to hurt (consistent with the findings by Dell’Ariccia and others [2008]).

2 Many of the spells have not ended and their eventual length is unknown. However, the statistical techniques used in this section take these incomplete spells into account. If some factor is common to long incomplete spells but absent in short complete spells, a protective effect on duration can be identified.

3 Even these “bivariate” estimations include initial income, in addition to the variable of interest, to avoid misattributing to another variable the effects of underdevelopment itself, with which that variable might be correlated. It turns out that low initial income is independently a significant predictor of longer spells. The estimations can also shed some light on whether the length of the spell itself is a risk factor, which it appears to be (the hazard is increasing in the time spent in the spell), even after the other potential determinants are included.
• Competitiveness and export structure: Avoidance of exchange rate overvaluation, high shares of manufacturing exports in total exports, and various measures of the sophistication of export structures (Hausmann, Rodriguez, and Wagner, 2006; Hausmann, Hwang, and Rodrik, 2007) are all correlated with longer growth spells.

• Macroeconomic volatility: Increasing rates of currency depreciation and inflation both reduce the expected length of spells.

• External shocks: Reductions in the terms of trade and increases in U.S. interest rates, in particular, are associated with shorter spells.

• Inequality: There is indeed a large and statistically significant association between income inequality and growth duration. Inequality is among the variables with the economically strongest effect on predicted spell duration. It is also among the most robust variables, in that it remains statistically significant across samples.

Overall, the results of the analysis have the flavor of some interpretations of the East Asian “miracle.” Growth is most enduring in countries that maintain outward orientation, have inward FDI but perhaps not much in the way of external debt or deficits, maintain macro stability, and have relatively equal income distribution. Given this, it is worth noting that overall results hold up even when Asia is excluded from the sample.

**Putting the Hazards Together**

So far, we have looked one by one at the possible factors influencing the duration of growth spells. It is possible that many of the identified determinants of spell duration are themselves correlated with each other. For example, perhaps inequality is only indirectly capturing the effects of poor institutions, poor health or education, or other factors that might be the true drivers of growth duration.

Many potential determinants of duration remain important in this joint analysis, though their statistical and economic significance varies substantially depending on the exact sample, whether or not other potentially important variables are also included, and so on. Several variables are significant in at least some samples and specifications.

Figure 10.3 presents the results from the preferred multivariate specification in Berg, Ostry, and Zettelmeyer (2011). To give a feeling for the importance of each variable, the figure reports the increase in expected spell duration for a given increase in the variable in question, with other factors kept constant. To do so requires first calculating expected duration when all variables are at the median for the sample (the 50th percentile). The expected duration is then recalculated when the variable in question improves by 10 percentiles.\(^4\) The main results are as follows:

\(^4\)To take the Gini as an example, the median in the sample is 40. A 10 percentile improvement takes the Gini to 37, which represents more equality than 60 percent of the Gini observations in the sample.
Better political institutions (measured by “autocracy” according to the Polity IV database) are correlated with longer spells; a reduction in autocracy from a rating of 1 (which corresponds to the sample median) to 0 on the 10-point scale is associated with a 25 percent longer spell.

Liberalized trade (measured with the Wacziarg and Welch [2008] dichotomous variable that takes a value of 1 when trade has been liberalized and 0 otherwise) is associated with a 45 percent longer spell.

A smaller real exchange rate overvaluation (associated with more durable growth); a decrease in overvaluation by 10 percentage points of the real exchange rate—measured as a deviation from purchasing power parity, after per capita income is adjusted for—is associated with an 8 percent increase in expected spell length.

The effects of financial globalization again depend on the nature of the capital flow. Higher FDI inflows are associated with longer spells, with an increase from 8 to 12 percent of GDP in FDI liabilities associated with an expected spell duration that is 15 percent longer. Lower external debt is associated with longer spells; a decrease from 44 to 39 percent in the ratio of external debt to GDP suggests an increase in the duration of the growth spell of about 2 percent.

A number of other variables that work one by one do not remain significant in the joint analysis. This may reflect the difficulty in identifying many different effects in a limited sample of spells, but it is also possible that they are, at least in

Figure 10.3  Effect of Increase of Different Factors on Growth Spell Duration (Percent)

Sources: Berg, Ostry, and Zettelmeyer (2012); and authors’ calculations.
Note: For each variable, the height of the figure shows the percentage increase in spell duration resulting from an increase in that variable from the 50th to the 60th percentile, with other variables at the 50th percentile. For trade, the figure shows the benefits of having an open instead of a closed regime, using the Wacziarg and Welch (2008) dichotomous variable. For autocracy, the figure shows the effects of a move from a rating of 1 (the 50th percentile) to 0 (the 73rd percentile). FDI: foreign direct investment.
part, not independent drivers of duration but rather manifestations of the underlying forces captured by some of the above variables.\(^5\)

**Inequality: A Significant Hazard to Growth Sustainability**

The key result from the joint analysis is that income distribution survives as one of the most robust and important factors associated with growth duration. As Figure 10.3 demonstrates, a 10 percentile decrease in inequality—the sort of improvement that a number of countries have observed during their spells—increases the expected length of a growth spell by 50 percent. Remarkably, inequality retains a similar statistical and economic significance in the joint analysis despite the inclusion of many more possible determinants. This suggests that inequality seems to matter in itself and is not just proxying for other factors. Inequality also preserves its significance more systematically across different samples and definitions of growth spells than the other variables. Inequality is thus a more robust predictor of growth duration than many variables widely understood to be central to growth.

The estimates of the effects of inequality mainly rely on cross-country variation, because generally inequality is fairly stable through time for a given country. However, sometimes income distribution does change dramatically, as in the United States, China, and a number of developing countries over the past few decades. And the estimates suggest that such changes may have significant effects on expected growth duration. To take one example, reducing inequality in Latin America enough to close even half of the inequality gap between that region and emerging Asia would more than double the expected duration of a growth spell in Latin America.

Income distribution is only one measure of social heterogeneity. Several researchers have argued that ethnic or religious fractionalization plays a similar role to inequality in making a country more vulnerable to shocks or more unstable.\(^6\) Anecdotally, there are clearly times when ethnic fractionalization seems to be associated with political and economic instability. And it seems plausible that ethnic and other sorts of fractionalization are correlated, and indeed interact, with income distribution in complex ways. We find some evidence to support the idea that higher ethnic fractionalization is associated with shorter growth spells, but the effect varies substantially across samples and is often not statistically

\(^5\) Lack of significance of manufactured exports may reflect the notion that these operate mainly by creating stronger institutions and reform constituencies, as suggested by Johnson, Ostry, and Subramanian (2007). Macro stability variables are also not particularly robust, possibly reflecting the idea that inflation reflects deep distributional conflicts (Taylor, 1991).

\(^6\) Easterly and Levine (1997), for example, attribute differences in a number of important public policy and economic indicators such as low schooling, political instability, and macroeconomic mismanagement to high ethnic fractionalization. However, they do not also control for income distribution.
TABLE 10.3
The Ends of Six Spells

<table>
<thead>
<tr>
<th>Country</th>
<th>Spell dates</th>
<th>Growth in real per capita GDP</th>
<th>Hazard ratio</th>
<th>Main contributing factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>During spell</td>
<td>Next decade</td>
<td>Inequality</td>
</tr>
<tr>
<td>Cameroon</td>
<td>1978–85</td>
<td>6.6</td>
<td>–5.6</td>
<td>109</td>
</tr>
<tr>
<td>Colombia</td>
<td>1967–78</td>
<td>3.4</td>
<td>1.2</td>
<td>66</td>
</tr>
<tr>
<td>Guatemala</td>
<td>1958–79</td>
<td>2.4</td>
<td>–1.3</td>
<td>56</td>
</tr>
<tr>
<td>Ecuador</td>
<td>1971–78</td>
<td>7.2</td>
<td>–1.0</td>
<td>47</td>
</tr>
<tr>
<td>Panama</td>
<td>1959–80</td>
<td>4.7</td>
<td>0.0</td>
<td>42</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1968–76</td>
<td>5.9</td>
<td>–4.0</td>
<td>29</td>
</tr>
</tbody>
</table>

Sources: Berg, Ostry, and Zettelmeyer (2008); and authors’ calculations.

Note: The hazard ratio is the ratio of the predicted probability that the spell would end during the last five years of the spell (prior to its actual end) to the predicted probability of a spell ending for the average observation in the entire sample. Thus, a hazard ratio of 1 implies no unusual risk that the spell will end. The factors contributing to the hazard ratio are based on the Model 1 of Table 12 of Berg, Ostry, and Zettelmeyer (2008), with the contributions rescaled so that they sum to 1. Shown here are only the main factors for these particular observations. FDI: foreign direct investment.

significant. For growth spells, at least, the evidence seems firmer on the importance of income inequality.

A Closer Look at the Evidence

Do these statistical results find a voice in the political and economic narratives of the actual country growth episodes? Specifically, where the model predicts a high likelihood that the spell will end, does the narrative highlight the income distribution channels suggested by the empirics? The answer is indeed a tentative yes.

Consider the 20 complete spells in the main sample shown in Table 10.2. For all of them, the predicted risk that the spell will end during the last five years of the spell (prior to its actual end) is several multiples higher than for an average country in the sample. What was going on in these cases? Table 10.3 gives some data for the period corresponding to the end of spells in six cases with the highest predicted hazard.

Colombia experienced a growth spell end in 1978. The spark was a crackdown on drug cartels, beginning a long civil conflict. According to Cárdenas (2007), the massive change in Colombia’s growth trajectory over two decades was related to “a fortuitous event that interacted with . . . high levels of inequality and poverty and the weak presence of the state.” The baseline multifactor model predicts that Colombia’s growth spell was indeed fragile—with a risk of ending 66 times higher than the average over all the spells in our sample. This higher risk can be decomposed into the various determinants included in the duration regression presented in Figure 10.3. Colombia’s high Gini (53 versus the sample average of 38) accounts for most of the higher risk.
Guatemala was in a state of civil war from 1960 until 1996. During these 36 years, thousands were executed, several coups took place, and civil liberties were denied. The war peaked in 1979, coincident with the end of the growth spell. In the words of Thorp, Caumartin, and Gray-Molina (2006), “By the late 1970s, Guatemala had entered a stage of polarization and radicalization of social organizations (trade unions, peasant organizations). In the face of increasing repression, many CUC [Comité de Unidad Campesina] or trade union members opted to join the guerrilla.” Carbonnier (2002) further noted that “peace or political conditionality induces the government to adopt lax economic policy in order to muster . . . political support to stay in power . . . [But] economic conditionality often means political turmoil and civil unrest . . . For instance, attempts to cut subsidy and raise transportation prices repeatedly spurred violent clashes in the streets of Guatemala City . . . The [result] has often been an increase in repression coupled with the reintroduction of a subsidy.” The prediction of the multivariate model is that the risk of Guatemala’s spell ending was indeed about 55 times higher than that of the average country between 1974 and 1979, with higher-than-average income inequality being one of the two factors (the other being FDI) driving the result.

The ends of spells in Cameroon, Nigeria, and Ecuador demonstrate how income distribution can interact with external shocks. Lewis (2007) noted for Nigeria that highly volatile politics, social incohesion, and external shocks drove bursts of economic volatility: “In Nigeria, ethnic and regional competition has hampered the formation of a stable growth coalition between the state and private producers. Political elites have turned instead to populist strategies and diffuse rent distribution among a fragmented and polarized business class. The populist option proved short-lived when oil revenues dwindled, while the residual alliances of rentiers were unstable, resulting in economic stagnation and disarray.” In Cameroon and Ecuador, oil wealth in the 1970s initially financed large increases in the public sector, particularly in the wage bill, which proved very difficult to cut when oil prices fell. “Although these measures [to cut government spending] were necessary to rescue the country from further economic crisis, they were very unpopular because they least affected the political elite and those in the upper echelon of government, whose privileges remained intact” (Mbaku and Takougang, 2003; see also Jácome, Larrea, and Vos, 1998; and Aerts and others, 2000). In all three countries, the model’s hazard ratio was very high (ranging from more than 100 times higher than normal for Cameroon to 29 times higher for Nigeria). In all three countries, high inequality and autocracy levels and low levels of FDI played important roles according to the regression.

The model attributes the (high) risk of Panama’s spell ending mainly to rising external debt, along with inequality. Indeed, Panama’s military dictatorship preserved power through the 1970s increasingly by borrowing externally to support transfers to government workers (Ropp, 1992). The global crisis of the early 1980s thus hit Panama hard. This pattern is consistent with the argument in Berg and Sachs (1988) that countries that suffered most from the debt crisis of the 1980s may have been those that used (unsustainable) foreign borrowing to bridge societal conflict.
The variety and complexity of the channels are evident in these examples. Crime, for example, seems key in Colombia, but not in other cases. The timing of crises seems to reflect an interaction of underlying vulnerabilities, including income distribution and shocks (such as a rise in the attractiveness of illegal drug production in Colombia and oil elsewhere). The narratives show the complexity of the debt/inequality/downbreak nexus, particularly with respect to timing. In Panama, debt grew prior to the crisis and thus shows up as a factor in the hazard regressions. In some of the oil exporters, debt grew mainly after the end of the spell, as an initial—and ultimately unsustainable—response to negative commodity shocks, thus helping to convert a shock into a sustained downturn. Clearly, ethnic fractionalization plays a role in some cases too. The regressions suggest that inequality is an underlying feature that makes it more likely that a number of these factors come together to bring a growth spell to an end.

**SOME TENTATIVE POLICY IMPLICATIONS**

One reasonably firm conclusion is that it would be a big mistake to separate analyses of growth and income distribution. To borrow a marine analogy when talking about economic growth and its beneficiaries: A rising tide may lift all boats, but our analysis indicates that helping to raise the smallest boats may help to keep the tide rising for all craft, big and small.

The immediate role for policy, however, is less clear. More inequality may shorten the duration of growth, but poorly designed efforts to reduce inequality could be counterproductive. If these efforts distort incentives and undermine growth, they can do more harm than good for the poor. For example, the initial reforms that ignited growth in China involved giving stronger incentives to farmers. Overall, this increased the income of the poor and reduced overall inequality as it gave a tremendous spur to growth. However, it probably led to some increased inequality among farmers, and efforts to resist this component of inequality would likely have been counterproductive (Chaudhuri and Ravallion, 2006).

Still, there may be some “win-win” policies, such as better-targeted subsidies, better access to education for the poor that improves equality of economic opportunity, and active labor market measures that promote employment. Market-oriented reforms in Brazil were complemented with progressive social policies aimed directly at poverty reduction (Ravallion, 2009). The multivariate estimates presented above would suggest that the resulting decline in Brazil’s Gini would, other things being equal, increase the expected length of a growth spell by some 40 percent.

When there are short-term trade-offs between the effects of policies on growth and income distribution, the evidence we have does not in itself say what to do. But our analysis should tilt the balance toward the long-term benefits—including for growth—of reducing inequality. Over longer horizons, reduced inequality and sustained growth may be two sides of the same coin.
The analysis calls to mind the developing country debt crises of the 1980s and the resulting “lost decade” of slow growth and painful adjustment. That experience brought home the fact that sustainable economic reform is possible only when its benefits are widely shared. In the face of the current global economic turmoil and the need for difficult economic adjustment and reform in many countries, it would be better if these lessons were remembered rather than relearned.

REFERENCES


Commodity Price Volatility, Poverty, and Growth Inclusiveness in Sub-Saharan African Countries

FRANÇOIS BOURGUIGNON

INTRODUCTION

The comparative advantage of sub-Saharan African countries predominantly lies in the export of commodities, whether they be oil, mineral, or agricultural. Managing development based on this kind of comparative advantage is difficult, however, so much so that some refer to the availability of natural resources in a country as the natural resource curse. Yet, there is little doubt that, on average, high real commodity prices as well as the discovery and exploitation of new resources are associated with faster growth, even though possibly temporarily. From that point of view, it is difficult not to relate the sustained growth in sub-Saharan Africa since the turn of the century (and for some countries, really from the mid-1990s) to the sustained surge in international commodity prices, itself most likely fed by the heavy demand of emerging economies. It is also interesting that this increase in commodity prices and acceleration of growth came after a long period (i.e., 15 years) of decline in commodity prices and economic stagnation.

The difficulty is that both descending and then ascending trends in the real prices of the commodities exported by sub-Saharan African countries and therefore in their terms of trade have come with a level of volatility so high that it has been impossible to detect such trends. Part of the inability of sub-Saharan African countries to take advantage of them or to avoid mismanaging them, and therefore part of the commodity curse, lies precisely in this volatility. There are innumerable examples of governments that increased their spending as a response to high commodity prices and had to suddenly stop ambitious investment programs because of a drop in the prices and the impossibility of borrowing on foreign markets—often because of debt accumulated in boom times.

1 There is a rather large literature on the growth impact of commodity prices in sub-Saharan Africa. See in particular Deaton (1999), Spatafora and Tytell (2009), and Collier and Goderis (2007) for the apparent contradiction between short-term and long-term effects of commodity prices.
Interestingly enough, the huge fall in international commodity prices that took place during the 2008–09 world crisis may have been the first instance in which most sub-Saharan African countries were able to apply countercyclical policies instead of being caught, as in previous instances, in the general crush. Yet, it is not clear whether they could have gone on for very long with such policies if prices had not vigorously rebounded in 2010.

How much poor people have been affected by this volatility of commodity prices over the last 10 to 15 years and whether governments have been able to take advantage of recent favorable circumstances to engineer a new development regime that would reduce their vulnerability in the future is hard to say. In this respect, one important observation is that the structure of growth in sub-Saharan African countries does not seem to have changed much over the last decade. Faster GDP growth in recent years has been concentrated in the sectors of construction and services, as if the additional income brought by the boom in commodity prices was mostly used to feed additional consumption and possibly to improve infrastructure in urban centers. If African governments have been more cautious than in the past in managing commodity export revenues, they do not seem to have put their countries on a development path that will allow them to progressively free themselves from the volatility of international commodity prices.2

In short, the possible trend reversal in commodity prices that may have taken place at the turn of the century may not yet have had structural effects on sub-Saharan African economies and on their poverty reduction capacity. A possible reason for this is that the natural volatility of commodity prices rationally pushed governments not to take radical action, unlike what they often did in the past.

This chapter focuses on the evolution of poverty in the sub-Saharan African region in connection with changes in the terms of trade faced by the various countries. Of course, the link goes through GDP growth and the way it is affected by commodity prices and volatility. In this chapter, we first discuss the available empirical evidence on poverty, growth, and commodity prices. We then look at the policy instruments available in African countries to cope with the volatility of commodity prices, at both the macro level and the micro level, and also through the help that the international community can contribute to African countries.

**POVERTY, INCLUSIVENESS, GROWTH, AND COMMODITY PRICE VOLATILITY**

Sub-Saharan countries are heavily dependent on the export of a few commodities, and the well-being of the population may be strongly affected by fluctuations in commodity prices on international markets. The channel may be a direct one, as seen with agricultural export prices affecting farmers’ incomes. It may be indirect,

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2 For a contrarian and more optimistic view, see McKinsey Global Institute (2010). This view about recent development policies in sub-Saharan countries is shared by other observers; see Arbache and Page (2010) and Collier and Goderis (2007) in particular.
such as when agricultural exports are handled by a marketing board with an implicit export tax feeding the government’s budget or when the exported commodity is extracted from the ground by national or foreign companies paying royalties and taxes to the government. With the indirect channel, the well-being of the people and, of course, the poverty rate are affected by the way the government spends the revenues it gets from commodity exports.

With perfect capital markets and some stationarity in the stochastic process behind commodity prices, the effect of their fluctuations on the well-being of agents could be smoothed through saving in good times and borrowing in bad times. In the absence of such markets and given the limited stationarity of commodity price fluctuations, the well-being of the agents and the growth rate of the whole economy may depend not only on the current price of commodities, but also on their uncertainty or volatility.

In view of this, the effect of commodity price and commodity price volatility on poverty may go through two channels. At a point of time, poverty may be higher because commodity prices are low but also because commodity prices are highly volatile, and this volatility affects the behavior of agents. Both effects may be direct, as in the case in which poor people’s incomes are directly impacted by commodity prices, such as with agricultural exports without marketing board shielding, or indirectly impacted, such as in the case in which poor people’s incomes are impacted through the government’s policy and its effect on the growth rate of the economy. If this is the case, the volatility of commodity prices might not affect poverty directly, but rather through the volatility they induce in the level of economic activity.

The importance of these various channels linking commodity prices and poverty is explored in Table 11.1, which reports the results of various regressions where the dependent variables is the change in poverty—as measured by the headcount index with the usual threshold of US$1.25 at purchasing power parity—between periods for which this poverty measure is available and the independent variables are the growth of GDP per capita, terms of trade, and measures of their volatility.

The story told by Table 11.1 is interesting. As could be expected, GDP per capita growth turns out to be a strong explanatory factor of poverty change, with an elasticity that depends on the initial level of poverty. The elasticity of poverty with respect to GDP found in column (i) of the table is a bit below unity, an order of magnitude consistent with earlier work, such as Bourguignon (2003) and Ravallion (2001). Column (ii) also shows that the relationship between poverty reduction and GDP growth is not linear, as found again in previous studies. All these results are robust with respect to fixed country effects as can be seen in columns (ii) and (iv).

The other columns of Table 11.1 show two other interesting results. On the one hand, the poverty change seems to be independent from the terms of trade, whether one considers the change in terms of trade during a growth spell or the volatility of that change. On the other hand, the change in poverty depends on the volatility of GDP growth during the same period. Other things being the same, a given growth rate over some period of time generates less poverty
Commodity Price Volatility, Poverty, and Growth Inclusiveness in Sub-Saharan African Countries

TABLE 11.1

Poverty Reduction Determinants in Sub-Saharan Countries: Alternative Regression Results

<table>
<thead>
<tr>
<th></th>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
<th>(iv)</th>
<th>(v)</th>
<th>(vi)</th>
<th>(vii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial poverty</td>
<td>–0.53</td>
<td>–0.63</td>
<td>–1.16</td>
<td>–1.35</td>
<td>–1.55</td>
<td>–1.37</td>
<td>–1.62</td>
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<tr>
<td>GDP per capita growth</td>
<td>–0.92</td>
<td>–2.31</td>
<td>–0.76</td>
<td>–2.42</td>
<td>–2.72</td>
<td>–2.43</td>
<td>–2.81</td>
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<tr>
<td></td>
<td>–5.12</td>
<td>–2.75</td>
<td>–3.94</td>
<td>–2.75</td>
<td>–3.25</td>
<td>–2.71</td>
<td>–3.05</td>
</tr>
<tr>
<td>Initial poverty*GDP per capita growth</td>
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<td>0.03</td>
<td>0.04</td>
<td>0.04</td>
<td>1.69</td>
<td>1.93</td>
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<td></td>
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<td></td>
<td></td>
<td>1.92</td>
<td>2.27</td>
<td>1.92</td>
</tr>
<tr>
<td>Standard deviation of GDP per capita growth</td>
<td>0.44</td>
<td>—</td>
<td>0.48</td>
<td></td>
<td>2.30</td>
<td>2.05</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Change in terms of trade (%)</td>
<td>–0.03</td>
<td>–0.04</td>
<td>–0.38</td>
<td>–0.44</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Coefficient of variation of terms of trade</td>
<td>0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.58</td>
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</table>

<table>
<thead>
<tr>
<th>Fixed country effects</th>
<th>No</th>
<th>No</th>
<th>Yes</th>
<th>Yes</th>
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</tr>
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<tbody>
<tr>
<td>R²</td>
<td>0.39</td>
<td>0.42</td>
<td>0.69</td>
<td>0.72</td>
<td>0.76</td>
<td>0.72</td>
</tr>
<tr>
<td>Number of observations</td>
<td>53</td>
<td>53</td>
<td>53</td>
<td>53</td>
<td>53</td>
<td>53</td>
</tr>
</tbody>
</table>

Source: United Nations Development Programme Millennium Development Goals database; World Bank, World Development Indicators and author’s calculations.

Note: Poverty data come from the United Nations Development Programme Millennium Development Goals database, which seems to be the most consistent source for low-income countries. Gross domestic product (GDP) per capita figures are from the World Development Indicators released by the World Bank, the same being true of the terms of trade indices, which for most countries summarize the impact of both exported and imported commodity prices on the domestic economy. The analysis is restricted to 53 growth spells in 25 sub-Saharan countries.

1 An observation is a period between two dates at which poverty data are available in the United Nations Development Programme Millennium Development Goals database. All explanatory variables are defined over the same time interval; t-statistics are in italics.

2 Multiplied by the number of years in the development spell for consistency with the rest of the specification.

The first result suggests that if poverty reduction reacts to changes in terms of trade, it does not do so directly, but rather through the impact of terms of trade or their volatility on GDP, assuming, of course, that terms of trade directly affect GDP, a point that will be discussed later in this chapter. This would seem reasonable in countries exporting mineral commodities, the extraction of which involves a tiny number of workers and the revenues of which accrue directly to the state. It may be seem more surprising for agricultural commodity exporters, since those commodities are much more labor intensive and often originate in small farms more vulnerable to poverty. Sudden falls in coffee or cocoa prices in countries like Côte d’Ivoire or Ghana are indeed known to have caused an acute increase in poverty. However, controlling for the nature of exported commodities does not modify the independence between poverty reduction and terms of trade.

3 See for instance, Cogneau and Jedwab (2012) regarding the effect of the fall of cocoa prices in Côte d’Ivoire in the 1980s.
A first explanation of this result is that producers of exported agricultural commodities often are shielded from fluctuations in international prices through administered prices set by marketing boards, which does not prevent drastic adjustments in the latter from time to time. Another possible interpretation of the lack of significance of terms of trade in explaining poverty changes lies in the denominator of the terms of trade. In many countries, oil is an important component of import, and its price has fluctuated widely over the recent past. It is not clear that poor people who are potentially affected by fluctuations in agricultural commodity prices would be equally affected by fluctuation in oil prices. Thus, terms of trade may not be the best indicator to describe the impact of export prices on poverty.

Unfortunately, there are few sub-Saharan countries for which full series of export price indices are available. The alternative to using the terms of trade would be to construct original data based on international commodity price series, export taxes, exchange rates, and consumer price indices. However, this proved to be feasible only for a small number of countries.

This possible weakness of the terms of trade for catching the impact of commodity price changes on poverty may explain why GDP growth is a powerful predictor of poverty reduction. Indeed, a fall in the international price of exported agricultural commodities is likely to produce both an increase in poverty and a slowdown or even a reversal in GDP growth. The GDP variable in the regressions reported in Table 11.1 may thus catch both effects at the same time.

In short, there is some ambiguity in the model being estimated. Due to data limitations, it is not clear whether commodity prices affect poverty essentially through their effect on aggregate activity, which is likely for mineral commodities, or also affect poverty directly.

The second interesting result in Table 11.1 is the fact that poverty reduction significantly depends on the volatility of growth during the spell being observed. This result is consistent with the view that poor people are somehow penalized more than the rest of the population in case of a big drop in GDP per capita and benefit less from very fast growth. In other words, they are more vulnerable to negative shocks and less favorably affected by positive shocks. On the other hand, in line with a previous argument, this nonlinearity may also capture the fact that the volatility of GDP growth is itself linked to that of commodity prices that also affect poverty directly.

Because the only significant determinant of poverty changes is GDP growth and GDP growth volatility rather than changes in terms of trade and its volatility, the extent to which GDP growth and volatility are affected by changes in terms of trade and their volatility remains to be seen.

First, it must be recalled that GDP growth over a period and its volatility over the same period are strongly and negatively correlated. In cross-sections of countries and over different time periods, it has been observed that countries where annual GDP growth rates are highly volatile tend to grow at a slower rate over time (Ramey and Ramey, 1995; Martin and Rogers, 2000; Hnatkovska and Loayza, 2005). An illustration of that relationship is given in Figure 11.1, which
Commodity Price Volatility, Poverty, and Growth Inclusiveness in Sub-Saharan African Countries

Plots the mean and the standard deviation of annual growth rates of a sample of 20 LICs (dark markers, mostly sub-Saharan countries) from 1980 to 2008. As can be seen from the trend line, a 1 percentage point increase in the standard deviation of GDP reduces the mean growth rate by 0.6 percentage points, a rather sizable effect. For comparison, the figure also includes observations for a small sample of 10 middle-income countries (MICs; light markers). It can be seen that their distribution is analogous to the distribution of LIC observations.

The next step is to understand the channels through which GDP growth volatility affects the average rate of GDP growth as well as to identify the sources of volatility. An important literature has developed in this respect that we do not intend to summarize here. It makes a distinction between exogenous causes of GDP volatility such as foreign prices, trade partners’ activity, contagion in times of international financial crisis (e.g., flight for quality and sudden stops in capital flows), and endogenous factors like self-inflicted economic crises or inadequate response to exogenous shocks. Channels through which exogenous factors affect overall growth may indeed be ill-adapted policies or expectations about future

Figure 11.1 The Negative Long-Term Relationship between Growth and Growth Volatility: Selected Low-Income and Middle-Income Countries, 1990 to 2008

Sources: World Bank, World Development Indicators; and author’s calculations.


4 This elasticity has the same order of magnitude as the estimates found in the literature. See in particular Hnatkovska and Loayza (2005).

prices on export and import markets or about future capital flows. They may also be of a structural nature like the degree of openness of the economy, its access to international credit markets, or simply its governance and the capacity of policymakers to make appropriate decisions.

Turning now to the effect of terms of trade on growth, the literature on growth regressions offers plenty of evidence. Most growth panel regressions that are run on five-year periods find that the terms of trade significantly affect growth performances in developing countries (Loayza and Soto, 2002; World Bank, 2010). From that point of view, it is thus likely that the effect of GDP growth on poverty in the regressions reported in Table 11.1 implicitly includes the effect of changes in terms of trade and commodity prices on the level of economic activity.

Less emphasis has been given in the literature on the impact of the volatility of terms of trade on the average rate of growth. Yet this influence is not marginal. Based on the view that past volatility is an indicator of future uncertainty regarding export and import prices, Mendoza (1997) showed that a substantial part of cross-country differences in consumption growth could be explained by terms of trade volatility. Bleaney and Greenaway (2001) found a significant impact of the volatility of the terms of trade on growth in a small sample of sub-Saharan countries. Recently, Furth (2010) showed, on the same basic World Development Indicators data as those used above, that one-quarter of the variance in growth rates among 51 developing countries observed between 1980 and 2007 could be explained by the standard deviation of the terms of trade with respect to their trend and that very little could be explained by this trend itself or even by the volatility of GDP. The lack of relationship with the trend in the terms of trade in that study may seem surprising in view of the strong relationship found in some standard growth regressions, as mentioned previously. The difference lies in the time horizon. Growth regression studies describe the short-term impact of fluctuations in terms of trade, whereas the analysis in Furth (2010) refers to the long-term effect, with the implicit assumption that over various decades, countries had the time to adjust their growth strategy to long-term trends in export and import prices.

As far as the effect of terms of trade volatility on growth is concerned, it is not unlikely that the results in the various studies mentioned above significantly depend on the sample being used, the period of analysis, and the cross-section versus panel nature of the methodology. Whether working on the sample of LICs as in Figure 11.1 or on the extended sample that also includes some MICs, it turns out that results are not as clear-cut as suggested in the previous studies. Differences in growth rates over the last three decades (1980–2008) or the last two decades (1990–2008) do not seem to depend significantly on terms of trade trends and to depend only very weakly on their volatility during the period. This variability of regression results across samples would be consistent with a relationship between growth and terms of trade volatility that would be strong for some countries but weaker or even nonexistent in other countries. Some work remains to be done to identify which types of countries would belong to the first set, particularly whether they are more predominantly specialized in mineral or oil exports.
We will now examine the relationship between the volatility of the terms of trade and the overall volatility of GDP growth. This is less problematic as there is something mechanical in that relationship. If it is the case that the terms of trade are a significant determinant of growth in the short term, as recalled above, then the volatility of GDP growth should automatically increase with that of the terms of trade, other things being equal. This is illustrated in Figure 11.2, which plots the volatility of GDP growth against that of the terms of trade for a sample of countries relatively similar to that in Figure 11.1.

In summary, the relationship between poverty and commodity prices in LICs as it appears in the cross-country analysis undertaken in this chapter is quite simple. The first point is that commodity prices, somewhat awkwardly approximated by the terms of trade, seem to affect poverty mostly through GDP growth and, more interestingly, through GDP growth volatility. This is confirmed by standard cross-country analysis of GDP growth, in which indeed terms of trade play a significant role in the short term, and their volatility significantly affects overall GDP growth volatility. Of course, it is most likely that direct effects of commodity prices are missed in such an aggregate analysis because of a lack of detail in the econometric specification being used and because of the cross-country nature of the exercise. Unfortunately, more precise data are unavailable for a large enough number of countries.

It is well-known that growth is a major determinant of poverty reduction. The preceding results simply confirm this very simple fact, adding to it the interesting idea that the relationship between poverty and growth might be nonlinear, with

![Figure 11.2](image_url)

**Figure 11.2** The Contribution of Terms of Trade Volatility to GDP Volatility: Selected Low-Income and Middle-Income Countries, 1990 to 2008

Sources: World Bank, World Development Indicators; and author's calculations.

Note: BEN: Benin; BGL: Bangladesh; BKN: Burkina Faso; BRA: Brazil; BUR: Burundi; CAR: Central African Republic; CHL: Chile; CHN: China; COL: Colombia; DRC: The Democratic Republic of Congo; EGY: Egypt; GAM: The Gambia; GHA: Ghana; HAI: Haiti; KEN: Kenya; MAD: Madagascar; MAL: Malaysia; MAU: Mauritania; MLW: Malawi; MOR: Morocco; MOZ: Mozambique; NEP: Nepal; NIG: Niger; PER: Peru; PHI: Philippines; SEN: Senegal; THA: Thailand; TOG: Togo; TUN: Tunisia; UGA: Uganda; ZMB: Zambia.
poor people more affected than others in big recessions and benefiting less in exceptionally good times.

Repeating the preceding exercise with inequality rather than poverty so as to evaluate the effect of commodity prices and their volatility on the inclusiveness of growth did not yield interesting results. GDP growth and volatility turned out to be nonsignificant, the same being true of the terms of trade. This confirms that if terms of trade and their volatility play any role in poverty, it is through growth and not through changes in the distribution of income.

The charts in Figure 11.3 show the evolution of the terms of trade and the inequality in consumption expenditures in four African countries, the exports of which consist mostly of agricultural commodities, the price of which is expected to directly affect some specific groups in the population. According to the distributional data available, it can be seen that the severe cocoa-led worsening of the terms of trade in Côte d’Ivoire and Ghana in the late 1980s and the first half of the 1990s did not produce any big change in inequality. It increased a bit in Ghana and decreased a bit in Côte d’Ivoire. Then inequality increased in both countries, although more in Côte d’Ivoire, whereas the terms of trade were recovering in Ghana and remained more or less stable in Côte d’Ivoire. In Madagascar, the improvement in the terms of trade in the second half of the 1990s has been associated with an increase in inequality, but the opposite evolution in the early 2000s did not produce any noticeable change. Out of the four countries in Figure 11.3, Kenya seems the only one to show a systematic pattern in which inequality varies in the opposite direction of the terms of trade.

Of course, there are simple explanations behind the curves of Figure 11.3 that show that the statistical relationship between inequality and terms of trade is necessarily a complex one. In the case of Côte d’Ivoire and Ghana, for instance, the role of the cocoa (and coffee) marketing boards has been crucial either in isolating domestic producers from international price fluctuations or in smoothing their effects or postponing them. In both countries, there is indeed very little effect of the worsening of the terms of trade that took place in the 1980s and early 1990s on inequality. In Côte d’Ivoire, the administered price of cocoa was drastically lowered in 1990 by the marketing board, Caisstab, which was dismantled 10 years later. Presumably, this should have produced a shock on inequality if cocoa producers had been the only people hit. However, the crisis was truly national. GDP per capita dropped by 5 percent that year so that most agents were hit at the same time, and no big change was observed in the degree of inequality. Interestingly enough, inequality increased much later, when Caisstab had practically ceased its interventions.

In Ghana, floor producer prices remained in force despite the liberalization of the Cocobod, the equivalent of Caisstab. They were progressively adjusted proportionally to international prices at the same time as GDP per capita started stagnating. There too, the impact on inequality, although positive, was limited. Comparable country-specific explanations are available for other countries as well. For instance, the loose inverse relationship between inequality and terms of trade in the case of Kenya might have to be associated with the weak regulation of the main agricultural exports in that country.
Figure 11.3 Terms of Trade and Consumption Inequality (Gini) in Selected Sub-Saharan Countries

Sources: World Bank, World Development Indicators; and author’s calculations.

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This discussion of the elusive relationship between the terms of trade and inequality helps one to understand the results obtained earlier on the evolution of poverty that seemed to depend on commodity prices mostly though GDP growth and its volatility. It was already stressed that this was logically the case for exporters of mineral commodities and oil. In the presence of domestic price-smoothing mechanisms, it is clear that international fluctuations in the price of agricultural commodities also affect national economy agents only through aggregate mechanisms and therefore GDP fluctuations. It is therefore sufficient to have enough heterogeneity in the nature of the commodities being exported and in the marketing of agricultural exports for no discernable effect of commodity price fluctuations on poverty or the distribution of standards of living to appear in statistical cross-section analysis. This does not mean that commodity prices do not have a direct impact on poverty and inequality in some countries or under particular circumstances. The result from the statistical analysis in this chapter simply suggests that this is not the most frequent case as commodity price shocks in countries that heavily depend on commodity exports have almost an immediate macroeconomic effect and hit most agents rather than only the commodity producers.

**INSTRUMENTS TO COPE WITH THE EFFECTS OF COMMODITY PRICE VOLATILITY**

The factual analysis of the relationship between poverty, inequality, and commodity price volatility suggests that the main instruments for coping with the adverse effects of that volatility are more of a macroeconomic than a microeconomic nature. At the same time, the presence of instruments that would shield some vulnerable groups in the society from commodity shocks, whether they are hit directly or indirectly, through macroeconomic spillovers, may enhance the efficiency of macroeconomic policies in reducing the social cost of commodity price fluctuations. From that point of view, considerable progress has been made lately in developing countries in implementing redistribution instruments that could possibly be used to cushion macroeconomic shocks on poor people. The implications of the availability of these new instruments will be examined next, followed by a discussion of macroeconomic instruments and the potential role of the international community.

**Micro Instruments to Help Poor People Cope With Income Shocks in LICs**

The conditional cash transfer programs Progresa and Bolsa Familia were launched in Mexico and Brazil, respectively, and have attracted a lot of attention in the development community. They have shown in particular that it is possible to manage huge cash transfers in developing countries at a rather low administrative cost and to reduce poverty and inequality substantially through these instruments, both in the short term by targeting poor people and in the long term through the obligation conferred on beneficiaries to send their children to school
and health clinics. Programs of this type have now spread to many other Latin American countries and to other developing regions. They are now considered an important part of social protection and of the “social safety net” in those countries.

Such a view calls for several important remarks, with respect first to the actual “income insurance” content of these instruments and, second, to their applicability in a low-income African context.

Most cash transfer programs are targeted toward poor people who are identified through permanent household characteristics rather than current market income because the latter is seldom observed. The consequence is that the programs cannot really insure against income shocks of the type triggered by price fluctuation on international commodity markets and should not be considered a true safety net. Yet, as they provide limited resources on a regular basis, cash transfers reduce the volatility of market incomes, and when the liquidity constraint is binding, they make adjustment to a worsening economic environment less painful. It must be noted, moreover, that this is true of all cash transfer programs, whether conditional or unconditional. For instance, transfers paid to elderly people without formal pension payments play this uncertainty-reducing role when the elderly live within larger households, as the latter can help alleviate overall households’ liquidity constraints.

Some other social protection instruments in developing countries may play a more direct income insurance role. Although unemployment insurance schemes are still infrequent (and are mostly limited to the formal sector of the economy), public employment guarantee schemes at some arbitrary (low) wage have been used in periods of crisis and are permanent in some countries, such as India and South Africa. Also, microcredit programs that allow poor people to borrow at a reasonable rate help them cope with the consequences of shocks, provided that they allow people to borrow for consumption purposes.

As most of these programs have been developed in MICs, the issue arises regarding their applicability in sub-Saharan LICs and their capacity to provide a safety net against commodity price fluctuations. Concerning conditional cash transfer programs, numerous pilots have been launched in various countries (e.g., Burkina Faso, Ghana, Kenya, Malawi, Nigeria, Tanzania, Zambia). However, the emphasis in these experiments is more on the impact of these programs on the behavior of beneficiaries in terms of schooling and health checks of children than on the role of these transfers in reducing income volatility. With poverty rates very often close to or even above 50 percent, it is not clear whether it would not be extremely costly, in relative terms, to scale up these pilots so as to cover all poor people in a country.

Of course, more modest programs could be envisaged that would target the poorest rather than all poor, although it might often be difficult to distinguish

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6For a general analysis of social protection in sub-Saharan countries, see European Commission (2010); on the issue of the replicability of Latin American conditional cash transfer programs in Africa, see the early analysis of Schubert and Slater (2006).
people according to the severity of poverty they face. Targeting specific groups of poor people who are easily identifiable might also be considered. Social pension programs, like the Old Persons Grant in South Africa, for instance, might not cost as much and could already do much in reducing poverty and vulnerability, not only for the elderly, but for the households in which they live (Bertrand, Mullainathan, and Miller, 2003; Duflo, 2003).

Even if the programs are relatively modest and target only a segment of the poor population, such cash transfer programs offer an interesting possibility in the context of commodity price shocks. They provide effective channels through which governments, and possibly foreign donors, can transfer more or less purchasing power to poor people depending on the strength of the macroeconomic shocks they have to face due to commodity price variations. In other words, once in place, those programs provide a convenient way for governments to provide some kind of insurance.

More direct income insurance instruments include public employment programs offering below–market wage jobs in public works to people who cannot earn a living on the market. Most often, such programs are created in periods of crisis. This has been the case in several sub-Saharan countries (e.g., Senegal, Tanzania, Uganda, Zambia). The difficulty of such temporary programs is the cost and the delay of putting them in place, which often makes them not very effective. There are strong arguments for making such programs permanent, with some monitoring of their intensity precisely to address the problems arising from fluctuations in economic activity. South Africa’s Expanded Public Work Program, created in 2004, and Ethiopia’s Productive Safety Nets Program, launched in 2005 and financed by foreign aid, are examples of such permanent programs. Yet there is little evidence on the way they can be scaled up or down as a response to the impact of macroeconomic shocks on individual standards of living.

Microcredit, and more generally microfinance, would seem to allow poor people to effectively smooth out their consumption when hit by positive and negative shocks. Yet the evidence on the overall effects of microfinance on poverty and vulnerability to poverty is, at this stage, somewhat mixed. Rigorous impact evaluation is difficult to conduct because of the difficulty of designing truly random experiments and because of the considerable heterogeneity of microfinance operators, from nongovernmental organizations to commercial banks to informal operators, as well as in the definition of operations. The common view has long been that microfinance contributes to an alleviation of poverty and consumption smoothing but also that it does not always reach out to the poorest (Morduch, 2002). The few randomized controlled trials available to date tell a more cautious story (Bauchet and others, 2011). In a sub-Saharan context, in which the large majority of poor people do not have access to any financial operator, it is unlikely that microfinance could be an effective way of coping with market income volatility today. At the same time, things are changing rapidly, and this might be an area for policy intervention that deserves special attention.
The micro instruments listed above are important for addressing idiosyncratic risks that poor households in developing countries are badly equipped to deal with. Of course, they also permit systemic risks of the type generated by terms of trade volatility to be addressed. Doing so, however, requires that governments have the capacity to scale up those transfers and programs through fiscal policies able to go against the direct budget effects of changes in commodity prices.

Economies that are price takers on all foreign markets and have limited access to the international credit market have few degrees of freedom to counteract the effects of adverse changes in the foreign price of their exports or imports. Failures to satisfactorily handle this uncertainty have led to dramatic experiences in the past. It is quite clear, for instance, that the structural adjustment period in sub-Saharan African countries and the so-called lost decade of development in the 1980s are the direct consequences of a mismanagement, both at the country and at the world level, of the commodity price cycle that started with the oil price boom in the mid-1970s.

Since then, lessons have been learned, the most important one being the need to apply prudent fiscal policies, even in times of improving terms of trade. Accumulating reserves, under one form or another, during favorable times and de-accumulating them in a countercyclical way when hard times hit is the basic recipe for reducing the volatility of GDP and for minimizing the impact of commodity price volatility on poverty and inequality.

Although simple, this basic principle is not necessarily easy to implement. Political pressures for increasing fiscal spending in good times are strong and get stronger the longer the bonanza lasts. The right institutions must be set up to resist this type of pressure. At the same time, it is clear that in the obvious absence of stationarity in the stochastic process that governs commodity prices, no automatic rule can be set, which leaves room for discretion in the conduct of policy. At the same time, excessive prudence may be costly because it slows down expected growth. Finally, given the unpredictability of commodity price behavior, it is also clear that countercyclical policies will be impossible to implement if prices remain low for long enough.

Thus, prudent fiscal policies are a necessary condition for escaping the natural resource curse brought about by the volatility of commodity prices, but they are not sufficient. There will always be situations in which LICs stricken by a long spell of low commodity prices will need to rely on foreign credit or foreign aid.

The 2008–09 crisis was a good example of how the accumulation of reserves during the previous period of favorable terms of trade helped some sub-Saharan LICs weather the global shock thanks to countercyclical fiscal policies. But such policies could not have been maintained if commodity prices had not quickly recovered in 2010.

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7 For an explicit optimal reserve accumulation policy in front of uncertainty on the terms of trade, see Barnichon (2009).
Reserve accumulation and fiscal adjustments are short- or medium-term policies to deal with commodity price volatility. Other aspects of macropolicies (i.e., monetary policy and exchange rate management) are important, too. In the long term, however, it may be more important to seek to reduce the overall importance of commodity exports within sub-Saharan countries through the diversification of economic activity. This may be accomplished through more trade or more regional integration, but also through the adequate structure of public spending. It is thus not only the size, but also the structure, of public spending that matters in regard to dampening the effect of commodity price volatility on growth and inclusiveness.

Role of the International Community and Donors

The preceding discussion points to two obvious areas for the intervention of the international development community and donors to mitigate the negative effect of commodity price volatility on growth and poverty reduction in LICs. The first one concerns the liquidity constraint of LICs that have gone through a sequence of negative shocks on commodity markets. The second one concerns the help that can be given to these countries to diversify their economies and make them less dependent on commodity exports.

On the first point, credit facilities, such as the Standby Credit Facilities provided by the IMF to LICs with short-term balance of payment needs should be made more accessible. More generally, more innovative lending products that would alleviate the liquidity constraint faced by LICs in periods of stress should be considered. This includes, for instance, the idea of mobilizing private lending more effectively, such as through partial guarantees provided by donors.

More explicitly linked to commodity price fluctuations, commodity price contingent aid contracts are a very attractive instrument. For instance, the French Development Agency (AFD) offers a concessional countercyclical loan (PTCC) to countries that have difficulties in repaying their debt and face an adverse evolution in their terms of trade. Namely, the PTCC may be triggered as soon as the export revenues of a country in year $t$ are more than 5 percent below the average revenue observed during the 5 years before $t$. Clearly, such a facility will not prevent the country from having to adjust if the drop in export revenues is permanent, but it will reduce its cost if such an adjustment must be undertaken and will avert unnecessary social costs in case terms of trade appreciate again.

Concerning the diversification of economic activity in commodity-export-dependent countries, it must be stressed that the initiative relies first of all on the countries themselves rather than on donors. Indeed, what is at stake here is the general development strategy of the country. Yet foreign partners can also be very effective in helping countries achieve such a diversification.

As far as donors are concerned, focusing aid on the development of trade-facilitating infrastructures (“aid for trade”) as often suggested would certainly help. More helpful for African LICs would be to grant them effective trade

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8The basic principles for the design of this facility were set in Cohen and others (2007).
preferences that would permit them to expand new nontraditional export markets for manufactured or possibly agricultural products. Indeed, such preferences already exist—the African Growth Opportunity Act (AGOA) in the United States and the Everything But Arms (EBA) agreement in the European Union. The problem is that they are extremely limited in scope. AGOA refers to a few, mainly textile products, whereas EBA imposes very restrictive rules of origin. Very substantial progress can be made on these two fronts without real danger for domestic producers in developed countries who are not present on these production lines. Such preferences would mostly affect the geographical distribution of their imports, with Asian investors possibly delocalizing part of their production to Africa. These preferences could be defined on a temporary basis so as to simply allow African countries to overcome infant industry handicaps that currently prevent them from entering some international manufacturing markets where they could develop some comparative advantage in the long term.

Another way of diversifying economic activity in African LICs is to push more toward regional integration. Organized in true custom unions (instead of a set of limited, mostly trade-diverting rather than trade-creating preferences), larger blocks of African countries would offer more import substitution opportunities and allow individual countries to improve their competitiveness by operating in larger markets. Of course, this would require these trade-integrated blocks to protect their common markets at a reasonable rate, a measure that is not incompatible with present World Trade Organization (WTO) rules. This would also require building the necessary infrastructure to facilitate trade between countries in the same trade bloc.

CONCLUSION

In short, there are policy measures that should reduce the cost of commodity price volatility in terms of growth, poverty reduction, and inclusiveness in the sub-Saharan LICs. The first set deals with the effects of shocks to commodity prices on individual incomes. They combine both fiscal policy rules and micro instruments, thereby allowing governments to reach the most vulnerable people and to reduce the volatility of their incomes. Such rules are being applied, and some of the micro instruments are starting to be developed in some countries. Yet considerable work remains to be done before they can become truly effective in mitigating the impact of commodity price shocks on poverty, inequality, and growth. A considerable amount of both national and international effort has to be devoted to that development.

The second set of measures aim at making commodity exports, and therefore commodity price volatility, less important in the development of African LICs. They have to do with the diversification of their economic activity and their foreign trade. The issue here is not only to reduce the individual and collective

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9This argument was first put forward by Collier and Venables (2007).
cost of commodity price volatility in those countries, but also to prepare them for more inclusive and sustainable development in the future. Given their size and the pace of demographic growth, it is indeed not very likely that a development strategy based exclusively on the rent of natural resources, whether mineral or agricultural, would be a long-term option for inclusive growth in Africa.

REFERENCES


Regional and Country Experiences with Inclusive Growth and Commodity Price Volatility
INTRODUCTION

Countries endowed with natural resources such as oil and gas are faced with important economic challenges. Those challenges are of both a short- and long-term nature (see Chapter 2). In the short term, resource-rich countries face highly volatile revenues derived from resource exports, rendering difficult the conduct of macroeconomic stabilization policies. In the long term, resource-rich countries have, on average, experienced a lower rate of economic growth compared to resource-poor countries. The Middle East and North Africa (MENA) region is not immune from those challenges. The region is both the locus of abundant reserves of natural resources and economically dependent on them. Indeed, 55 percent of global oil reserves and 29 percent of natural gas reserves are located in the MENA region (Oil and Gas Journal, 2009). The hydrocarbon sector also dominates many of these economies, contributing to large shares of government and export revenues.

For instance, in 2008, Algeria’s hydrocarbon revenues represented 38 percent of government revenues and 98 percent of total goods exports (see IMF, 2012). Studying the specific experience of the MENA region with respect to the management of natural resources revenues is thus important. The objective of this chapter is to take stock of the economic performance of resource-rich countries in the MENA region over the past 40 years. To do so, we review the developmental outcomes of resource-rich countries in the MENA region and how this experience...
fits into the international experience, drawing from the recent developments in the literature related to the economics of resource-rich countries. We then offer some specific policy prescriptions to help inform the debate on how to address the challenges faced by MENA resource-rich countries.

The ongoing political and social developments in the MENA region have contributed to put inclusive growth—and not solely the rate of output growth—at the top of the policy and research agenda. The World Bank (2004) has documented that MENA’s total labor force has been experiencing an unprecedented expansion—from 104 million workers in 2000 to an estimated 146 million in 2010 and to an expected 185 million by 2020. By all accounts, the region has so far failed to create the millions of jobs needed to absorb this rapid expansion of the workforce, resulting in the region experiencing the highest level of unemployment in the world (International Labour Organization, 2012). The youth bear the brunt of the unemployment problem. The International Labour Organization (2012) estimates that the ratio of youth to adult unemployment in 2011 was exceptionally high—4.0 for the MENA region compared to 2.8 globally. In spite of MENA’s rapid economic growth performance over the last decade, the lack of economic inclusiveness has certainly been a key factor driving the ongoing social instability in the MENA region. In principle, resource-rich countries in the region are well placed to mobilize their public finances to ignite long-term economic growth that will benefit all the citizenry. The track record of MENA resource-rich countries has been poor, however, as we document in this chapter.

Beyond economic outcomes, natural resources may also shape political outcomes as well as the choice of developmental policies. Among others, Ross argues in this volume (Chapter 3) that oil hinders democratization and could even yield a “political curse” as it, for instance, allows the political elite to cultivate a culture of patronage. More specifically, Awadallah and Malik (2011) and Ross, Mazaheri, and Kaiser (2011) have argued that the root of the current instability in MENA lies in the nature of the regional economic development model, which consists of inefficient state interventions and redistribution financed through external windfalls. Nabli and others (2005) have provided a historical account documenting that oil and strategic revenues have allowed the region to maintain old-style industrial policies far longer than other regions. In this chapter, we fully recognize the critical importance of the political economy factors in explaining the

1 We refer to inclusive growth as growth that provides rapid and sustained poverty reduction to allow people to contribute to and benefit from economic growth (see Chapter 8). Warner also discusses, in Chapter 9, the concept of growth inclusiveness and provides evidence of the lack thereof for selected resource-rich countries.

2 A nascent literature provides evidence that resource abundance leads to higher levels of inequality (see Ross [2007] and Goderis and Malone [2008], among others). The data quality on income distribution in the MENA region, however, remains quite low. Within these data limitations, Bibi and Nabli (2009) provided evidence of moderately high levels of inequality in terms of household expenditure compared to other regions of the world and of significant variation across MENA countries. More research is, however, needed to specifically document the evolution of income distribution in MENA resource-rich countries.
adoption of specific policies, including industrial policies, and discuss the consequences of those policy choices in shaping economic outcomes.

Not all the countries in the MENA region are alike with respect to the importance of natural resources in their economies. Some of these countries have large reserves of natural resources and relatively small populations. Others have relatively large reserves but also large populations. Some countries are oil and gas net importers. To capture those differences, we classify MENA countries into three groups. First, the Gulf Cooperation Council (GCC) group is composed of natural resource–rich, labor-importing countries that are Bahrain, Kuwait, Oman, Saudi Arabia, the United Arab Emirates, and Qatar. Second, the non-GCC group comprises natural resource–rich, labor-abundant countries such as Algeria, Iraq, Libya, and Syria. Third, the emerging group comprises natural resource–poor countries such as Egypt, Jordan, Morocco, and Tunisia. For additional comparison, a fourth non-Arab group is also included, namely, other natural resource–rich countries, comprising Iran and Venezuela.

In this chapter, we document that resource-rich countries in MENA have overall performed poorly when going beyond the assessment based on standard income-level measures. They have experienced relatively low and noninclusive economic growth, as well as high levels of macroeconomic volatility. Important improvements in health and education have taken place, but the quality of the provision of public goods and services remains an important source of concerns. Looking forward, we argue that the success of economic reforms in MENA rests on the ability of those countries to invest boldly in building appropriate and strong institutions as well as high levels of human capacity in public administration. We then discuss the overall developmental outcomes in resource-rich MENA countries and propose a set of critical policy prescriptions.

**MENA DEVELOPMENTAL OUTCOMES**

**Rising Income Levels, but Declining Overall Wealth**

Overall, resource-rich countries in MENA have experienced large gains in income. Between 1970 and 2008, real gross national income (GNI) per capita increased 18 times in the GCC group, 9 times in the non-GCC group, and about 10 times in the emerging group, as shown in Figure 12.1. For resource-rich countries, these gains are almost entirely due to improvements in terms of trade, with little gains due to increased production in the nonresource sector. This evidence suggests that countries of the region have reaped major benefits from the increase in their terms of trade when standard income-level measures are considered. However, resource-rich non-GCC countries have not achieved higher rates of growth in income over the long term compared to the resource-poor countries of the region, as shown in Figure 12.1.

In spite of the higher levels of income in resource-rich MENA countries, they have achieved lower levels of wealth, in turn raising concerns over the sustainability of their economies. Conceptually, Hartwick (1977) provided a canonical
rule for sustainability in resource-dependent economies that can help consumption to be maintained indefinitely, even in the face of finite resources and fixed technology. The rule consists in setting “genuine” savings to zero at each point in time; this sets traditional net savings just equal to resource depletion.\(^3\) The so-called Hartwick rule suggests that countries should invest rents in other types of assets. In the case of Arab resource-rich countries, their wealth is mostly concentrated in natural capital, as shown in Figure 12.2.\(^4\) Adjusting for depletion of resources would in many cases imply negative saving rates. Figure 12.3 shows that the MENA region indeed experienced negative genuine savings and thus a decline in wealth between 1975 and 2005 as opposed to East Asia, where wealth increased significantly over the same period. Notwithstanding the relatively large but recent financial savings accumulated by some countries in the region in the context of sovereign wealth funds, the trend in overall wealth raises serious concerns about the viability of the regional economic development process.

\(^3\) Genuine savings differ from standard national accounts calculations in that they deduct the value of depletion of natural resources, among other things.

\(^4\) Although the Hartwick rule is a commonly used benchmark, it could be seen as restrictive. Indeed, it fails to take into account the potential yield on investments made out of “rent savings.” If these are high, there can be considerable consumption out of rents on a sustainable basis. Resource-rich countries with large populations may, however, not be able to afford such a “rentier state” model and thus need to foster domestic private sector development to create the kind of wealth and jobs that can in turn help sustain those economies.
Low Growth and High Levels of Volatility

The so-called natural resource curse literature has focused specifically on the effects of natural resource endowments on the economic performance of natural resource–rich countries. This literature emphasizes several channels through which resource windfalls may affect economic performance, including the...
Dutch disease, the deterioration of institutions, and excess volatility, to name a few (for a survey, see Chapter 2). Sachs and Warner (1995, 2001), Auty (2001), and Gylfason (2001) provided early evidence of a significant negative correlation between natural resource abundance and economic growth. Overall, this negative relationship was subsequently confirmed, although there remains some controversy about its existence. The MENA region illustrates to the extreme the low growth and high volatility nexus for resource-rich countries. As shown in Figure 12.4, over the last five decades, both GCC and non-GCC natural resource–rich countries’ average per capita GDP growth was almost zero, and the volatility of their output growth was twice as high as that in resource-poor countries in the region.

Macroeconomic volatility has adverse consequences for economic growth. Aghion and Banerjee (2005) explored the various causal connections between the growth trend of output and the volatility of output around the trend, concluding from empirical cross-country evidence that volatility hurts growth. Along similar lines, Ramey and Ramey (1995) provided evidence that volatility in economic growth diminished average growth in a sample of 92 countries as well as in a sample of OECD member countries. Indeed, the presence of volatility complicates saving/investment decisions by governments, firms, and households, and, in turn, affects long-term economic performance. Increased volatility in government revenues may thus call for higher levels of precautionary
saving. In the specific case of resource-rich countries, Arezki and Gylfason (2012) argue that revenues derived from natural resources transit directly to the government coffers (e.g., through state ownership, taxation, or export tariffs) and thus may be prone to rent-seeking behavior and not be saved or invested appropriately. In that context, Arezki and Gylfason provide evidence that institutions that can prevent misappropriation of natural resources and promote good policies play a crucial role in moderating the impact of volatility on economic growth in resource-rich countries. We shall return to the implication of these findings for MENA in the following section.

Mixed Outcomes in Financial Sector Development

One potential other avenue of the resource curse in MENA countries is the potential lack of financial development, which in turn could explain, at least in part, the difficulties faced by the private sector in MENA. There are few systematic studies of financial deepening in resource-rich countries. Among the very few studies on this topic, Beck (2011) found no differential effect of natural resource wealth on the effect of financial development on economic growth. On the other hand, he found evidence of a resource curse in financial sector development disproportionately hurting firms rather than households. Specifically, Beck discovered that while banks in resource-rich countries are more liquid, better capitalized, and more profitable, they give fewer loans to firms, as well as evidence of significant supply constraints in the offering of bank loans to firms in resource-rich countries compared with resource-poor countries.

Within the MENA region, there is evidence that the degree of financial development varies widely (Creane and others, 2004). In the case of the GCC countries, financial sector development has been quite rapid but is subject to pronounced boom-and-bust cycles tightly linked to oil price fluctuations. For instance, Figure 12.5 shows how bank deposits in GCC surged during the 1970s followed by a sharp decline. There is also evidence that stock markets in the GCC are also subject to boom-and-bust cycles (Al-Hassan, Omran, and Delgado Fernandez, 2007). Financial deepening in GCC countries has not for the most part helped spur economic diversification, as discussed in the following subsection. Although the experience of individual resource-rich labor-abundant MENA countries varies widely, for the group, financial deepening (measured by the importance of credit to the private sector) has lagged compared to resource-poor countries, as shown in Figure 12.6. In spite of recent attempts at financial liberalization in countries such as Algeria, the financial systems in many non-GCC countries in the region remain dominated by ineffective public banks.

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This is especially the case in the presence of incomplete markets that may incapacitate governments in commodity-exporting countries trying to hedge against volatility using financial instruments.
Limited Economic Diversification

Another channel of the resource curse is the so-called Dutch disease. Diversified economies tend to perform better over the long term (Gelb, 2011). Resource-rich countries are, however, facing challenges that hinder their ability to diversify. The most basic static Dutch disease models distinguish two effects, namely,
the spending effect and the relocation effect (van Wijnbergen, 1984). First, the spending effect relates to higher domestic incomes as a result of the boom, leading to extra expenditure on both traded and nontraded goods. In a small open economy, the price of traded goods is determined by international market conditions and so does not rise despite the extra domestic spending; in contrast, the price of nontraded goods is set in the domestic market and thus does rise. The higher relative price of nontraded goods makes domestic production of traded goods less attractive, and so their output declines. A second effect emerges if, in addition, the booming sector shares domestic factors of production with other sectors, so that its expansion tends to bid up the prices of these factors. The resulting resource movement effect reinforces the tendencies toward appreciation of the real exchange rate (i.e., a rise in the relative price of nontraded goods and services) and a squeeze on the tradable goods sector, a result commonly termed Dutch disease.

The experience of the MENA region shows clear signs of the Dutch disease. Figure 12.7 shows a dramatic decline in the share of agriculture and manufacturing in GDP, while the resource-poor countries in the region experienced an increase in the share of manufacturing. Similar results can be shown using exports data. It should be noted that the flexible nature of labor markets in GCC countries and the high level of unemployment in populous resource-rich countries may contribute to dampening the relocation effect. The spending effect is certainly the dominant feature at play in MENA resource-rich countries. The presence of widespread price controls, including those on domestic fuel and food products, in MENA countries may also render it difficult to find empirical evidence supportive of the Dutch disease when using real exchange rate and consumer price data. The burden of adjustment in the latter case is, however, falling on public finances rather than prices, which may endanger the fiscal sustainability of those countries over the long term.

![Figure 12.7](image-url)

**Figure 12.7** Structure of Production, 1960–2008 (Percent of GDP)


Note: GCC: Gulf Cooperation Council; RR: resource rich.
Beyond the standard Dutch disease channels, there are several political economy factors explaining the failure of policies to diversify MENA resource-rich economies. Nabli and others (2005) have described the emergence of state-dominated vertical industrial policy, in which traditional sector-selective and sector-specific policies have been used extensively. Nabli and others have also explained the failure of industrial policy to evolve during the 1980s and 1990s. While the developing world has moved toward more market-oriented policies and production systems that are dominated by the private sector and rely on market signals, MENA has maintained much of the old-style industrial policies and high state intervention in the economy that characterized much of the developing world in the past. Despite the mounting strains on MENA’s economic development models, oil revenues have allowed the region to maintain industrial policies far longer than other regions.

Equally important is the failure of interest groups to emerge and press for changes, which has hindered the region’s move toward more functional, market-friendly policies for growth—a phenomenon that is closely linked to the weaknesses in the governance arena, which are addressed in the following section. In addition, while in the initial industrialization stage MENA countries used industrial policy to create new activities and support the development of new (infant) firms, during the second stage (1980s to 1990s), those countries played a more passive role, that of preserving the existing structures. From a political economy perspective, this preservation of structures can be explained by governments’ need to seek support to remain in power by continuing to offer rewards to a set of supporters to deter the formation of opposition groups. All those political economic factors have played a large role in limiting, or preventing in some cases, the emergence of a thriving and genuine private sector in those economies.

POLICY PRESCRIPTIONS TO HARNESS THE POWER OF NATURAL RESOURCES

To avoid the resource curse, MENA countries are better placed to diversify their economies and create the kind of jobs that are needed to face the unprecedented expansion of the labor force. The so-called Arab Spring is also a stark reminder that job creation is crucial to maintaining social stability in the region. We propose four policy directions: (1) Resource-rich countries should avoid or limit boom-bust cycles; (2) the region should invest in human capital and other public goods while maintaining quality; (3) those countries should adapt “new” industrial policies, correcting for market failures and distortions created by the resource wealth; and (4) the countries in the MENA region should build appropriate and strong institutions.

Limiting Boom-Bust Cycles

Fiscal policy in natural resource–rich countries in general has tended to be procyclical, and the recent period has been no exception, as shown in Arezki, Hamilton, and Kazimov (2011), including in MENA resource-rich countries.
The evolution of output in countries of the MENA region illustrates the typical severe boom-bust cycles experience. As shown in Figure 12.8, the bust of the 1980s was of extreme severity, and the growth collapse lasted almost two decades. This observation is consistent with those of Isham, Woolcock, and Busby (2005), who have provided evidence that mineral and energy exporters are plagued with weaker economic performance and, in particular, weaker recovery.\(^6\) Macroeconomic stability remains a priority, and to achieve such an outcome, governments in MENA should limit fiscal policy procyclicality.\(^7\) However, political economy and institutional issues in the MENA region are daunting. Arezki and others (2011) have provided evidence that the adverse effects of resource windfalls on macroeconomic stability and economic growth are moderated by the quality of political institutions. In other words, democracies tend to be less subject to macroeconomic instability and grow faster following resource windfalls.

To address issues of macroeconomic instability, many resource-rich countries have set up fiscal institutions over the past decade\(^8\) in the forms of stabilization funds or fiscal rules. A relevant question here is whether countries that have implemented fiscal rules defined as numerical targets to constrain budget aggregates have had greater macroeconomic stability.\(^9\) Arezki (2011) provided evidence that fiscal rules have not had any significant effect on the degree of procyclicality of resource-rich countries. One explanation could be that it is simply too early to

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\(^6\) Point-based as opposed to diffuse natural resources are indeed seen as more subject to rent-seeking behavior. It is thus harder to monitor governments in regard to how much they receive and how much they spend in countries endowed with point-based as opposed to diffuse resources.

\(^7\) Monetary policy has been mostly geared toward exchange rate targeting, with a strong dollar peg in the case of the GCC, which has at times contributed to fueling the business cycle in GCC countries.

\(^8\) Funds for future generations or loosely labeled sovereign wealth funds have also been set up in many resource-rich countries to address the issue of intergenerational equity.

\(^9\) In the following, we interchangeably use the terms “fiscal rule” and “fiscal institution.”
tell. Indeed, as documented by Ossowski and others (2008), many fiscal institutions in resource-rich countries were put in place only in the early 2000s. An alternative explanation could be that fiscal rules are not necessarily effective because they can be circumvented, especially in weak institutional environments. If that is true, the design of fiscal rules in resource-rich countries should perhaps be revisited to adapt them to the challenges posed by a weak institutional environment. One country that has successfully implemented a fiscal rule, Chile, has targeted a structural budget balance set by an independent panel of experts with binding recommendations. This could certainly be a source of inspiration for MENA countries (Frankel, 2011).\(^\text{10}\)

**Investing in Human Capital and Infrastructure: The Quality Imperative**

Overall, resource-rich countries in MENA have invested heavily in infrastructure and human capital. As shown in Figures 12.9 and 12.10, indicators of life expectancy, mortality rates under age five, and average years of schooling have all significantly improved over the past decades. However, two observations can be made. First, the improvements achieved by resource-rich, labor-abundant MENA countries were not superior to those of resource-poor countries in the region. The GCC countries have, however, achieved better results than the non-GCC countries. Second, the investment in human and physical capital was not of the magnitude and quality to offset the depletion of natural resources. Indeed, resource-rich countries face physical and human capital deficits and thus need to rebalance their economies away from natural resources, as relying solely on revenues derived from the resource sector may not be sustainable. To illustrate the extent of the needed rebalancing act, Figure 12.2 shows that the share of natural capital in developing countries in the MENA amounts to more than 30 percent of overall wealth as opposed to less than 10 percent for advanced economies. The picture would appear even bleaker if one were to consider indicators that take into account the quality of education and public infrastructure.

Gelb and associates (1988) provided careful case studies showing that governments in many resource-rich countries, including in the MENA region, embarked on large investment projects following commodity price booms during the 1970s and early 1980s. He argues that those investment projects were plagued by inefficiencies and also contributed to resource misallocation. In addition, those disproportionately large investment projects depreciated quickly or even became obsolete as governments were unable to cover the associated high maintenance costs due to lack of continued financing. More recently, Gelb (2012) provided evidence that education scores in MENA countries are notably lower compared

\(^{10}\)Arezki and Ismail (2010) found that fiscal rules in selected oil-exporting countries have forced adjustment in regard to capital spending in bust times, raising some concern over the consequences for economic growth. This raises the issue of the design of fiscal rules to account for the asymmetrical adjustment of the composition of spending during booms and busts.
Overall, resource-rich countries do not seem to have learned from past mistakes and thus need now to spend carefully so as to ensure the quality of their public investment.

Theoretically, Arezki, Dupuy, and Gelb (2012) have provided a framework to help understand how the optimal level of public investment in countries experiencing resource windfalls should depend on the initial quality of institutions affecting the public and private sectors. To do so, they augmented the traditional permanent-income framework with a production function featuring a scaling factor that captures business climate conditions and public investment faced with adjustment costs, thereby capturing the extra cost associated with the existing administrative capacity and ongoing rent-seeking activities. A key assumption is
that the higher are natural resource windfalls, the higher are the adjustment costs associated with public investment. The latter assumption is motivated in part by the fact that rent-seeking activities become more lucrative in the presence of higher windfalls, in turn increasing the cost of undertaking public investment.

The main result of the model developed by Arezki, Dupuy, and Gelb (2012) is that weaker administrative capacity lowers the level of optimal public capital. They also found that business climate conditions reduce the degree of disinvestment in public capital triggered by weaker administrative capacity. They further extended their basic model to allow for “investing-in-investing” (e.g., building up administrative capacity) by endogenizing the adjustment cost in public investment. Their results suggest that a higher initial stock of public “know-how” commands a higher level of optimal public investment. These results suggest that the decision to conduct public investment in resource-rich countries, including in the MENA region, needs to be thought through in light of country-specific constraints related to the business climate and the level of administrative capacity. Kyobe and others (2011) have provided evidence that, on average, the quality of the public investment captured by the public investment management index in resource-rich countries is lower than that in resource-poor countries and that MENA has one of the lowest levels of the public investment management index. Investing in building the administrative capacity in the region, including through fighting rent seeking and building high-level human capital in public administration, is of paramount importance for the MENA region.

“Industrial” Policies for Diversification

As Stated Earlier, the Arab Spring is a stark reminder that job creation is crucial to maintaining social stability in the region

Indeed, although there are many arguments to be made as to why resource-rich countries need to diversify and not follow their comparative advantage—that is, specializing in natural resource exports (Gelb, 2011)—we suggest here that the most important argument is the need to create the kind of jobs that are required to absorb the large and rapidly increasing labor force, as shown in Figure 12.11. Indeed, the natural resource sector, especially the oil and gas sectors, is capital intensive and has very low labor intensity. In turn, this raises the following questions: Could the labor force be employed in the nontradable sector, which tends to be more labor intensive, and is productivity in the nontradable sector high enough to provide high-quality and sustainable jobs that will use the existing human capital accumulated over the years? Those questions regarding the nontradable sector are difficult to answer and will need to be evaluated on a country-by-country basis. There seems to be a consensus among development economists, however, on the strategic importance of developing a strong tradable sector, which tends to be a high-productivity sector whose expansion is not limited by the size of the domestic market as opposed to the nontradable sector. But what specific role should the public sector play in igniting the development
of the tradable sector? To attempt to answer this question, we now turn to the issue of industrial policies.

**Is there a role for industrial policies to achieve diversification?**

The region should avoid old-style industrial policies, which target favored sectors and protect losing sectors and entrenched interests. The achievements in terms of diversification and structural transformation are very weak in the region. The industrial policies that have been pursued have been ineffective. The region should orient itself toward new-style policies that try to deal with market and coordination failures. It is paramount that this be done in an open trade and investment environment, albeit perhaps with a gradual approach. Indeed, the low level of trade and financial integration within the MENA region and between the MENA region and the rest of the world suggests that MENA countries should take advantage of the opportunities that may result from further economic integration. For instance, it seems mutually advantageous for sovereign wealth funds to invest in resource-poor but labor-abundant MENA countries. SWFs also have long-term investment horizons that are consistent with developing countries’ development needs. There are, however, important obstacles to those investments which call for domestic structural reforms to improve investors’ perception in regard to destination countries. The question now becomes what specific new policies or reforms could be effective for avoiding the pitfalls of rent seeking and inefficient specialization. Making the wrong choices will mean wasting the existing limited resources and limited foreign investments. This is a major area where progress needs to be made.

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**Figure 12.11 Labor Force Growth Rate, 1960–2008**


Note: GCC: Gulf Cooperation Council; RR: resource rich.
Institutions and Governance

Throughout this chapter, a common thread has been the paramount importance of strong institutions to ensure the success of economic policies. Strong institutions and democracy are critical for harnessing the power of natural resources for development. Indeed, an important strand of the literature has stressed the importance of political institutions in achieving better policy outcomes (see, for example, Persson, 2002). In their seminal contribution to the growth and institutions literature, Acemoglu, Johnson, and Robinson (2001, 2002) have shown that political institutions are key determinants for long-term economic development. These results suggest that democracy, through promoting accountability and consensus, reduces the perverse effects that resource windfalls may have on the nonresource sector. Governments that are more accountable may exercise less discretion in the conduct of fiscal policy, in turn leading to less macroeconomic instability and promoting long-term economic growth in resource-rich countries (Arezki and others, 2011). Also, Melhum, Moene, and Torvik (2006) have argued that the natural resource curse does not exist in resource-rich countries with good institutions, such as Botswana and Norway.

Historically, MENA countries, both resource rich and resource poor, have had markedly lower scores on governance and democracy indicators compared to other regions, as shown in Figure 12.12. This is one critical challenge that will condition the economic and social developmental success of the MENA region. Ensuring sufficient checks and balances and increasing transparency and accountability should help citizens in resource-rich countries reap the full benefits of resource revenues. Reforms that allow powerful groups to be

![Figure 12.12](image_url)

**Figure 12.12** Tendency of Democracy (Mean Polity Index, 1960–2006)


Note: GCC: Gulf Cooperation Council; RR: resource rich.
checked by the rest of society are thus crucial. Acemoglu and Robinson (2012) discussed the historical critical junctures that shape modern polities: the processes of institutional drift that produce political and economic institutions that can be either inclusive, focused on power-sharing, productivity, education, technological advances and the well-being of the nation as a whole, or extractive, bent on grabbing wealth and resources away from one part of society to benefit another. The current waves of political transformation in MENA countries constitute a critical juncture for reform institutions in those countries in regard to making them more inclusive and a rampart against rent seeking and nepotism.

Practically, there exist important international initiatives aimed at enhancing transparency in the management of natural resource revenues as well as at enhancing the effectiveness with which those revenues are spent. For instance, the Extractive Industries Transparency Initiative constitutes a set of global standards for transparency in the oil, gas, and mining extractive industries. The Natural Resource Charter, which builds on EITI, represents a more comprehensive set of principles for governments and societies on how best to harness the opportunities created by extractive resources for development. Those initiatives could serve as anchors for propping up domestic reforms to improve transparency and accountability in MENA countries. However, it is essential to recognize that civil society and political actors will ultimately be the drivers of domestic reforms in resource-rich countries (Chapter 18).

CONCLUSION

The most striking features of the policy agenda for natural resource-rich countries are (1) the complexity and multidimensionality of what needs to be done and (2) the need to adapt to specific circumstances and conditions. The priority issues we have identified are (1) better macroeconomic management to avoid procyclical policies, (2) larger and better-quality investments in human and physical capital, and (3) innovative policies to achieve diversification and transformation of the economies to meet the employment challenge. The three components are highly interrelated and call for major institutional and governance reforms. This clearly requires a very strong capacity not only to manage and design rules and regulations, but to implement and enforce them. This capacity requires inclusive institutions with the appropriate enforcement mechanisms and also a high level of human capacity in public administration. One of the most important investments a country rich in natural resources can make is to develop and keep such capacity among high-level managers in both the public and private sectors. That is one of the lessons from the often-cited example of Chile.
REFERENCES


Inclusive Growth in Sub-Saharan Africa: Evidence from Six Countries during the Recent High-Growth Period

RODRIGO GARCIA-VERDU, AEBBE AEMRO SELASSIE, AND ALUN THOMAS

INTRODUCTION

Most countries in sub-Saharan Africa experienced a period of high economic growth beginning in the mid-1990s, leading to renewed optimism about the region’s development prospects. Furthermore, most countries in the region weathered the global economic crisis of 2008–09 remarkably well, contrasting with previous episodes when growth collapsed as a result of external shocks.

Despite this acceleration of growth, how certain are we of the magnitude of the acceleration? The statistical base on which real GDP per capita is measured is extremely weak in most countries in sub-Saharan Africa, so there is a high degree of uncertainty associated with these growth estimates.

Even if one is willing to take data on the growth of real GDP at face value, the perception exists among policymakers and citizens in the region that growth in sub-Saharan Africa has not been shared evenly among the population or accompanied by an increase in employment opportunities in many countries (i.e., jobless growth), especially where growth has been concentrated on the extraction of natural resources. What is the evidence that higher levels of output are being translated into greater job creation, improved access to key services, and higher living standards for the majority of the population?

This chapter is based on Chapter 2 of the IMF’s Regional Economic Outlook: Sub-Saharan Africa—Sustaining the Expansion (October 2011). Yemirach Amare and Cleary Haines assisted in the preparation of the chapter. At the time of writing, the authors were associated with the IMF’s African Department.

1 Contrast, for example, the papers of Collier and Gunning (1999a, 1999b) and Artadi and Sala-i-Martin (2003), on the one hand, with those of Sala-i-Martin and Pinkovskiy (2010) and Young (2010) or the books by Kenny (2011), Miguel (2009), and Radelet (2010), on the other.

In this chapter, we present a diagnostic of whether the population at large has benefited from the recent high-growth episode in sub-Saharan Africa and focus on well-being indicators measured by access to basic services, ownership of durable goods, and household consumption using household survey data from Cameroon, Ghana, Mozambique, Tanzania, Uganda, and Zambia. We then look at the distribution of changes over time in real consumption per capita among the population through the estimation of the growth incidence curve (GIC) for each country and analyze the determinants of household consumption using Mincer-type regressions and the impact of growth on employment opportunities through the estimation of standard measures of labor market performance. We then apply a methodology to estimate the bias in the consumer price index using Engel curves as a way to corroborate the growth rates of real GDP per capita from the System of National Accounts. The basic conclusions of the chapter are as follows:

- Close examination of household survey data suggests that high per capita economic growth does have a strong bearing on the inclusiveness of growth. Ownership of consumer durables has increased extremely rapidly over the sample period in all case study countries except for Zambia, which experienced weak per capita GDP growth. In terms of consumption growth, we consider two measures of inclusiveness. Our first (absolute measure) is whether the poorest quartile of the consumption distribution registered positive real per capita consumption growth. The second measure, which is more of a relative concept of inclusiveness, compares the ratio of consumption growth between the lowest and highest quartiles of the consumption distribution. Under the absolute measure, the poorest quartile experienced substantial annual household per capita consumption growth in three of the four high-growth countries (Ghana, Tanzania, Uganda). By contrast, the poorest quartile of the consumption distribution in the low-growth countries saw low (Cameroon) or even negative (Zambia) changes in real consumption per capita. The results for Mozambique depend on whether one uses the CPI or regional price indices to deflate nominal household consumption per capita, with the former showing relatively high growth and the latter showing negative growth for the poorest quartile.

- We also found evidence of the importance of employment opportunities in rural areas, particularly in agriculture, for higher consumption growth among the poorer households. The stronger per capita consumption growth observed in Cameroon and Uganda at the poorest levels is correlated with high agricultural employment growth. By contrast, rural agricultural employment between the surveys considered fell in both Mozambique and

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3 The choice of countries analyzed in this chapter was driven by data availability and, in particular, by the need to have at least two household surveys collected using the same methodology, so that changes in measured total household consumption and changes in household characteristics were not the result of changes in sampling scheme, questionnaires, definitions, data collection procedures, and so on.
Zambia, where the poorest experienced weaker or negative per capita consumption growth. The importance of rural employment outcomes is intuitive given the fact that on average about 70 percent of the population in the six countries resided in rural areas in the early 2000s.

- There is also evidence of significant employment growth in the case study countries. Surveys include questionnaires about the level of formal employment as well as involvement in other income-generating activities (which would also capture subsistence agriculture). When the two numbers are considered together, with the exception of Ghana, the employment-to-population ratio in the countries increased between surveys.

- Regarding the evolution of real incomes in the region, we provide evidence that the growth in real consumption is being underestimated, most likely due to biases in the measurement of the CPI. In particular, we considered the change between surveys in the share of consumption devoted to food in each country. According to Engel’s law, this share varies negatively with the level of income. The estimated shifts over time in the Engel curves for three (Cameroon, Ghana, Zambia) of the four countries considered suggest that in our sample, real income growth was significantly underestimated.4

MEASURES OF WELFARE

The issue of whether GDP is an appropriate measure of economic performance and welfare has been debated ever since the introduction of the System of National Accounts in the late 1940s, and it remains a hotly contested issue. Sen, Stiglitz, and Fitoussi (2010), in a recent report written for the French government on “the measurement of economic performance and social progress,” argue that GDP is neither a measure of income nor a measure of well-being, but rather an indicator of market activity constructed by adding up the market value of goods and services produced in the economy.

One of the contested issues is whether national income and product accounts (NIPA) data or household survey data provide a more accurate reflection of household welfare. Sala-i-Martin and Pinkovskiy (2010) have argued that a very sharp decline in poverty rates has been registered in sub-Saharan African countries based on combining the growth rates from NIPA data and data on the distribution of consumption from household budget surveys, although these authors do not justify why NIPA data are better than survey data for measuring changes in means. In contrast, Deaton (2010) has argued that there is no reason to believe that NIPA data are better than survey data for measuring consumption and concludes that the true poverty level lies between the estimates using NIPA and survey consumption growth rates (see Box 13.1).

Although there is general agreement that well-being is multidimensional and covers material living standards, health, education, political voice, social connections,

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4 In the other case (Uganda), we find real income growth to have been overestimated.
Inclusive Growth in Sub-Saharan Africa

This chapter limits its analysis to material living standards and employment opportunities. We first consider welfare measured through ownership of assets and access to public services and then turn to household consumption and employment opportunities.

### Welfare Measured through Asset Holdings and Access to Services

A number of analysts have used indices based on ownership of consumer durable goods and assets and access to public services as an alternative measure of economic well-being to household consumption (Booysen and others, 2008; Filmer and Scott, 2008; Sahn and Stifel, 2000; Sahn and Younger, 2010;)

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**BOX 13.1 Differences between Survey and National Accounts Estimates of Consumption**

Many argue that living standards or welfare are more closely associated with household consumption estimated from surveys rather than with the alternative measure based on national income and product accounts (NIPA) estimates of private consumption expenditure. This is because household surveys provide detailed information on household market and nonmarket consumption and imputed housing services, whereas private consumption expenditure in many developing countries is derived as a residual. It is calculated by taking the difference between nominal GDP calculated from the production approach and those components of aggregate demand that are calculated directly. On the other hand, surveys often fail to capture households at the top end of the income distribution and exclude nonprofit establishment expenditures on services that are provided to households.

To assess differences between the two estimates, the value of private consumption expenditure from the NIPA is compared to aggregate consumption estimates from the household surveys used in this chapter (see Table 13.1). The decline over time in the ratio of the survey estimate to the NIPA estimate of consumption is consistent with the experience of other countries and likely reflects an increase in the number of people at the top end of the income distribution that are not sampled in the survey. The speed at which the ratio has declined in Cameroon, Ghana, and Zambia is comparable to that of China, although it is faster than in India and the United States. In Mozambique, Tanzania, and Uganda, the ratio has remained fairly constant.

<table>
<thead>
<tr>
<th>Country</th>
<th>Ratio of survey to NIPA private expenditure totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td>0.9 (2001) 0.77 (2007)</td>
</tr>
<tr>
<td>Ghana</td>
<td>0.92 (1998) 0.79 (2005)</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.83 (2002) 0.86 (2009)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1.00 (2001) 1.02 (2007)</td>
</tr>
<tr>
<td>Uganda</td>
<td>1.3 (2002) 1.2 (2009)</td>
</tr>
<tr>
<td>Zambia</td>
<td>0.88 (1998) 0.75 (2004)</td>
</tr>
<tr>
<td>China¹</td>
<td>0.95 (1990) 0.8 (2000)</td>
</tr>
<tr>
<td>India¹</td>
<td>0.68 (1983) 0.56 (1999)</td>
</tr>
<tr>
<td>United States¹</td>
<td>0.8 (1984) 0.64 (2001)</td>
</tr>
</tbody>
</table>

Sources: Household data surveys unless otherwise indicated.

Note: NIPA: national income and product accounts.

¹Source is Deaton (2005).
Young, 2010). Items such as a radio, television, refrigerator, bicycle, motorcycle, and car are normally chosen as the consumer durables, while dwelling characteristics such as building materials, the quality of flooring and roofing, main source of drinking water, and type of toilet facilities are used to measure access to services. The methodology of principal components is a common method for providing the weights used to aggregate these indicators into a single asset index.

The rank correlation between per capita expenditures and these types of asset indices is typically greater than 0.50, with the correlation higher for countries outside sub-Saharan Africa. For example, Filmer and Scott (2008) found that the correlation for Brazil is 0.64, while the correlation for Ghana and Zambia is about 0.40. The lower correlation among sub-Saharan African countries is likely related to the fact that a large subset of low-income households do not own the consumer durables used in the index, while access to piped water and sanitation is very low, especially in rural areas. Booysen and others (2008) emphasized that the limited discrimination ability at the lower end of the income scale makes asset indices a poor tool for analyzing the extremely poor.

We aim to enrich the current understanding on the inclusiveness of growth in the region using six case studies—from Cameroon, Ghana, Mozambique, Tanzania, Uganda, and Zambia. The sample choice is driven by data availability, and the sample is not fully representative of sub-Saharan African countries in general—there are no postconflict or fragile states and no large oil exporters (Cameroon is a marginal net exporter), and only one francophone country is included (Appendix 13.1). With the exception of Cameroon and Zambia, the countries all enjoyed average per capita income growth of more than 2¼ percent during 1995–2010 (among the region’s faster-growing economies).

For the sample of countries, data on access to publicly provided services and consumer durables is obtained through the Afrobarometer surveys supplemented by the household budget surveys (Figures 13.1 and 13.2). Both types of surveys indicate that ownership of consumer durables has increased extremely rapidly over the past decade in all case study countries except for Zambia, which registered negative growth in the fraction of the population that reported owning a given asset. If we weigh ownership of radios, televisions, and cars equally, the annual change in consumer durables varies between no change in Zambia to an increase of 2.2 percent per year in Ghana. Except for Ghana, the changes are broadly inversely related to initial ownership shares. Cameroon had the highest television and motor vehicle ownership share, with a 0.4 percent annual increase and Mozambique had the lowest share in 2002 and the highest annual increase (1.5 percent).

Afrobarometer is an independent, nonpartisan research group funded by the United Kingdom’s Department for International Development and the U.S. Agency for International Development that surveys nationally representative, random, stratified probability samples for 20 sub-Saharan African countries every three years.
Access to publicly provided services has also become much more widespread over time across most countries. Ghana and Cameroon have the highest levels of access to the electricity grid, piped water, and sewage system, which is consistent with their higher levels of GDP per capita. Moreover, Ghana has also

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6 Although access to health clinics in Cameroon and Uganda seems to have stalled, the question asked in Cameroon is not comparable across surveys because in 2007, access to hospitals was included together with access to health clinics.
Figure 13.2 Consumer Durables (Percent of sample)
Sources: Afrobarometer and household budget surveys.

demonstrated the fastest increase in coverage over this period, with Mozambique a close second. The increase in access to publicly provided goods is buttressed by the proportion of respondents who indicated that they seldom go without food, water, medical care, and cooking fuel. Except for in regard to access to cooking fuel in Uganda, all countries show a rising share over time of households that
report seldom going without these basic needs, with Ghana remaining above the other countries in terms of levels.

Based on the demand for durables, various housing characteristics, children’s health status, and family conditions, Young (2010) has argued that the growth rate of per capita consumption among sub-Saharan African countries was about 3½ percent per year over the 15-year period ending in 2005–06, which is three times the average estimate from NIPA data. His analysis is based on the relationship between these factors and educational attainment, under the assumption that educational attainment is a good proxy for family income (as supported by the Mincer regressions below). He shows that the elasticity of education with respect to owning a car is positive and significant and is much higher than the elasticity with respect to owning a radio. Using these relationships between educational attainment and the identified characteristics, combined with an assumption about the rate of return to education, he derives consumption growth estimates.7

In contrast to Young’s findings, Harttgen, Klasen, and Vollmer (2012) have argued that the relationship between asset growth and per capita income growth is very weak, especially among non-African countries where concerns about NIPA statistics are less serious. They conclude that inferring income growth from changes in asset indices is not very robust.

Welfare Measured through Household Consumption

An alternative benchmark of household welfare is aggregate consumption using household survey data on home production for self-consumption, consumption of purchased goods (i.e., expenditure), and consumption of imputed housing services. Consumption is preferred over income as the measure of welfare or living standards for a variety of reasons.

First, because surveys can only hope to measure financial flows over a short period, consumption is a better measure of living standards since it is less volatile than income. Indeed, many people in low-income countries do not receive any income during their lifetime because they are paid in kind or are unremunerated employees in unincorporated family enterprises. Therefore, measuring inequality based on data on the previous month’s income will overstate inequality. Second, the concept of consumption is clearer to survey participants than the concept of income, especially in countries where income from self-employment is the norm and salaried employment is the exception. Third, respondents are generally more reluctant to share information about their income than about their consumption. Because income is usually taxable, it may be hard for respondents to be persuaded that their income information will not be passed to the tax authorities.

7 Luminosity data from satellites and anthropometric measures such as height for age and weight for age provide additional measures of welfare, but these give a mixed picture of living standards in sub-Saharan Africa. See Chen and Nordhaus (2011), Deaton (2010), and Henderson, Storeygard, and Weil (2011) for a discussion.
Evidence on the Incidence of Growth in Sub-Saharan Africa

One common concern among policymakers and citizens alike in the sub-Saharan Africa region is whether the recent growth has been evenly distributed among the population. Estimating the GIC proposed by Ravallion and Chen (2003) can identify the incidence of growth in real consumption per capita. The GIC depicts the annual growth rate of real consumption per capita between two periods (vertical axis) with comparable surveys for each group of households ordered according to their position in the distribution of consumption per capita (horizontal axis). If the GIC lies above zero all along the entire distribution of real consumption per capita, then all households experienced positive growth and growth is said to be inclusive according to the absolute definition of inclusive growth. If, in addition to lying above the zero-growth line, the GIC has a negative slope throughout (i.e., it decreases monotonically), then growth is said to be inclusive according to the relative definition of inclusive growth. In practice, the GIC tends to have more complex forms, often crossing the horizontal axis (negative growth) at one or more points, so one cannot categorically say that growth was inclusive or not inclusive for the entire distribution.

Figure 13.3 shows the GIC of real household consumption per capita for the total populations of our six case study countries. Our main findings are as follows:

- In absolute terms, the poorest quartile fares best where economic growth is higher. In particular, in the six country case studies, the pattern of household consumption growth for the poorest quartile is closely linked to the evolution of overall per capita GDP growth (Table 13.1). Indeed, the correlation between the two variables is 0.7. In four of the six countries in the sample (Ghana, Mozambique, Tanzania, Uganda), per capita GDP expanded by 4.25 percent annually between the relevant surveys, and mirroring this annual household consumption, growth averaged a relatively high 3.5 percent for the poorest quartile of the consumption distribution. In the other two sample countries, where annual per capita GDP growth was 1 percent or lower between surveys (Cameroon and Zambia), the poorest quartile did rather badly. In Cameroon, annual household consumption per capita growth was 1 percent for the poorest quartile, and in the case of Zambia, this group actually experienced an annual decline of 1.9 percent.

As mentioned previously, the Mozambique household survey data provide their own set of regional price indices that can be used to deflate total household consumption per capita in 2008–09 and compare it with the same variable in 2002–03. If one does so, instead of using the CPI to deflate nominal household consumption per capita, one obtains a growth incidence curve that is shifted downward, with the lowest three deciles in fact experiencing negative consumption growth. The use of regional price indices is in general preferable to the use of the CPI to deflate nominal consumption because it is well known that there are significant differences in prices across regions. The reason this chapter uses the CPI to deflate nominal is for uniformity, because regional price deflators are not available for the other countries.
Figure 13.3  Growth Incidence Curves of Real Household Consumption Per Capita
Source: IMF staff estimates based on data from various household surveys (see Appendix 13.1).
Note: The black line surrounded by the shaded area is the actual growth incidence curve, the lighter gray line is the average consumption level for all deciles, and the darker gray line corresponds to the growth rate for households in the middle of the consumption per capita distribution (the representative household).
### TABLE 13.1
Macroeconomic, Poverty, and Consumption Aggregates in Sample of Countries

<table>
<thead>
<tr>
<th>Period</th>
<th>Growth per capita</th>
<th>Percent change over the period</th>
<th>Real exchange rate</th>
<th>Percent change over the period</th>
<th>Terms of trade</th>
<th>Poverty headcount</th>
<th>Gini coefficient</th>
<th>Per capita consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cameroon</td>
<td>2001–07</td>
<td>0.57</td>
<td>6.9</td>
<td>56.2</td>
<td>9.6</td>
<td>0.045</td>
<td>0.043</td>
<td>0.010</td>
</tr>
<tr>
<td>Ghana</td>
<td>1998–05</td>
<td>2.33</td>
<td>–29.1</td>
<td>–33.6</td>
<td>30.0</td>
<td>–1.3</td>
<td>0.41</td>
<td>0.43</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2003–09</td>
<td>5.54</td>
<td>6.4</td>
<td>32.8</td>
<td>60.0</td>
<td>–2.5</td>
<td>0.47</td>
<td>0.46</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2000–07</td>
<td>4.38</td>
<td>–34.6</td>
<td>–47.2</td>
<td>67.9</td>
<td>–3.0</td>
<td>0.35</td>
<td>0.38</td>
</tr>
<tr>
<td>Uganda</td>
<td>2002–09</td>
<td>4.45</td>
<td>0.4</td>
<td>–5.0</td>
<td>28.7</td>
<td>–4.1</td>
<td>0.46</td>
<td>0.44</td>
</tr>
<tr>
<td>Zambia</td>
<td>1998–04</td>
<td>1.16</td>
<td>9.8</td>
<td>20.9</td>
<td>64.3</td>
<td>1.5</td>
<td>0.53</td>
<td>0.51</td>
</tr>
</tbody>
</table>

**Memo items:**
- Bangladesh: 1992–2000
- Cambodia: 1994–2004
- Vietnam

| Source: Household surveys; Klump and Bonschab (2004); World Bank (2007); and IMF, World Economic Outlook database and Information Notice System. |
| Note: Percent change per year, except where stated. NIPA: National income and product accounts. |
| ©International Monetary Fund. Not for Redistribution |
• In relative terms, however, the extent to which growth is inclusive is not related to the level of economic growth. The poorest quartile did better in relative terms than richer households in low-growth Cameroon and Zambia as well as in high-growth Uganda. In the other three high-growth countries (Ghana, Mozambique, Tanzania), the poorest quartile experienced lower growth in consumption relative to the highest quartile (see Table 13.1 and Figure 13.3).

• In terms of national poverty estimates, both the relative and absolute measures of the inclusiveness of consumption seem to matter. Thus, in five of the six countries in which overall consumption growth was positive (Ghana, Mozambique, Tanzania, Uganda) or relatively inclusive (Cameroon, where the poorest quartile fared much better than the richest quartile, even though overall growth was low), estimates show a decline in poverty headcount (Table 13.1). It was only in Zambia, where per capita GDP growth was low and consumption growth was strongly negative for the poorest quartile, that poverty increased significantly.

The diverse pattern of inclusive growth observed in sub-Saharan Africa is broadly similar to the experience of a number of comparable Asian countries. In Bangladesh (between 1991 and 2000) and Vietnam (between 1993 and 2002), overall consumption growth was positive (5.5 percent per year in Vietnam and 2 percent in Bangladesh). The highest consumption quartiles also saw significantly higher consumption increases than the poorest quartiles (Table 13.1).

In Cambodia (between 1994 and 1999), the consumption growth rate was high among the urban population (3.5 percent per year), but not in rural areas. Consistent with higher growth at the upper end of the income distribution in all three countries, their Gini coefficients rose during the 1990s.

Determinants of Household Consumption

Having identified large differences in the incidence of growth across countries, we now consider the factors that might help explain these differences, with particular focus on the households in the lowest quartile of the consumption distribution.

The coefficients associated with the determinants of consumption are similar among the sample of countries and can explain a large fraction of the variation in household consumption. As can be seen in Table 13.2, on average, between 60 and 70 percent of the variation in household consumption can be explained by household size, age, sex, employment status, sector of employment, and education level of the household head as well as whether the household is located in an urban or rural area. Household size has the highest explanatory power in all six countries, with each additional household member raising household consumption but at a declining rate. This may reflect more children that consume less than household adults and/or more family members with less earnings potential than the household head. The log of the age of the household head is also positive and reflects a rising consumption/income profile for more experienced adults, whereas a consistent positive education-consumption profile is evident across countries. Specifically,
### TABLE 13.2

Log Household Consumption Determinants (Most Recent Survey)

<table>
<thead>
<tr>
<th></th>
<th>Ghana</th>
<th>Cameroon</th>
<th>Uganda</th>
<th>Mozambique</th>
<th>Tanzania</th>
<th>Zambia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household size (log)</td>
<td>0.31***</td>
<td>0.29***</td>
<td>0.28***</td>
<td>0.24***</td>
<td>0.23***</td>
<td>0.26***</td>
</tr>
<tr>
<td>Age (log)</td>
<td>0.10***</td>
<td>0.19***</td>
<td>0.20***</td>
<td>0.20***</td>
<td>0.17***</td>
<td>0.16***</td>
</tr>
<tr>
<td>Male head of household</td>
<td>0.05***</td>
<td>0.02</td>
<td>0.03**</td>
<td>0.08***</td>
<td>0.03**</td>
<td>0.04**</td>
</tr>
<tr>
<td>Employment dummy</td>
<td>0.16***</td>
<td>0.05***</td>
<td>0.02</td>
<td>0.02</td>
<td>0.10***</td>
<td>0.07***</td>
</tr>
<tr>
<td>Agriculture sector dummy</td>
<td>-0.26***</td>
<td>-0.23***</td>
<td>-0.15***</td>
<td>-0.31***</td>
<td>-0.09***</td>
<td>-0.17***</td>
</tr>
<tr>
<td>Manufacturing sector dummy</td>
<td>0.01</td>
<td>-0.08***</td>
<td>0.05***</td>
<td>-0.03***</td>
<td>-0.07***</td>
<td>-0.10***</td>
</tr>
<tr>
<td>Government sector dummy</td>
<td>0.03</td>
<td>-0.12***</td>
<td>0.16***</td>
<td>0.19***</td>
<td>0.16***</td>
<td>0.16***</td>
</tr>
<tr>
<td>Primary schooling</td>
<td>0.03</td>
<td>0.07***</td>
<td>0.06***</td>
<td>0.08***</td>
<td>-0.05***</td>
<td>-0.14***</td>
</tr>
<tr>
<td>Lower secondary schooling</td>
<td>0.10***</td>
<td>0.16***</td>
<td>0.15***</td>
<td>0.16***</td>
<td>0.15***</td>
<td>-0.04</td>
</tr>
<tr>
<td>Upper secondary schooling</td>
<td>0.28***</td>
<td>0.38***</td>
<td>0.31***</td>
<td>0.29***</td>
<td>0.21***</td>
<td>0.01</td>
</tr>
<tr>
<td>College/nursing/teacher training</td>
<td>0.31***</td>
<td>0.69***</td>
<td>0.62***</td>
<td>0.59***</td>
<td>0.71***</td>
<td>0.87***</td>
</tr>
<tr>
<td>Urban dummy</td>
<td>0.25***</td>
<td>0.24***</td>
<td>0.10***</td>
<td>0.21***</td>
<td>0.39***</td>
<td>0.20***</td>
</tr>
<tr>
<td><strong>Coefficients of lowest quartile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment dummy</td>
<td>-0.02</td>
<td>0.05</td>
<td>0.04</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.06</td>
</tr>
<tr>
<td>Agriculture sector dummy</td>
<td>0.11**</td>
<td>0.13***</td>
<td>0.11***</td>
<td>0.04</td>
<td>0.16***</td>
<td>0.02</td>
</tr>
<tr>
<td>Manufacturing sector dummy</td>
<td>0.00</td>
<td>-0.03</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Government sector dummy</td>
<td>0.03</td>
<td>0.38***</td>
<td>-0.24***</td>
<td>-0.21***</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>Primary schooling</td>
<td>0.07*</td>
<td>0.06</td>
<td>-0.03</td>
<td>0.08***</td>
<td>0.14***</td>
<td>0.21***</td>
</tr>
<tr>
<td>Lower secondary schooling</td>
<td>0.02</td>
<td>0.04</td>
<td>-0.01</td>
<td>0.11***</td>
<td>0.01</td>
<td>0.13**</td>
</tr>
<tr>
<td>Upper secondary schooling</td>
<td>-0.15</td>
<td>-0.39***</td>
<td>-0.05</td>
<td>0.02</td>
<td>0.01</td>
<td>0.18**</td>
</tr>
<tr>
<td>College/nursing/teacher training</td>
<td>-0.22*</td>
<td>-0.76***</td>
<td>-0.39***</td>
<td>-0.16**</td>
<td>-0.49**</td>
<td>-1.01***</td>
</tr>
<tr>
<td>Urban dummy</td>
<td>-0.15***</td>
<td>-0.13***</td>
<td>-0.03</td>
<td>-0.13***</td>
<td>-0.19**</td>
<td>-0.21***</td>
</tr>
<tr>
<td><strong>Diagnostic statistics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>5,151</td>
<td>7,280</td>
<td>10,021</td>
<td>10,416</td>
<td>6,729</td>
<td>6,117</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.68</td>
<td>0.68</td>
<td>0.66</td>
<td>0.69</td>
<td>0.65</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Source: IMF staff estimates based on data from various household surveys (see Appendix 13.1).

1 Characteristics refer to head of household except for household size and urban dummy.
2 For Zambia, the manufacturing dummy refers to nonagriculture, nongovernment salaried employment.
3 Statistical significance at the 99 percent level; ** at the 95 percent level; * at the 90 percent level.
• Large urban-rural consumption differentials are evident in the six case study countries, varying between 12 percent (Mozambique) and 24 percent (Ghana), and these have generally remained stable over time. These differentials have provided the incentives for workers to move from rural to urban areas over the past decade, consistent with the Harris-Todaro model of migration. Between 2001 and 2009, the share of the population in rural areas fell more than 6 percentage points (median) in the sample of countries to 62 percent. Moreover, Nsowah-Nuamah, Teal, and Awoonor-Williams (2010) have shown for Ghana that in urban areas, the likelihood of being employed rises in line with the level of education, so it is likely that the more educated have made the rural-to-urban move.

• Regional consumption differentials have hardly changed in any sample country over recent surveys, remaining stable in Ghana and Mozambique and actually diverging in Cameroon (not shown). The differential between Cameroon’s richest regions (Yaounde and Douala) and other regions doubled between 2001 and 2007 to 30 percent, while in Mozambique, Central Maputo has maintained a 50 percent positive consumption differential over other regions, and in Ghana, Accra has maintained a 40 percent consumption differential over the poorest regions (the Upper East and West). These nominal consumption differentials are likely to be partially compensated for by differences in regional price indices. Indeed, deflating nominal consumption in Ghana by the regional price indices reduces the differential between the richest and poorest regions by 10 percentage points to 30 percent, and the ranking of the richer regions is changed, with Accra losing the top spot.

• Household heads with primary school education earn between 0 and 13 percent (Tanzania) more than those without education, whereas college-educated household heads earn between 60 percent (Cameroon) and more than 100 percent (Mozambique, Tanzania, Zambia) more than uneducated household heads. Moreover, in contrast to the stability of education differentials at lower levels of education, the college premium has increased substantially over time, consistent with the findings of Fox and Gaal (2008).  

• Large consumption differentials also exist for household heads employed in government relative to the primary sector. In most countries, government workers are among the highest paid (for example, Cameroon, Tanzania, Uganda), whereas agricultural workers earn the least, and manufacturing workers are only slightly higher up the consumption scale than agriculture workers in half of the countries in the sample (the reference group omitted from the sectoral coefficients in nongovernment services). Over the past decade, the consumption differential between agricultural workers and those in other sectors has declined over time.

9The stability of the coefficients over time provides support for the estimation of the GIC based on repeated cross-sectional household survey data because it requires the assumption that the same groups of households occupy the same position in the distribution of consumption over time.
Very limited differences exist in regard to characteristics for the poorest quartile of the consumption distribution:

- Across time within a single country and across countries, the distribution of consumption between those living in urban and rural areas is very similar, suggesting limited incentives to migrate to urban areas for those at the bottom end of the consumption distribution. With other characteristics (work experience, household size, and employment sector) controlled for, an urban premium for the poor is identified only in Cameroon and Ghana. This is supported by Kakwani, Soares, and Son (2005), who found that a cash transfer system that targets the poor in rural areas is able to reduce the poverty gap considerably more in Cameroon and Ghana than in the other case study countries.

- Agriculture and nongovernment service work and various education categories exhibit little variation in consumption. Although higher-educated households are likely to be positioned at the upper end of the consumption distribution of the poorest households, the modal estimate is the same as for household heads with no education. A possible explanation is that more highly educated household heads have unobservable characteristics that make them stay in the poorest segment of the population. With other factors controlled for, the regression estimates reveal a positive consumption differential for primary and lower secondary education for the poorest individuals, suggesting that education incentives exist for the poorest in these countries.

**Employment Developments**

Against the backdrop of strong growth in sub-Saharan Africa in recent years, the perception exists that this growth experience was not accompanied by increased employment opportunities, especially in countries concentrated on the extraction of natural resources. This is an important issue because household consumption is clearly dependent on employment income, as shown in the coefficient estimates from the regressions in the previous section. One difficulty in making this assessment is the general absence of employment data among sub-Saharan Africa countries (only Botswana, Mauritius, and South Africa provide annual data).

Household income and expenditure surveys can be used to overcome this problem because almost all surveys have a labor market component and can provide periodic snapshots of employment developments. However, the frequency of data is limited to two or three data points, and changes in questionnaires between surveys make comparisons difficult (see Appendix 13.1 for a discussion of the methodology used to generate the labor force data). Moreover, the meaning of employment for households in sub-Saharan Africa differs considerably from that used in developing countries because subsistence living represents a large share of household activity and formal employment represents a low share of total employment. For these reasons, we prefer to view employment as all income-generating activities rather than just formal employment.
Inclusive Growth in Sub-Saharan Africa

The increase in the number of people engaged in income-earning activities (a proxy for employment) has been strong over the past decade among the sample of countries analyzed, with a median estimate of 3.25 percent per year (Table 13.3). This outcome compares favorably with Cambodia and Vietnam, two other fast-growing LICs. The high employment growth rates have helped raise the ratio of employment to the working-age population in all sample countries except Ghana, where there has been a sharp increase in the number of people out of the labor force, which is attributable to youth remaining in school for a longer period.\(^1\) In addition, economic growth in these countries has been characterized by high employment intensity, with the median employment-output growth elasticity at 0.6 compared with 0.4 for Cambodia and Vietnam.

Agricultural employment growth has been particularly strong in sample countries that have demonstrated inclusive growth over the past decade. Agricultural employment has grown at 6 percent per year in both Cameroon and Uganda, whereas the growth rate has been much weaker in the other sample countries, and even negative in Zambia. The correlation between consumption growth of the poorest quartile and agricultural employment growth is even stronger for the rural population at 0.62, slightly below the correlation between growth of real GDP per capita and consumption growth of the poor.

The growth in urban employment has been extremely rapid, with a median estimate of almost 7 percent per year, over twice the employment growth rate among the whole population. However, given the rapid migration from rural to

\(^{10}\)The proportion of those out of the labor force and remaining in school has risen from 7 to 50 percent in Ghana between the two surveys, compared to a jump of 38 to 80 percent in Cameroon and flat at 60 percent in Mozambique.

### TABLE 13.3

<table>
<thead>
<tr>
<th>Employment Indicators</th>
<th>Employment output elasticity</th>
<th>Urban employment</th>
<th>Agricultural employment</th>
<th>Rural agricultural employment</th>
<th>Formal sector employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>Total employment</td>
<td>Urban employment</td>
<td>Agricultural employment</td>
<td>Rural agricultural employment</td>
<td>Formal sector employment</td>
</tr>
<tr>
<td>Cameroon 2001–07</td>
<td>2.7</td>
<td>0.8</td>
<td>5.6</td>
<td>5.9</td>
<td>4.2</td>
</tr>
<tr>
<td>Ghana 1999–2005</td>
<td>3.4</td>
<td>0.7</td>
<td>6.1</td>
<td>3.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Mozambique 2003–09</td>
<td>4.4</td>
<td>0.6</td>
<td>7.4</td>
<td>3.4</td>
<td>−0.4</td>
</tr>
<tr>
<td>Tanzania 2000–09</td>
<td>3.3</td>
<td>0.5</td>
<td>8.8</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Uganda 2002–09</td>
<td>7.5</td>
<td>1.0</td>
<td>9.8</td>
<td>6.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Zambia 1998–2004</td>
<td>1.9</td>
<td>0.6</td>
<td>5.1</td>
<td>−0.2</td>
<td>−1.6</td>
</tr>
<tr>
<td>Memo items:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambodia 2004–07</td>
<td>4.2</td>
<td>0.4</td>
<td>4.5</td>
<td>3.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Vietnam(^2) 2000–07</td>
<td>2.9</td>
<td>0.4</td>
<td>6.1</td>
<td>−0.3</td>
<td>n.a.</td>
</tr>
<tr>
<td>Sub-Saharan Africa (sample median)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Household surveys; Coxhead and others (2010); and Economic Institute of Cambodia (2008).

1 Latest estimate in percent of working-age population.
2 Agricultural employment is for 2000–08.
urban areas, the increase in the ratio of employment to the working-age population has been more modest, at almost 1 percentage point (Figure 13.4). The increase in the ratio of employment to the working-age population among sub-Saharan African countries is comparable to the experience in Cambodia and Vietnam in recent years.

Formal sector employment is often used as a measure of the development process among LICs because formal jobs generally provide social security benefits and more stable incomes. Formal employment is proxied by salaried employment (government and other salaried workers) in this chapter given the unavailability of information on social benefits from most surveys. Based on this definition, formal employment in relation to the working-age population for the whole economy has risen in all sample countries except for Cameroon, and in regard to urban areas, it has risen in all sample countries except for Cameroon and Tanzania. However, at 13.6 percent of the working-age population (median estimate for the six sample countries), it remains considerably below the levels registered in Cambodia (25 percent in 2007) and Vietnam (44 percent in 2007).

On the other hand, the fact that salaried employment has grown less rapidly than total employment among sub-Saharan African countries is not necessarily synonymous with adverse welfare developments. First, formal employment may not reflect jobs with health and social security benefits because of lack of data. Second, Fox and Gaal (2008) show that informal sector earnings grew more rapidly than formal sector earnings during the 1990s in Cameroon and Mozambique. Third, Perry and others (2008) argue that many labor force participants in Latin America prefer the flexibility afforded by working for themselves in a nonfarm business rather than being an employee. This is because of low economy-wide productivity levels and the fact that informal sector workers may have access to

![Figure 13.4](image_url)

**Figure 13.4** Ratio of Total Employment to Working-Age Population

Source: Household surveys.

1For Cameroon, the employment-to-population ratio for 2007 refers to those who worked at least 25 hours per week.
mechanisms that substitute for formal social protection programs financed by payroll taxes.

**ENGEL CURVES**

We now turn to one of the best-established empirical regularities in economics, Engel’s law, to help explain the apparent dissonance between changes in income and poverty reduction in our case studies. Several recent studies, including Kenny (2011), Sala-i-Martin and Pinkovskiy (2010), and Young (2010), have suggested that well-being in the African region might actually be higher than is generally believed. Engel’s law, which states that the share of total household resources allocated to food consumption decreases with the level of total household resources, has been found to hold across countries and across households in a given country (see Figures 13.5 and 13.6). Our aim here is to exploit this empirical regularity for insights on the evolution of real incomes. Perhaps real incomes in the region are not being measured well, giving rise to the dissonance between growth and progress in poverty reduction. In other countries, including Brazil, Mexico, and the United States, among others, there is evidence that real income growth has been underestimated on account of the overestimation of true cost-of-living increases by CPI inflation (see Costa, 2001; Hamilton, 2001; and de Carvalho and Chamon, 2012). Could the same factor be at work in sub-Saharan Africa, where there has arguably been even more rapid economic change?

The basic intuition for the approach used in this section is as follows. Assuming household preferences are stable over time and given a well-specified model, we should be able to infer the evolution of real incomes from shifts in the estimated Engel curve.\(^\text{11}\) For example, if the estimated Engel curve shifts over time to the left (right), it implies that a lower (higher) level of total household consumption corresponds to each food share.\(^\text{12}\) Figure 13.7 depicts the Engel curve for Ghana estimated using data for the period 1998–2005. In particular, it shows the fitted regression line (in darker gray) and the fitted regression line including the negative

---

\(^{11}\) Nakamura (1997) was the first to suggest that Engel’s law could be used to measure changes in real income. His motivation was the possibility that the measured productivity slowdown that began in the early 1970s in the United States and in other developed countries was actually a result of the overestimation of inflation, which resulted in a decrease in the growth rate of real income. Both Costa (2001) and Hamilton (2001) formalized Nakamura’s intuition using regression analysis, with which they analyzed the relation between food expenditure and real total household expenditure after controlling for household characteristics. In particular, they employ Deaton and Muellbauer’s (1980) Almost Ideal Demand System (AIDS) specification, reaching similar conclusions, because they both find that inflation measured through the CPI in the United States has overestimated true cost-of-living increases.

\(^{12}\) Engel curves, by definition, require that all other variables be held constant. In particular, Engel curves generally take the form \(w = f(p, y, z)\), where \(w\) is the share of total household resources (income, expenditure, or consumption) allocated to food consumption, \(p\) is a vector of prices (including the food price index), \(y\) is a measure of total household resources, and \(z\) is a vector of household characteristics. Although it can be argued that prices are held constant when data from a cross-sectional household survey (as long as the law of one price holds) are used, several household characteristics change over time, and thus regression analysis is used to control for these changing characteristics.
Figure 13.5  Food Expenditure Share and Household Consumption Expenditure per Capita in a Sample of 84 Countries, 2010


Figure 13.6  Ghana: Food Expenditures as a Share of Total Household Consumption by Deciles of the Total Household Consumption Distribution

coefficient associated with a year dummy variable (in lighter gray), which shifts the original Engel curve toward the origin. Given that for every level of real total household consumption, the lighter gray line associates a lower share of total household consumption allocated to food than the darker gray line, one conclusion we can draw is that real total household consumption may be underestimated.

The reason for the underestimation of real income growth is generally acknowledged to be overestimation of inflation. There are various upward biases associated with measuring cost of living with a Laspeyres-type CPI index. First, the use of a fixed basket of products in most CPI indexes overestimates changes in the cost of living because consumers change their consumption bundles in response to relative price changes (substitution bias). Second, most statistical agencies ignore changes in the quality of products, so that any increase in the price of a product will be accounted for as inflation, even if it corresponds to a product of higher quality. Third, statistical agencies are also slow in changing their sampling schemes to incorporate new products (which often experience sharp initial declines in prices) and establishments.

As shown in Table 13.4, which illustrates regression results for the case of Ghana (1991–2005), our results show that there is an upward bias in CPI

---

13If, on the contrary, the coefficient of the year dummy variable were positive, then for every level of real total household consumption, the darker gray line would be associated with a higher share of total household consumption allocated to food, and one would have to conclude that inflation measured through the CPI was downward biased and that the growth of real total household consumption was overestimated.
inflation in the later period (1998–2005) because the coefficient associated with the time dummy for 2005 (d2005) is negative and statistically significant. In contrast, there was a downward bias in the first period (1991–98) because the first period dummy variable (d1998) is positive.

The result of this regression formalizes the intuition shown for the case of Ghana (Figure 13.7), which suggests that the rapid decline over the period 1998–2005 in the share allocated to food consumption from the household survey is too large to be accounted for by the increase in real GDP per capita or in real consumption expenditure per capita from national accounts, thus suggesting that CPI inflation overestimated the true cost of living increases.

The specification in column (6) is used for contrasting the four countries for which comparable data on consumption by category are available for at least two years, namely, Cameroon, Ghana, Uganda, and Zambia. The magnitude of the CPI bias implied by the parameter estimates in each of the regressions was

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14 All the regressions were estimated using the ordinary least squares (OLS) estimator, and the sample was restricted to households whose food consumption as a share of total household consumption was greater than 5 percent and smaller than 90 percent. In all cases, this restriction reduced the sample by less than 2 percent of the original sample size, and the sign and magnitude of the estimated biases are not sensitive to this sample selection rule.

15 The results of the regression are shown only for the whole sample in the case of each country. Nevertheless, all deciles of the consumption per capita distribution show similar changes over time in the food shares as the mean (see Figure 13.6 for evidence from Ghana), which suggests the bias is not driven by changes in the consumption patterns of any particularly group, but is a common phenomenon. Thus, in principle there is no reason to believe that the poorest quartile is experiencing more or less underestimation of real income than the average.

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**TABLE 13.4**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
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<td>1.528***</td>
<td>1.607***</td>
<td>1.524***</td>
<td>1.535***</td>
<td>1.521***</td>
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<td>-0.062***</td>
<td>-0.069***</td>
<td>-0.066***</td>
<td>-0.066***</td>
<td>-0.067***</td>
</tr>
<tr>
<td>consumption (log)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005 dummy</td>
<td>-0.016***</td>
<td>-0.013***</td>
<td>-0.014***</td>
<td>-0.014***</td>
<td>-0.014***</td>
<td>-0.014***</td>
</tr>
<tr>
<td>1998 dummy</td>
<td>0.013***</td>
<td>0.015***</td>
<td>0.014***</td>
<td>0.014***</td>
<td>0.014***</td>
<td>0.013***</td>
</tr>
<tr>
<td>Household size</td>
<td>0.005***</td>
<td>0.004***</td>
<td>0.004***</td>
<td>0.004***</td>
<td>0.004***</td>
<td>0.003***</td>
</tr>
<tr>
<td>Age of household head</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male head of household</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.009</td>
<td>-0.006***</td>
</tr>
<tr>
<td>Employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.001***</td>
<td>0.001***</td>
</tr>
<tr>
<td>Number of observations</td>
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<td>19,036</td>
<td>19,036</td>
<td>19,036</td>
<td>19,036</td>
<td>18,444</td>
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<tr>
<td>R-squared</td>
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<td>0.1070</td>
<td>0.1141</td>
<td>0.1252</td>
<td>0.1261</td>
<td>0.1341</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.0998</td>
<td>0.1069</td>
<td>0.1139</td>
<td>0.1250</td>
<td>0.1258</td>
<td>0.1338</td>
</tr>
</tbody>
</table>


Note: Dependent variable: Food consumption as a share of total household consumption.

***Statistical significance at the 99 percent level; **at the 95 percent level; *at the 90 percent level.
obtained by combining the parameter estimates for the coefficient of real income and the dummy variable with an estimate of the food price elasticity and the corresponding relative inflations of the food and nonfood components of the CPI in each country. Because no estimate of the food price elasticity was available for any of the countries in our sample, the estimate by Hamilton (2001) of 0.0369 for the United States was used.

The results for three out of the four countries for which the Engel curves are estimated—Cameroon, Ghana, and Zambia—show a drift to the left over time of the Engel curve, thus suggesting that CPI inflation has overestimated the increase in the true cost of living and that real income growth has been underestimated (Table 13.5). In the case of Uganda, the opposite has been the case because the Engel curve has drifted to the right over time, suggesting that CPI inflation has underestimated the increase in the true cost of living and that real income growth has been overestimated. The estimates of the annual CPI bias are a 10 percent underestimation (annual) in the case of Zambia, 8.6 percent in the case of Cameroon and 2 percent in the case of Ghana, and a 9 percent overestimation in the case of Uganda. Although the magnitude of these estimates is larger than that found for estimates for developed countries (which generally are in the range of 1 percent to 3 percent annually), they are comparable with those obtained for some developing countries, including those of de Carvalho and Chamon (2012) for Brazil during the period 1987–96, which found an overestimation of close to 9.5 percent using a similar specification and estimator, and those of Gibson, Stillman, and Le (2008) for Russia during the period 1994–2001, which found an overestimation of 1 percent per month.

The apparent underestimation of the growth rate in true real income in Cameroon, Ghana, and Zambia, particularly during the period when growth accelerated in the region, has important implications. First, it supports the conclusions of Young (2010), who argued that real consumption per capita growth

<table>
<thead>
<tr>
<th>TABLE 13.5</th>
<th>Engel Curves for Food in Cameroon, Ghana, Uganda, and Zambia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.546***</td>
</tr>
<tr>
<td>Total real household consumption (log)</td>
<td>-0.089***</td>
</tr>
<tr>
<td>Second-year dummy</td>
<td>-0.065***</td>
</tr>
<tr>
<td>Household size</td>
<td>0.013***</td>
</tr>
<tr>
<td>Age of household head</td>
<td>0.001***</td>
</tr>
<tr>
<td>Male head of household</td>
<td>-0.006**</td>
</tr>
<tr>
<td>Employed</td>
<td>0.065***</td>
</tr>
<tr>
<td>Number of observations</td>
<td>22,140</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.2106</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.2104</td>
</tr>
</tbody>
</table>

Source: IMF staff estimates based on data from the various household surveys (see Appendix 13.1). Note: Dependent variable: Food consumption as a share of total household consumption.

***Statistical significance at the 99 percent level; **at the 95 percent level; *at the 90 percent level.
has been underestimated in national accounts using a completely different methodology. The evidence of an underestimation of real income growth in three of the four countries for which data are available suggests that real income growth may be underestimated in other countries in the region, although given the data limitations (in terms of coverage of the region’s population with comparable household surveys), this is a conjecture that requires further research to be confirmed or rejected.

**CONCLUSION**

Broadly, then, our main findings are as follows:

- There is evidence of growth having been fairly inclusive in the region’s high-growth countries. We find, for example, that the lowest quartile in three out of the four case study countries (Ghana, Tanzania, Uganda) enjoyed fairly high increases in consumption. But there are signs that in many of these countries, higher-income households enjoyed still higher growth in consumption. This implies some increase in inequality, broadly in line with patterns observed in a number of high-growing Asian countries.

- We find evidence of real income growth having been underestimated in some countries—fairly significantly in some cases. In these cases, real consumption gains have accordingly been underestimated (and thus poverty rates likely overstated). The main reason for this appears to be biases in the way that CPI is measured. This is consistent with the views of Young (2010) that income growth has been much higher than is registered in NIPA statistics.

Some of the policy implications that we can infer from our findings are as follows:

- The focus of many sub-Saharan African policymakers on policies that promote broad and sustainable growth are likely the means by which the poor can be helped the most.

- Still, this does not imply that high average growth is a sufficient condition to ensure inclusiveness. Once it has been established that growth has not indeed been inclusive, temporary and well-targeted transfer programs could be considered to help those being left out by the growth process. In terms of targeting, as shown above, even a few observable household characteristics—such as education levels, region of residence, sector of employment, employment status, and so on—go a long way toward explaining, in a statistical sense, the difference in consumption levels across households.

- Perhaps more importantly, as shown in the case of the six case studies, those countries that experienced higher growth in agricultural employment also experienced higher poverty reduction. Some public policies could, if properly implemented, lead to short-term increases in agricultural output and productivity, including diffusion of fertilizers and improved seeds, whereas
others, such as investments in electrification, irrigation, rural roads, and agricultural extension services, will require time to be implemented properly and will thus have medium-term effects. At any rate, with about two-thirds of the region's population living in rural areas and with most of them deriving their income from agricultural activities, increasing agricultural productivity is necessary for accelerating poverty reduction.
## APPENDIX 13.1: SURVEY CHARACTERISTICS

### TABLE 13.A1

<table>
<thead>
<tr>
<th>Country</th>
<th>Survey</th>
<th>Years</th>
<th>Acronym</th>
<th>Data collection agency or agencies</th>
<th>Start date of data collection</th>
<th>End date of data collection</th>
<th>Sampling frame</th>
<th>Sampling scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon</td>
<td><strong>Enquête Camerounaise Aupres des Ménages III</strong></td>
<td>2007</td>
<td>ECAM 3</td>
<td>Institut National de la Statistique</td>
<td>September-07</td>
<td>December-07</td>
<td>3ème Recensement Général de la Population et de l’Habitat de novembre-décembre 2005</td>
<td>Two-stage stratified random sampling</td>
</tr>
<tr>
<td>Cameroon</td>
<td><strong>Enquête Camerounaise Auprès des Ménages II</strong></td>
<td>2001</td>
<td>ECAM 2</td>
<td>Institut National de la Statistique</td>
<td>September-01</td>
<td>December-01</td>
<td>2ème Recensement Général de la Population et de l’Habitat de 1987</td>
<td>Two- and three-stage stratified random sampling</td>
</tr>
<tr>
<td>Ghana</td>
<td><strong>Ghana Living Standards Survey 5</strong></td>
<td>2005</td>
<td>GLSS5</td>
<td>Ghana Statistical Service</td>
<td>September-05</td>
<td>August-06</td>
<td>Complete list of the 2000 Population and Housing Census Enumeration Areas</td>
<td>Two-stage stratified random sampling</td>
</tr>
<tr>
<td>Mozambique</td>
<td><strong>Inquérito sobre Orçamento Familiar</strong></td>
<td>2008–09</td>
<td>IOF 2008-09</td>
<td>Intituto Nacional de Estadística</td>
<td>August-08</td>
<td>September-09</td>
<td>Master Sample (amostra mãe) from the 2007 Population Census (Censo Populacional)</td>
<td>Three-stage stratified random sampling</td>
</tr>
<tr>
<td>Mozambique</td>
<td><strong>Inquérito aos Agregados Familiares</strong></td>
<td>2002–03</td>
<td>IAF 2002-03</td>
<td>Intituto Nacional de Estadística</td>
<td>July-02</td>
<td>June-03</td>
<td>Master Sample (amostra mãe) from the 1997 Population Census (II Recenseamento Geral da População e Habitação 1997)</td>
<td>Three-stage stratified random sampling</td>
</tr>
<tr>
<td>Country</td>
<td>Survey</td>
<td>Years</td>
<td>Acronym</td>
<td>Data collection agency or agencies</td>
<td>Start date of data collection</td>
<td>End date of data collection</td>
<td>Sampling frame</td>
<td>Sampling scheme</td>
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<td>Uganda National Household Survey II</td>
<td>2002–03</td>
<td>UNHS 2002/03</td>
<td>Uganda Bureau of Statistics</td>
<td>May-02</td>
<td>April-03</td>
<td>List of enumeration areas with number of households based on cartographic work for the 2002 Population and Housing Census</td>
<td>Two-stage stratified random sampling</td>
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<tr>
<td></td>
<td>Living Conditions Monitoring Survey II</td>
<td>1998</td>
<td>LCMS II</td>
<td>Central Statistical Office</td>
<td>November-98</td>
<td>December-98</td>
<td>Updated master frame based on the 1990 Census of Population and Housing</td>
<td>Two-stage stratified cluster sampling</td>
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<td>Country</td>
<td>Sampling Units</td>
<td>Total population</td>
<td>Sample size (households) planned</td>
<td>Sample size (households) Actual</td>
<td>Sample size (persons)</td>
<td>Percentage of responses (coverage rate)</td>
<td>Sample fraction</td>
<td>Representativeness of the sample</td>
</tr>
<tr>
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<td>----------------</td>
<td>------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td>----------------------</td>
<td>-----------------------------------------</td>
<td>----------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Enumeration areas or zones de dénombrement (742), households (ménages)</td>
<td>18,659,938</td>
<td>12,609</td>
<td>11,391</td>
<td>51,837</td>
<td>90.34</td>
<td>360</td>
<td>National, urban, and rural, for 10 administrative regions (provinces), and for the metropolitan regions of Yaounde and Douala</td>
</tr>
<tr>
<td></td>
<td>Enumeration areas or zones de dénombrement (612), households (ménages)</td>
<td>16,242,478</td>
<td>11,553</td>
<td>10,992</td>
<td>56,443</td>
<td>95.14</td>
<td>288</td>
<td>National, urban, and rural, for 10 administrative regions (provinces), and for the metropolitan regions of Yaounde and Douala</td>
</tr>
<tr>
<td>Ghana</td>
<td>Enumeration areas (550), households (15)</td>
<td>22,279,846</td>
<td>8,700</td>
<td>8,687</td>
<td>37,128</td>
<td>99.85</td>
<td>600.1</td>
<td>National, urban, and rural, for 10 administrative regions, with a minimum sample size of 400 households, for three ecological zones (coastal, forest, and northern), and for the Greater Accra metropolitan region</td>
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<td>Enumeration areas (300), households (20)</td>
<td>18,724,275</td>
<td>6,000</td>
<td>5,998</td>
<td>25,694</td>
<td>99.97</td>
<td>728.7</td>
<td>National, urban, and rural</td>
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<td>Mozambique</td>
<td>Primary sampling units (Unidades Primárias de Amostragem), enumeration areas (Áreas de Enumeração), households (Agregados Familiares)</td>
<td>22,638,414</td>
<td>11,000</td>
<td>10,832</td>
<td>51,177</td>
<td>98.47</td>
<td>442.4</td>
<td>National, urban, and rural, for three regions (north, center, and south), and 10 provinces (Cabo Delgado, Niassa, Nampula, Tete, Zambezia, Manica, Sofala, Inhambane, Gaza, Maputo Provincia) and the capital city (Maputo Capital)</td>
</tr>
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<td></td>
<td>Primary sampling units (Unidades Primárias de Amostragem), enumeration areas (Áreas de Enumeração), households (Agregados Familiares)</td>
<td>19,521,546</td>
<td>8,727</td>
<td>8,700</td>
<td>44,100</td>
<td>99.69</td>
<td>442.7</td>
<td>National, urban, and rural, for three regions (north, center, and south)</td>
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### TABLE 13.A1
Survey Characteristics (continued)

<table>
<thead>
<tr>
<th>Country</th>
<th>Sampling Units</th>
<th>Total population</th>
<th>Sample size (households) planned</th>
<th>Sample size (households) Actual</th>
<th>Sample size (persons)</th>
<th>Percentage of responses (coverage rate)</th>
<th>Sample fraction</th>
<th>Representativeness of the sample</th>
</tr>
</thead>
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<tr>
<td>Tanzania</td>
<td>Clusters (447), households (24)</td>
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<td>10,752</td>
<td>10,466</td>
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<td>97.34</td>
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<td>Clusters (1,158), households (24)</td>
<td>34,514,835</td>
<td>22,584</td>
<td>22,178</td>
<td>108,084</td>
<td>98.20</td>
<td>319.3</td>
<td>Mainland Tanzania, Dar es Salaam region (urban), other urban, and rural areas, and mainland Tanzania’s 20 regions</td>
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<td>Uganda</td>
<td>Enumeration areas (712), households (10)</td>
<td>30,700,000</td>
<td>6,800</td>
<td>6,775</td>
<td>36,432</td>
<td>99.63</td>
<td>842.7</td>
<td>National, urban, and rural, and for these regions (central, eastern, northern, and western)</td>
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<tr>
<td></td>
<td>Enumeration areas (1,000), households (10)</td>
<td>25,000,000</td>
<td>10,000</td>
<td>9,711</td>
<td>50,513</td>
<td>97.11</td>
<td>494.9</td>
<td>National, urban, and rural, and for these regions (central, eastern, northern, and western)</td>
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<td>Zambia</td>
<td>Standard enumeration areas (1048), households (around 20)</td>
<td>11,583,176</td>
<td>20,000</td>
<td>19,350</td>
<td>103,295</td>
<td>96.75</td>
<td>112.1</td>
<td>National, urban, and rural, for nine provinces, and for the 72 districts</td>
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<tr>
<td></td>
<td>Standard enumeration areas (820), households (around 20)</td>
<td>10,039,846</td>
<td>16,740</td>
<td>16,715</td>
<td>93,471</td>
<td>99.85</td>
<td>107.4</td>
<td>National, urban, and rural, for nine provinces, and for the 72 districts</td>
</tr>
</tbody>
</table>

Source: Household surveys.
APPENDIX 13.2: A METHODOLOGY FOR CALCULATING LABOR FORCE COMPONENTS

The labor force definition used in this chapter comprises individuals between 16 and 65 years old who are employed or are actively seeking work; this definition is comparable to the UN definition used for most countries. In all countries, employment status corresponds with the main job, so that students working part time are not counted in the labor force because they are not working as their primary activity.

For Cameroon and Ghana, the employed are defined as those who have worked during the preceding 12 months, and this amount is divided by the total working-age population to derive the employment ratio. This figure is compared with the number of people who indicate their sector of employment and the minimum of these two figures is used. For Zambia, the employed are defined as those who had an active economic status in terms of working for wages, running a business, working in agriculture, and unpaid family workers, while for Tanzania, those who indicate an industry affiliation are assumed employed. For Mozambique and Uganda, only status during the preceding seven days is used for employment, with the employment total defined as the sum of those who worked during the preceding seven days and those who did not work during this period but normally have a job.

In Ghana and Cameroon, the split between the unemployed and those out of the labor force is obtained using the question, “Did you search for work during the past seven days?” Those who searched for work are defined as the unemployed, and the unemployment rate is derived using this figure divided by the working-age population. Those out of the labor force are defined as working-age population minus employed minus unemployed. If the number of unemployed derived in this way looks as if it is miscoded, the figure for those out of the labor force is used based on the question, “Why have you not worked or looked for work?” with the unemployment rate derived as a residual. If there is disparity between the employment totals based on questions about activities during the past 12 months and the unemployment and out-of-the-labor force totals based on questions about activities during the preceding week, the ratios of the latter two variables are applied to the difference between the working-age population and the employment total.16

To identify salaried employees, government workers are first separated out in all countries based on the assumption that all of these workers receive wage income. Nongovernment salaried workers are defined as follows: In Ghana, a worker potentially receiving payment is asked, “How are you paid in your main job?” All categories except “payment in kind” and “not remunerated” are summed. In Mozambique, salaried workers are identified in response to the question, “Are you a salaried worker?” In Cameroon, salaried workers are defined as senior executives, middle management, and qualified and semiqualified workers. In Tanzania, nongovernment salaried workers are defined as those working for

16This is the case for Ghana.
NGOs, religious workers, parastatal employees, and other employees, while in Zambia, nongovernment salaried workers are defined as parastatal, private sector, and NGO employees. In Uganda, salaried workers are derived from the question on employment status.

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CHAPTER 14

Distributional Consequences and Policy Responses to Food Price Inflation in Developing Asia

SHIKHA JHA AND CHANGYONG RHEE

INTRODUCTION

Rapidly rising food prices are not just a macroeconomic problem. By directly influencing poverty levels, they create a political challenge for developing countries. As the poor spend large fractions of their income on food, recent surges in food prices have pushed more people into poverty. According to the Asian Development Bank (ADB) estimates based on a $1.25 per day poverty line, a 10 percent increase in domestic food prices would increase the number of poor in developing Asia by more than 60 million and, further on, close to 200 million if the prices were to shoot up by 30 percent (ADB, 2011a). High prices thus weaken poverty reduction and exacerbate income inequality. In this chapter, we assess the economic impacts of evolving global food price movements on Asia and explore alternative domestic and regional policy tools to deal with the issue in light of structural impediments faced by the region.

Movements in global food prices over the last half a century can be roughly divided into three subperiods: the stable years from 1960 to 1972, the volatile years with a somewhat flat trend from 1973 to 2001, and the upward-drifting years with rising volatility from 2002 onward (Figure 14.1). After more than two decades of staying below trend, food prices surged in 2007–08, driven by structural and cyclical factors, demand and supply conditions, the ensuing financial market turbulence, and the links between food and energy markets (ADB, 2008). The food price index in 2007 and 2008 was 26 percent and 68 percent higher, respectively, than the index in 2006 due to a shortfall of production relative to

The views expressed in this chapter are those of the authors and do not necessarily reflect the views and policies of the Asian Development Bank, its Board of Governors, or the governments they represent. The authors are grateful to Rabah Arezki for valuable comments. This chapter draws heavily on previous ADB research.

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As demand continued rising but supply could not keep pace, grain inventories were depleted rapidly. When the markets returned to balance in the aftermath of the financial crisis, the prices began to drop back toward trend late in 2008, but after declining briefly until 2009, they started climbing again from mid-2010 due to supply disruptions caused by adverse weather conditions. The combined stocks of rice, wheat, and corn, after declining by the end of 2006 to below 60 percent of the maximum observed in 1999, recovered to only a little over 70 percent by the end of 2010. In particular, the upward movement of corn and wheat prices continued until the second quarter of 2011 before retreating in July due to better supply conditions arising from improved weather.

Food price increases in recent years have become more persistent than in the past. Not only have these increases been widespread, but their synchronized movements with other commodities, especially energy, have been particularly noticeable (see Figure 14.2 and Ghoshray [2011]). Energy feeds into agricultural prices via the cost of energy-intensive inputs (such as nitrogen-based fertilizers made from natural gas, diesel used for irrigation pumps and transport, and power) and through diversion of food crops as input for production of competing products (corn and sugar are used to produce biofuels, and soybeans and palm oil are used to produce biodiesel, a substitute for crude oil). Between 2004 and 2008, world food prices in real terms went up by 55 percent along with the prices of energy-based agricultural inputs. The main commodity indices not only have continued their upward movement, but have also become more volatile.1 By November 2011, energy and metal prices were more than double their prices at the end of 2008. Agriculture and fertilizer prices also exceeded their end-of-2008 levels, though at a smaller magnitude. Volatility in commodity prices has become

---

1 One may argue that, in real terms, current prices including those in the 2007–08 episode are well below those observed in 1974. However, price volatility (as measured by standard deviation) in 2008 was higher than that in 1974.
more pronounced from 2006, fluctuating within a much wider band than ever before.\(^2\)

In recent years, world food prices have been driven by strong growth in emerging economies, declining agricultural investments, low productivity, high input costs, unfavorable weather, diversion of food for biofuels production, and distortionary “beggar-thy-neighbor” policies, such as export restrictions, among others. Although the 2010–11 price surge was somewhat similar to the one that occurred in 2007–08, it was characterized by different factors at work. First, the main drivers in the earlier period were structural causes such as rapidly rising demand from emerging economies, dwindling global stocks of food, active promotion of biofuels, and possible financialization of commodity markets. Recent price rises, however, were fostered more by weather disturbances, natural calamities, and protectionist trade policies.

Second, in 2007–08, the surge in food prices was led by energy, which impacted grain prices directly and indirectly. Third, while earlier rises in prices were uniformly higher for most foods, the recent increase was less sharp for rice. This is particularly important for developing Asia, which hosts 8 of the top 10 rice producers (contributing more than 95 percent of their combined total) and 7 of the 10 leading exporters. The scene is somewhat less Asia-centric for wheat, for which Asian economies are relatively more self-sufficient. Between June 2010 and May 2011, wheat and corn prices doubled, but rice prices increased by less than 20 percent as Thailand and Vietnam, two of the world’s largest exporters, freed exports and the Philippines, the world’s single largest importer, dropped the government monopoly on imports due to better domestic crop prospects. However,

\(^2\)Moreover, the frequency of natural disasters has increased, with more occurring in the Asia and Pacific region. Between 2001 and 2010, of the world total, the region accounted for 90 percent of the people affected, 65 percent of those killed, and 38 percent of economic damages, exceeding its share of world GDP (UN-ESCAP, 2011).
Distributional Consequences and Policy Responses to Food Price Inflation in Developing Asia

rice prices gained strength in July 2011 (as Thai farmers withheld rice following a government pledge to pay farmers about 50 percent above the market rate) and then remained firm as the government implemented the policy in October. This was aided by the negative effects of floods in Cambodia, Thailand, and other countries in Southeast Asia. The relaxation of export restraints by India after a four-year ban dampened the prices only slightly. Prices of corn, wheat, and rice, which provide the world with most of its food energy, have gone down relatively, but they have settled on a higher plane.

The supply conditions now are better than they were in 2008. The November 2011 World Agricultural Supply and Demand Estimates report of the U.S. Department of Agriculture shows an estimated 405 million metric tons of grains ending stock in 2010/11, which far exceeds the below 380 million metric ton estimate for 2007/08. Although better weather conditions and lifting of trade restrictions have improved the prospects for food supply, the likelihood of rapid growth in these prices again soon cannot be ruled out. The latest Department of Agriculture estimates show a lower ending stock for grains in 2011/12 compared with the previous year as growth of total usage is expected to outpace growth of total supply. With low global stocks, small shortfalls in supply can significantly affect prices.

The rest of this chapter is organized as follows. We discuss economic impacts of price changes on developing Asia, followed by an assessment of policy priorities for the region in the face of various constraints and challenges. We then conclude with selected policy recommendations at the global, regional, and national levels.

**ECONOMIC IMPACT OF GLOBAL PRICE MOVEMENTS**

The frequency with which food price spikes have occurred in recent years has raised policy challenges associated with not only ensuring food security, but also reducing poverty and maintaining macroeconomic stability. High and volatile food prices adversely affect growth, employment, external accounts, and fiscal positions of governments. These prices are having knock-on effects in Asian economies, especially those in which supply and demand conditions are tight. Countries with rapidly growing domestic demand particularly face the risk of second-round effects of higher food prices spilling over to higher prices of other goods and wages. Such a situation can cause inflation to become entrenched and create a wage-price spiral. By spurring inflation, food prices have necessitated monetary tightening, thereby affecting the robust growth record of the region. The persistence of high prices has also provoked fiscal measures such as higher consumer subsidies and farm support, which have dented the hitherto generally strong fiscal positions of Asian governments. In food-importing countries, high world market prices have created strains on balance of payments through depletion of foreign exchange reserves. For example, for the Philippines, the rice import bill multiplied almost five times in 2008.
Vulnerability of the Poor

A number of studies show that food price inflation is a regressive tax. In the developing world, the lower the level of household income, the larger is the fraction of income spent on food (ADB, 2008; de Hoyos and Lessem, 2008). The food share falls by between 8 and 14 percentage points as development levels rise from low to high incomes (Anker, 2011). Interestingly, the food expenditure shares in developing Asia are much larger than in Africa, Latin America, and advanced economies, making it particularly vulnerable to food price shocks (see Figure 14.3 and de Hoyos and Lessem, 2008). Additionally, the income elasticity of food expenditure also falls with per capita income, declining from around 0.8 for low-income countries to 0.7 for lower-middle-income countries, 0.6 for upper-middle-income countries, and 0.3 for high-income countries (Anker, 2011). This means that any fall in income, say, arising from higher food prices, will give a much larger food consumption shock to the poor.

In addition to the high household expenditure on food by the poor, consumer price indices in Asia boast a much higher share of food as well compared to richer economies (Table 14.1). This implies that a rise in food prices will contribute more to inflation in developing than in advanced economies. In some of the larger countries of the region, such as Bangladesh, Cambodia, India, and Sri Lanka, the share exceeds 45 percent. Even where it is lower (e.g., up to 35 percent in China, Malaysia, and Thailand), the food share in inflation is still much higher than that observed in advanced economies. In contrast, in the United States and the euro area, the food share in the CPI basket is below 15 percent, and in Japan, it is below 26 percent.

Even if food prices plunge, they remain high by historic standards, and this can seriously dent the budgets of poor families in the region. This brings significant challenges to economies in Asia, which is home to two-thirds of the

![Figure 14.3](chart.png)

**Figure 14.3** Share of Food Expenditures in Total Household Expenditure (Percent)

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... world’s poor (Wan and Sebastian, 2011). Food price variations bring distributional issues to the forefront of economic policy as governments seek to protect the vulnerable populations, including the undernourished and hungry people. In general, the urban poor are the most affected by high prices, followed by the rural poor, especially those who do not produce any food for self-consumption. Although better protected, even farmers who are net food sellers could be adversely affected as input costs (such as fuel, fertilizers, irrigation, and transportation) rise along with food prices. With low and volatile prices, farmers will be unable to recover their investments.

As noted earlier, according to ADB estimates, a 10 percent increase in domestic food prices would increase the poverty rate in developing Asia from 27 percent to 29 percent, based on a $1.25 a day poverty line (see Figure 14.4 and ADB, 2011a). In low- and middle-income countries across the world, food price increases may have pushed about 44 million more people into poverty in 2011 in comparison with 105 million in 2008 (Ivanic, Martin, and Zaman, 2011). By 2012, an additional 31 million people in low-income countries may fall into

### Table 14.1

<table>
<thead>
<tr>
<th>Economy</th>
<th>Share</th>
<th>Economy</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>58.8</td>
<td>Indonesia</td>
<td>36.2</td>
</tr>
<tr>
<td>India</td>
<td>46.2</td>
<td>Thailand</td>
<td>33.0</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>45.5</td>
<td>Malaysia</td>
<td>30.3</td>
</tr>
<tr>
<td>Cambodia</td>
<td>44.8</td>
<td>China</td>
<td>30.2</td>
</tr>
<tr>
<td>Pakistan</td>
<td>40.3</td>
<td>United States</td>
<td>14.8</td>
</tr>
<tr>
<td>Vietnam</td>
<td>39.9</td>
<td>Euro area</td>
<td>14.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>39.0</td>
<td>Japan</td>
<td>25.9</td>
</tr>
</tbody>
</table>


**Figure 14.4**  Food Inflation Could Lead to Rising Poverty

poverty with higher food prices (IMF, 2011). The affected populations would include middle-income earners as well. Such impacts on local populations can create a serious political problem for authorities as reflected in social unrest and protests in many countries following the 2007–08 food price crisis. Predictably, governments across Asia spend large sums of money to control the problem.

Impact on Fiscal Costs

Concomitant with the rise in international food prices and rapid growth in the region, the first half of 2011 saw intensifying price pressures in Asia. As Figure 14.5 shows, domestic rice and wheat prices in many economies have followed the rise in international grain prices. However, the effect is muted compared to the situation that would have occurred had the countries allowed complete pass-through of global food prices to domestic markets. Local prices would have been higher in the absence of aggressive fiscal interventions (such as higher subsidies and lower taxes and tariffs on food) that Asian governments implemented.

Figure 14.5  Increase in Domestic Prices of Rice and Wheat, November 2011 (Percent, year over year)

Source: Asian Development Bank staff calculations using the Food and Agriculture Organization’s Global Price Monitor.

Note: International rice price (Thai 100 percent Grade B); international wheat price (U.S. hard red winter).

Based on commodity futures options, this scenario assumes that relative to the World Economic Outlook baseline scenario as of September 2011, food prices would increase by 25 percent in 2011 and 31 percent in 2012, fuel prices by 21 percent in 2011 and 48 percent in 2012, and metals prices by 21 percent in 2011 and 36 percent in 2012.

While in most countries the domestic price rise remains relatively subdued, in a limited number of countries, the rise in domestic prices is outpacing that in international prices due to local supply and demand factors.
in the wake of the food price spikes. Although the global price pressures have subsided, the levels of domestic food prices in general remain high.

To protect the poor from the high food prices, governments adopt a variety of fiscal instruments such as higher subsidies, lower food taxes and tariffs, and scaled-up public transfers. For example, food and fertilizer subsidies make up the bulk of nonenergy subsidies in Indonesia. In 2008, at the peak of food prices, they accounted for 0.56 percent of GDP (Table 14.2). Food subsidies multiplied almost three times within a span of four years between 2006 and 2010, while fertilizer subsidies rose by close to six times during the same period. The fertilizer subsidy alone accounts for more than double the budget of the Ministry of Agriculture at the Indonesian central government level.

In India, food and fertilizer subsidies reached 2.2 percent of GDP in the fiscal year 2008/09 (Table 14.3). These subsidies increased sharply in the last six years, increasing from 415 billion rupees (Rs) in 2005/06 to over Rs 1 trillion in 2010/11. The current figure is a marked reduction from 2008/09, which showed food and fertilizer subsidies shooting up to Rs 120 trillion from the earlier-year figure of Rs 638 billion due to skyrocketing prices. To contain the costs, the government is considering various directions for reforming its food subsidy program.

In the Philippines, the expenditures of the National Food Authority—which is mandated to control domestic rice prices—amounted to about 1.5 percent of GDP in 2010. Reforms are currently being undertaken in the Authority, which has long been criticized for being inefficient in the performance of its mandate. In 2010, it incurred an income loss of more than 30 billion Philippine pesos. These figures suggest serious leakage and undercoverage problems in the program. Although the government has tried to improve targeting by limiting rice distribution to only Family Access cardholders, considerable leakages and exclusions remain due to the lack of household-level data needed for identifying eligible beneficiaries (Usui, 2011). These large fiscal interventions have unintended

| TABLE 14.2
| Food and Fertilizer Subsidies in Indonesia (Percent of GDP) |
|----------------|----------------|
|                | 2006  | 2007  | 2008  | 2009  | 2010  |
| Food subsidy   | 0.16  | 0.17  | 0.24  | 0.23  | 0.24  |
| Fertilizer subsidy | 0.09  | 0.16  | 0.31  | 0.33  | 0.29  |
| Food and fertilizer subsidies | 0.25  | 0.33  | 0.55  | 0.56  | 0.52  |


| TABLE 14.3
| Food and Fertilizer Subsidies in India (Percent of GDP) |
|----------------|----------------|
| Food subsidy   | 0.6   | 0.6   | 0.6   | 0.8   | 0.9   | 0.7   |
| Fertilizer subsidy | 0.5   | 0.6   | 0.7   | 1.4   | 0.8   | 0.6   |
| Food and fertilizer subsidies | 1.1   | 1.2   | 1.3   | 2.2   | 1.7   | 1.3   |

negative side effects, such as pilferage and smuggling of food and embezzlement of funds.

**Macroeconomic Impacts on Asian Economies**

Undoubtedly, high food prices have contributed heavily to general inflation in Asia because of the high share of food in CPI (Figure 14.6). The effect is particularly noticeable in Bangladesh, China, Sri Lanka, and Thailand, where food price inflation accounted for more than 60 percent of the CPI inflation. Because food cannot be substituted with other goods, its high contribution to general inflation adds further to the misery of the poor. Commodity price stability is important from a broader macroeconomic perspective because volatility in one commodity price can spill over to other commodities (e.g., from wheat to rice or from fuel to food, as seen over the duration of 2011), thereby increasing uncertainty throughout the economy.

Rising food prices not only have fueled inflation, but are also expected to affect growth in developing Asia. To estimate the level of their impacts in 2012 and 2013, we carried out a simulation analysis using the Oxford Economics Global Macro Model, which is a quarterly linked international macroeconomic model. The model comprises 44 country models that are fully interlinked via trade, prices, exchange rates, and interest rates and divided into six trading blocs to complete the world coverage. The blocs of world variables include oil and commodity prices, world GDP, and industrial production, among others. In the country models, functional forms of equations are identical in structure, but the bigger models incorporate greater disaggregation and more financial sector detail. The macroeconomic approach provides both forecasting and policy analysis tools. As a

![Figure 14.6 Contributions to CPI Inflation, January 2011–Present (Percentage points)](image-url)

*Source: CEIC Data Company.*

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general equilibrium model, it traces the economy-wide effects of exogenous shocks and allows for endogenous monetary policy responses to shocks. It generates projections of key economic variables for 10 developing Asian economies: the People's Republic of China, Hong Kong SAR, India, Indonesia, the Republic of Korea, Malaysia, the Philippines, Singapore, Taiwan Province of China, and Thailand.

Our estimates show that domestic inflation is expected to pick up with the increase in global food prices. In particular, in India and Singapore, it is likely to result in an increase in the inflation rate in 2012 larger than half a percentage point (Table 14.4). In the absence of a domestic agriculture sector, Singapore’s economy is completely reliant on the global market for food, whereas India’s inflation is mostly homegrown. Likewise, a 10 percent increase in global food prices would decrease real GDP growth of developing Asian countries by 0.06 to 0.61 percentage points in 2012. The smallest growth impact would likely be seen in more self-dependent countries such as China and India, while Singapore would once again be the worst affected from a global price rise.

**TABLE 14.4**

| Inflation and Growth Effects in Developing Asia (Percentage Point Change from 2011) |
|---------------------------------|---------------------------------|
|                                | Inflation                      | Growth                          |
|                                | 2012   | 2013   | 2012   | 2013   |
| China                          | 0.28   | 0.19   | -0.06  | -0.07  |
| Hong Kong SAR                  | 0.16   | 0.33   | -0.11  | -0.11  |
| Korea, Rep. of                | 0.12   | 0.05   | -0.12  | 0.12   |
| Taiwan Province of China       | 0.16   | 0.07   | -0.24  | 0.23   |
| India                          | 0.69   | 0.35   | -0.06  | -0.20  |
| Indonesia                      | 0.34   | 0.20   | -0.11  | -0.18  |
| Malaysia                       | 0.36   | 0.17   | -0.10  | -0.19  |
| Philippines                    | 0.39   | 0.20   | -0.18  | -0.11  |
| Singapore                      | 0.66   | 0.37   | -0.61  | -0.73  |
| Thailand                       | 0.36   | 0.19   | -0.11  | -0.13  |


**STRUCTURAL CONSTRAINTS, CHALLENGES, AND NEW POLICY IMPERATIVES**

Changes in price trends are affected by factors different from those influencing price volatility. The distributional consequences of and appropriate policy responses to address price trends and volatility therefore differ as well. This

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5 In this model, the price transmission mechanism and monetary policy are endogenous. It is assumed that there is 100 percent pass-through of world prices in importing countries and that interest rates in Asia are determined so as to bring inflation rates within a band around a target.

6 Positive effects on GDP growth by the Republic of Korea and Taiwan Province of China for 2013 are driven by subdued inflationary impacts in their economies.
section examines policy priorities arising from the constraints and challenges faced by developing Asian economies. To stay focused on the most important policy choices, we have selectively chosen what seemed to be the crucial areas in which the Asian experience can contribute to global decision making. These choices, of course, need to be supplemented with the usual policy and institutional reforms to reduce distortions, create a level playing field, and increase economic efficiency.

**Restore Confidence in Global Food Trade**

To protect their populations from erratic world price movements, many countries have implemented trade barriers and begun focusing on inward-looking self-sufficiency initiatives. However, acting in self-interest, the authorities do not realize that such protectionist policies have a direct spillover effect on global prices.

High and volatile world market prices generate panic herd behavior by both exporting and importing countries. For instance, in the wake of the 2008 food price crisis, at least 30 exporters imposed export restrictions or bans on agricultural commodities, especially on rice. At the same time, 84 low- and middle-income importing countries reduced food taxes and tariffs (IMF, 2008). More recently, Brunei Darussalam increased its rice self-sufficiency target from a low of 3 percent to 60 percent. The Philippines is also targeting total rice self-sufficiency by 2015.

Domestic insulation policies cause inefficiencies and increase food price volatility further, both globally and nationally. When world prices are high, export restrictions to protect domestic consumers create distortions, deprive domestic producers of the gains from higher export prices, and exacerbate the problem of high world prices. Likewise, if domestic farmers are shielded from world price volatility by an increase in tariffs when world prices are low, they indiscriminately harm all domestic consumers by raising local market prices and distort price signals. In contrast, tariff reductions can help reduce inefficient trade distortions and mitigate price increases. There is evidence that food price volatility has been higher in periods when trade has been impeded, such as during the World War I and World War II and the breakdown of the Bretton Woods regime in the 1970s. Martin and Anderson (Chapter 17) note that during the price spikes in 2006–08, 45 percent of the increase in rice prices and 30 percent in wheat prices could be attributed to insulating behavior of individual governments.

If exporters impose export restrictions and importers reduce tariffs to insulate their domestic markets completely from world markets, then the net effect is to simply raise world prices (see Chapter 17). Coordination failures through such antitrade policies are also a typical example of a zero-sum game with poor countries like the sub-Saharan African economies (which import more than half of their rice from Asia) being most adversely affected. Lifting trade bans and promoting multilateral negotiations such as the Doha Round is an important step toward restoring confidence in food trade. Although trade liberalization may
expose countries to external vulnerability, evidence shows that progressive dismantling of barriers against international trade has been an important source for the rise of Asian economies as key players on the international scene (ADB, 2011c). Though conclusion of the Doha Round may not reduce food prices in the short term, it will advance efficient agricultural production in the long term and boost global growth.

**Rechannel Public Spending**

We previously noted that fiscal costs of shielding consumers from global price effects are significant and have many unintended side effects. In developing Asian economies, social safety net programs are usually riddled with problems of leakage, poor targeting, and inefficiencies in operation. The poor targeting of program beneficiaries leads to high levels of inclusion (unintended households are included as beneficiaries) and exclusion (intended households are excluded as beneficiaries) errors, limiting overall impacts of the programs funded by scarce public resources.

For example, India spends over 2 percent of its GDP on various antipoverty and social protection programs, amounting to 40 percent of the annual rural poverty line in 2004–05 (World Bank, 2011). Yet despite several reforms, the poor are not able to reap the full benefits of such large investments because of weak design of the programs and limited administrative capacity of state governments. Moreover, allocations of social protection funds to state governments are regressive. In the Philippines in 2009, over 60 social protection programs were in place and implemented by as many as 20 agencies, which resulted in poor coordination among the implementing agencies and duplication of program beneficiaries. A recent study shows that 31 percent of the lowest income quintile is not able to access the programs, whereas 12 percent of the highest income quintile has accessed the programs (Reyes, Sobreviñas, and de Jesus, 2010). Moreover, 36 percent of the poor do not benefit from the programs, whereas 49 percent of the beneficiaries are not poor. Additionally, geographic distribution of subsidized rice is not sensitive to regional poverty incidence. The leakage rate in the urban national capital region at 87.8 percent is the highest in the country. Poorly designed subsidies in the two countries are characterized by leakages to the rich, large diversions of food from the system, and excess costs arising from inefficiencies, tremendously reducing their effectiveness (Jha and Ramaswami, 2012). Given such economic waste, even if inclusion errors were minimized to zero, the share of the poor would rise to at most 35 percent in the Philippines and 29 percent in India.

Governments thus need to think of better ways to help the poor. In the short term, such measures could include replacing general subsidies with integrated social safety nets, which can reach the poor more efficiently and effectively. These include subsidies targeted to the poor (e.g., cash transfers, school lunch programs, food for work, and food stamps), geographical targeting, self-targeted programs subsidizing items that are disproportionately consumed by the poor, and programs for vulnerable populations based on their socioeconomic and
demographic characteristics, such as the elderly, children, or the unemployed. Implementation of targeted transfer programs can, however, be challenging. Weak institutions and inadequate administrative capacity hinder the implementation of mechanisms to protect the poor.

The best option in the longer term is to develop well-targeted social safety nets that can protect vulnerable households in the face of rising prices. Indexing the program benefits to inflation will ensure automatic compensation to the poor when prices rise. Implementation of such programs, however, requires development of administrative capacity. In the interim, Asian economies are increasingly adopting conditional cash transfer programs. To achieve the expected goals, such programs should be designed carefully for better targeting, higher delivery capacity, effective implementation, and careful monitoring and evaluation.

In the longer term, there is also a need for expenditure shifting from general subsidies toward more public investment for the agriculture and food sectors (irrigation water management, transport and trade logistics, regional emergency reserves, and food supply chains). Additionally, farm support programs can help increase output if they are carefully designed and focus on increasing the productivity of small farmers. Reorienting public expenditure obviously creates competition for scarce fiscal resources but promises more economic efficiency and better distributional gains in return.

**COOPERATE TO MAINTAIN AND MANAGE REGIONAL GRAIN RESERVES**

To address rising food price volatility, grain reserve management has become an important agenda item in the G-20 discussion. In this context, the Asian experience has a few lessons to offer. Asia has a long history of emergency grain reserve management based on the premise that a permanent regional cooperation mechanism for managing food reserves could serve as the region’s insurance in times of food crises.

Following a spate of unexpected instabilities in supply and production, members of the Association of Southeast Asian Nations (ASEAN) agreed in 1979 to establish an ASEAN Emergency Rice Reserve (AERR). The reserve consisted of voluntary national food security stocks earmarked to address food emergencies. A country experiencing a food emergency was defined as one “having suffered extreme and unexpected natural or man-induced calamity, which is unable to cope with such state or condition through its national reserve and is unable to procure the needed supply through normal trade” (Briones, 2011). Members earmarked 50,000 tons from their national food stocks that could be released via bilateral negotiations. However, this instrument could never be used due to flaws in its design and ineffective operational mechanisms. For instance, despite a severe rice shortage in 1997, Indonesia was unable to take advantage of the tool (Daño, 2006). Similar regional emergency reserves were held at different time periods in other parts of the world, including the International Emergency Food
Distributional Consequences and Policy Responses to Food Price Inflation in Developing Asia

Reserve established by the World Food Programme in the 1970s and the South Asia Association for Regional Cooperation Food Security Reserve in the 1980s. Each of these cooperation arrangements, however, failed because they turned out to be expensive and ineffective (Wright, 2009; Briones, 2011). Some of the factors contributing to the failures were a large share of contributions tied to specific commodities and emergencies, the small size of the reserves, cumbersome delivery procedures, lack of funds for the secretariat, and bilateral negotiations that faced opposing pressures from food-exporting and -importing countries.

Also, with greater openness to trade following the WTO agreements, the importance of domestic buffer stocks for price stabilization has diminished for both exporting and importing countries, while variable levies have emerged as an alternative option to stabilize domestic prices. This is reflected in the declining levels of global food stocks over recent years. More open trade means that domestic crop shortfalls can be compensated for by buying on world markets. Likewise, excess production in the domestic economy can be exported. Access to higher international trade thus facilitates price stabilization within individual countries without their holding large buffer stocks.

However, repeated occurrence of simultaneous weather shocks in several countries across the world has reignited an interest and provoked governments to reexamine the merits of holding stocks. In particular, the G-20 Agriculture Ministers agreed at their meeting in June 2010 to pilot small regional emergency food reserves that could be used to replenish national safety net buffers. Learning from past experiences and to address the shortcomings, in 2004, ASEAN+3 countries initiated a pilot project, the East Asian Emergency Rice Reserve (EAERR). The project was planned as a mutual assistance system to share rice stocks among the 13 ASEAN+3 countries and to contribute to price stability of rice in the region (ASEAN, 2009). It was initially established for a three-year period, but was subsequently extended to 2010. A project steering committee that reported to the ASEAN+3 was tasked with oversight, and day-to-day management was vested in a management team (Briones, 2011).

Reserves were composed of earmarked reserves (under AERR), now totaling 787,000 tons, and stockpiled reserves (rice stocks or in-kind donations to the rice reserve). Releases from the earmarked reserves could be made on grant terms under a special commercial transaction, governed by a loan or grant agreement from the earmarking country, or to meet the acute emergency needs of disaster victims. Some of these mechanisms were successfully pilot tested. Based on the favorable experience of the EAERR pilot project, the establishment of a permanent reserve scheme called the ASEAN+3 Emergency Rice Reserve (APTERR) is now underway.

7 Unlike buffer stocks that are held to stabilize food prices within a price band, much like open market operations by central banks, emergency stocks are held during normal times for use when prices go beyond an unacceptable limit due to an emergency situation.
8 ASEAN+3 comprises the 10 ASEAN member states, plus China, Japan, and the Republic of Korea.
APTERR provides for a permanent institutional framework—a governing council consisting of country representatives, decision making by consensus, and a secretariat to undertake day-to-day management of the reserve program. The agreement also provides for financial contributions for the regular support of APTERR’s overhead costs.

The new structure of EAERR was built on the lessons learned from past failures in establishing well-functioning reserve mechanisms. Among those, three lessons stand out for designing such tools in the future:

1. The reserves should be sufficiently large to address great needs.
2. The price determination mechanism matters. In the previous case of AERR, bilateral negotiations between exporters and importers did not work because of political constraints, which meant that the negotiated price could not be different from the market price. This obviously led to the criticism that the scheme was not very useful. Thus, to avoid political pressure, the system had to be redesigned. A multilateral price determination mechanism was introduced and an EAERR secretariat set up to facilitate decision making by consensus.
3. Such emergency reserve stocks cannot be a panacea for disasters of all scales. Rather, there should be more realistic expectation from reserve stock management, which is a tool good mainly for idiosyncratic country-specific shocks, not for large-scale or systemic global or regional calamities.

Enhance Agricultural Productivity and Improve Supply Chains

Asian agriculture suffers from low TFP growth. Data from 116 countries from 1961 to 2001 show that while the global production frontier in agriculture has advanced rapidly, agricultural TFP growth in all developing regions has been falling away from the frontier (Hertel, Ludena, and Golub, 2006). Low agricultural labor productivity and persistent gaps in yield (output per hectare of land), reflecting the difference between potential and actual yields, have become critical binding constraints in improving food production in Asia.

Poor countries typically have the largest share of labor hours in agriculture, while rich countries have the smallest share (Duarte and Restuccia, 2010). As less-developed countries advance through structural transformation over time, there is a systematic fall in the share of labor allocated to agriculture and an increase in shares of employment in the industrial and service sectors. With the movement of surplus labor out of agriculture, labor productivity rises. In China, India, and some other Asian countries, high-productivity employment opportunities have expanded and structural change has contributed to overall growth (McMillan and Rodrik, 2011). Yet agriculture constitutes the main source of employment in many economies of the region, absorbing as much as 40 to 60 percent of the labor force. Gaps in labor productivity between different sectors,
therefore, continue to be large, and this ensures significant potential for rapid economic growth.

Similarly, average yields of staples rice and wheat in much of the region remain far below potential levels (Cassman, 1999; Jha, Srinivasan, and Landes, 2007; Godfray and others, 2010). Only three developing Asian countries among the top 10 rice producers in the world—China, Indonesia, and Vietnam—were able to surpass average global yields over the past decade. ADB (2011a) estimates have shown that if the yields in the six major rice-producing countries (Bangladesh, Brazil, India, Myanmar, the Philippines, and Thailand) that are below the global mean could be raised to just the world average, global rice production would increase by more than 10 percent. If, however, yields of these six countries could match the maximum global yield, worldwide rice production would expand by a whopping 170 percent.

Market imperfections, distortions, and weak public incentives, however, keep these economies far below the attainable productivity frontier. Therefore, exploiting the productivity potential depends on many factors and will not be easy. It will require reforms, diversification, and structural change (Hausmann, Rodrick, and Velasco, 2005). Indeed, agricultural productivity growth has accelerated in developing regions that undertook substantial economic reforms (Hertel, Ludena, and Golub, 2006). Another important cause of low productivity growth is low rates of adoption of modern agricultural technology, which can accelerate the process of structural transformation. In contrast, agricultural investment, which is essential in improving productivity, has been neglected by both individual governments and donor agencies, owing partly to a relatively flat trend in global food prices between 1960 and 2000. For example, between 2004 and 2010, agriculture’s share of total investment varied between only 6 and 9 percent for India, while it was barely 2 to 3 percent for the China. Likewise, the share of agriculture in official donor aid saw a steep declining trend from about 20 percent in early 1980s to just about 4 percent by the mid-2000s before the food price crisis struck.

The rapidly dwindling world food stock position will not support the growing demand over the long term unless sustainable food production and supply-augmenting measures are implemented on a war footing. Indeed, one of the key G-20 recommendations is to improve agricultural production and productivity. Increasing agricultural productivity in low-income countries by narrowing the yield gap, expanding cultivated areas, and facilitating structural change can greatly improve rural incomes and enhance long-term food security.

However, focusing on the farm sector alone will be inadequate to ensure food security. Weak marketing infrastructure (processing, storage, transport) and lack of market access keep the prices of inputs and the cost of moving agricultural produce to markets high. This reduces returns to farmers and increases food prices. Increasing yields and closing labor productivity gaps alone will therefore not bring all of their potential benefits to farmers and consumers unless post-harvest facilities and the food supply chain are improved to reduce waste and transform the food processing and distribution systems. Without the facilitating measures for market access and complementary investment to cater to the world
market, larger production will simply translate into excessive inventories with falling prices and little net value added (Jha and others, 2010).

Through an organized system of exchange from production to consumption, the value chain can increase the value and competitiveness of agricultural products. This seems to be an attainable goal. Indeed, postharvest losses could be reduced to a third by shifting from traditional to mechanized systems (Gummert, 2011). In addition, 50 to 70 percent of Asian consumers’ cost of food is formed in the post-farm-gate segments of food chains. This implies that the need for research and development is not just at the farm level (which was the case during the green revolution era), but also through the whole food supply chain. Improving supply chains has another benefit in terms of absorbing surplus farm labor into nonfarm employment, which is yet another means of enhancing labor productivity.

SUMMARY AND CONCLUDING REMARKS

Not only has the food price surge that began in 2007–08 and, after subsiding briefly, picked up speed again in 2010–11 continued its upward movement, but prices have also become more volatile. These movements have brought significant policy challenges to economies in Asia, where two-thirds of the world’s poor live. The Asian poor spend large fractions of their income on food in comparison with the rich, and therefore rising food prices act as a regressive tax. Furthermore, due to the high share of food in CPI, food prices have contributed heavily to general inflation in Asia compared to advanced economies. Rapidly rising and volatile food prices increase poverty, inequality, and social unrest. Our estimates show that if food prices continue their recent trends, they will add further to inflation in 2012 by between 0.12 and 0.69 percentage points and cut growth by between 0.06 and 0.61 percentage points across developing Asian economies.

To counter food price inflation, many countries in the region have imposed trade barriers and focused attention on inward-looking self-sufficiency policies. However, national policies that insulate domestic markets from world markets increase global food price volatility even more, as evidenced through 2010 and 2011. Restoring confidence in global food trade and discouraging governments from resorting to such market-distorting policies is crucial for reducing market volatility.

At the regional level, repeated incidents of bad weather across the world have reignited an interest in holding emergency grain reserves. This is a plausible avenue to address idiosyncratic price shocks in individual countries. Emergency reserves can supplement domestic buffer stocks but not replace them. Asia offers a long and rich experience with such reserves that could significantly contribute to the ongoing G-20 discussions.

As Asian governments seek to protect their vulnerable populations from the impact of higher and volatile food prices through subsidies and safety net programs, they add significantly to their fiscal costs. On the positive side, though,
these expenses have helped to limit the pass-through of international prices to
domestic markets; local prices would have been even higher in the absence of such
public spending. However, these interventions have also had unintended side
effects through pilferage, smuggling, and embezzlement of scarce public resourc-
es. To reduce the problems of leakage and poor targeting, governments should
focus on designing efficient and well-targeted safety net mechanisms.

In the longer term, increasing productivity is the key to enhancing food secu-
rity through higher supplies. That is, investment in agriculture must increase,
because inadequate marketing infrastructure and lack of market access reduce
returns to farmers and increase food prices. But focusing only on research and
development and agricultural infrastructure in the farm sector will not suffice.
Countries must focus on the whole supply chain that transfers food from the farm
gate to the food plate of both domestic and foreign consumers. Indeed, invest-
ment in postharvest technology should be implemented quickly.

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CHAPTER 15

Mexico’s Oil Price–Hedging Program

JAVIER DUCLAUD AND GERARDO GARCÍA

INTRODUCTION

In 2008, on the brink of the worst financial crisis in decades, West Texas Intermediate (WTI) oil prices plummeted from their peak levels above US$140 per barrel to about US$40 in less than six months. For commodity-exporting countries like Mexico, for which oil revenues represent a substantial portion of total government income, a drop in oil prices of that magnitude could have compromised the public balances of the government and destabilized the economy. However, as it had done on several occasions in the past, Mexico had implemented an oil-hedging program, precisely to buy insurance against an adverse scenario such as the one that it eventually faced. The profits generated by the hedge proved to be a key compensating source of income for the government and greatly contributed to the stabilization of the domestic financial markets in Mexico. In fact, at some point during the crisis, the marked-to-market value of the program was close to $10 billion, an amount that was made public to anchor expectations with regard to the strength of Mexico’s public finances and balance of payments.

BACKGROUND

Oil Industry in Mexico

The oil industry has been extremely important for the Mexican economy over the years. In the 1980s, oil represented more than half of total exports. Nevertheless, the structural reforms implemented during the last decades, particularly those in relation to the negotiation of the North American Free Trade Agreement (NAFTA) with the United States and Canada, greatly reduced the dependency of the Mexican economy on oil exports (Figures 15.1 and 15.2). Indeed, NAFTA has largely benefited the non-oil sector, which has expanded vigorously. As a result, today’s oil price movements do not represent a major source of

The views, analysis, and opinions expressed in this chapter are those of the authors and should not be considered to imply official policy or views of Banco de México.
vulnerability to the balance of payments. Nonetheless, in spite of several tax reforms, public finances are still highly dependent on oil-related revenues, representing more than 30 percent of total government income.

**Oil Income Stabilization Fund**

To reduce the vulnerabilities posed by such dependence, the Mexican government has implemented several oil-hedging programs since the 1990s and also constituted an Oil Income Stabilization Fund (Fondo de Estabilización de los Ingresos Petroleros, or FEIP) in 2000.
The FEIP is a public trust created by the Undersecretary of Finance and Public Credit under direct orders from the Ministry of Finance. Its objective is to reduce the effects on public finances and the economy that result from a gap between the actual oil revenues and those established in the Federal Income Law. This might be the result of either a decline in oil prices and production volume or an extreme movement in the peso-dollar exchange rate.¹

The trust was initially funded by contributions from the federal government and grew significantly until 2008 with the windfalls of the oil industry as energy prices reached historically high levels. Nonetheless, as the financial crisis deepened, the capital of the fund was used to compensate for budget gaps and helped to cover expenses of programs authorized in the federal budget of the following fiscal years. Table 15.1 describes in more detail the source and use of FEIP funds.

Although the FEIP has served its main purpose, it is important to recognize that its size and scope are limited when compared to other countries’ stabilization funds. In fact, the small size of the FEIP, relative to the size of the Mexican economy and the importance of the oil industry in Mexico, argues in favor of an oil-hedging program to self-insure against adverse movements in oil prices (Figure 15.3).

### OIL-HEDGING PROGRAM

**Governance Structure**

The oil-hedging program is executed through the FEIP. The fund’s operation is the responsibility of a technical committee formed by officials from the Ministry of Finance. Among its responsibilities, the committee decides whether an oil price-hedging program will be implemented, and if so, it also defines the amount of resources that would be available to purchase the hedging instruments.

An oil price-hedging subcommittee that groups technical experts from the Ministry of Finance, the Mexican State Oil Company (Petróleos Mexicanos, or PEMEX), the Ministry of Energy, and the Central Bank of Mexico (Banco de México) determines the characteristics of the hedging instruments to be used and coordinates the execution of the hedge itself. Banco de México, being the financial agent of the federal government and building on its infrastructure and expertise in regard to international financial markets, is directly responsible for the hedge’s actual implementation.

¹ Objectives of the FEIP were published in the *Mexican Official Journal* in May 2007.
There are various reasons that explain why Banco de México has executed the hedging program on behalf of the Mexican government. First and foremost, the central bank has the experience and infrastructure to actively participate in international financial markets, mainly as a result of its responsibility to invest the country’s international reserves. This infrastructure includes not only information technology and operational capabilities, but also a highly skilled staff that has a thorough understanding of the functioning of financial markets. Throughout the years, Banco de México has gained experience in its investment of the international reserve portfolio, in addition to other hedging programs it has implemented on behalf of the government in other asset classes such as interest rate and foreign exchange products. This has given the bank a comparative advantage relative to other government agencies. Furthermore, the bank has more experience in selecting counterparties and in setting up the legal framework for the hedging program.

From an execution standpoint, having a flexible approach to minimize the impact of the program in the financial markets has proven to be very important. Therefore, the bank’s staff has developed a framework to optimize the execution of the hedging strategies, mainly by trading under good liquidity conditions and by being patient and staying away from the markets in unfavorable circumstances (i.e., a sudden increase in implied volatilities of the put options). Finally, Banco de México has probably the strongest governance structure among public institutions in Mexico, which guarantees that the execution of the program is carried out with transparency and efficiency.

**Figure 15.3** Mexico: Oil Income Stabilization Fund (*Year-end balance, billions of U.S. dollars*)

Source: Ministry of Finance.
BOX 15.1 Important Steps before the Execution of the Hedging Program

Selection of Counterparties

The execution of the hedging program is challenging, so particular attention must be placed on selecting counterparties and on avoiding any potential impact of their execution on the hedging program’s cost.

The process of selecting counterparties usually starts with a comprehensive analysis of the daily market coverage of potential counterparties by the central bank’s operations staff. Several institutions are important participants in the commodities markets, but their clients’ coverage, including their daily market commentaries, research, strategy, and comments on specific markets, is still an important factor in dictating which institutions are leaders in the market and thus will be considered for the execution of the hedging program. Given that the program involves transacting complex financial derivatives, it is also important to understand the intermediaries’ valuation methodologies, modeling techniques, and risk-hedging strategies. In doing so, Banco de México gets a clearer picture of which institutions have an in-depth knowledge of the hedging vehicles that will be traded and on their strategies to absorb risk or transfer it to other market participants. Having a full understanding of the counterparties’ trading platforms is also relevant because a deeper infrastructure may give institutions the ability to manage risk more efficiently and become more competitive (leaders in the commodities markets have large financial platforms and large physical trading capabilities).

Assessing the ability of the institution to warehouse risk and to be competitive on a consistent basis is more complicated and usually requires a direct and open dialogue with the firms, preferably at a higher level in the organization. The fact that the hedging program might be implemented on a continuous basis is important because it lines up the incentives for counterparties to be consistent in service and pricing if they want to be considered for the execution of the program in the years ahead.

Setting Up the Legal Framework

The definition of legal contracts to engage in the hedging program is also indispensable. Banco de México’s activities with its counterparties are governed by an International Securities Dealers Association (ISDA) agreement. One of the main objectives of having ISDA contracts is to reduce the credit risk by establishing collateral management policies. Other important benefits include having legal certainty on what could constitute a credit event or an event of default and what would be the legal proceedings to follow under such circumstances.

Execution of the Oil-Hedging Program

The objective of the oil price–hedging program is to hedge the value of Mexican oil exports at a price that is consistent with the one determined in the federal budget law for any given fiscal year.

The program has evolved significantly during the last years as new markets have developed and liquidity conditions have improved. Taking advantage of these structural changes, the Mexican oil price–hedging program has also
evolved to better suit the needs of the Mexican government. For example, the hedge is now more precise and less subject to a breakdown in the correlations of the different types of crude reference prices in the market. Nevertheless, there are still significant challenges in terms of execution and price discovery. A thorough explanation of one of the hedging strategies used in recent years is given in Table 15.2.

**Options**

As previously mentioned, the execution of the oil-hedging program has evolved throughout the years. Nonetheless, the one characteristic that has remained constant is the use of put options as the main vehicle for hedging. The rationale behind using options is simple. Options cover the risk of a decline in oil prices while keeping the benefits if prices increase (see Figure 15.4).

**Asian Term Options**

Asian options have recently been a preferred alternative, because the Mexican government needs to hedge the price of its oil exports throughout the year and not only at a particular expiration date (as would be the case with European or American options). The payoff of an Asian term option is determined by the difference between the strike price and the average price of the underlying asset

![Figure 15.4](image)

**Figure 15.4  Hedging Strategy**

Source: Banco de México.

Note: Graph (a) reflects both the put option structure and the long exposure to oil prices. Graph (b) represents the final exposure to oil prices once considered the hedge. P/L: profit/loss.
over a predetermined period of time. Asian term options are particularly useful because the volume of the Mexican exports is stable (Figure 15.5), and they better match the average price at which oil exports are sold. Figure 15.6 exemplifies the benefits of Asian term options. In an oil price scenario, such as the one described in this figure, a European put option would not be exercised at

**Figure 15.5** Mexico: Monthly Oil Exports (Millions of barrels per day)
Source: Banco de México.

**Figure 15.6** Oil Price Scenario and Strike Price
Source: Banco de México.
Mexico’s Oil Price–Hedging Program

a profit, because oil prices would end up above the strike price at the end of the hedging period (despite the fact that during the life of the option oil prices were below the strike). In contrast, an Asian term option would settle at a profit, because the average oil price during the period is below the strike price, and would therefore fully compensate for the foregone revenue resulting from a lower average oil price.

Because of their averaging feature, Asian term options also have a lower implied volatility and consequently are usually less costly than American or European options. Furthermore, a one-year term option is less expensive than a strip of 12 monthly Asian term options (see Table 15.3).

**Underlying Asset**

The Mexican crude oil basket is composed of three crudes: Maya, Olmeca, and Isthmus. The first one is a heavy and sour crude, whereas the other two are lighter and sweeter, like WTI or Brent. Recently, Maya production has represented more than 80 percent of total production in Mexico.

WTI and Brent crudes are probably the most important benchmarks, and therefore, the financial derivatives referenced to these crudes are the most liquid and easiest to trade. Nonetheless, the Mexican crudes have different properties (from an energy and chemical perspective) than those of WTI or Brent, and consequently, the prices between the former and the latter can vary significantly.

One of the most important challenges of the oil price–hedging subcommittee is to weigh the costs and benefits of hedging the Mexican crude oil basket to minimize the basis risk (the risk of hedging the Mexican oil basket using WTI or Brent derivatives) at the expense of trading less liquid and less transparent derivatives against those of hedging using WTI or Brent as underlying assets at the expense of having a larger basis risk.

### Table 15.3

<table>
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<tr>
<th>Option type</th>
<th>Premium offer ($/bbl)</th>
<th>Payoff</th>
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<tbody>
<tr>
<td>Asian term settled</td>
<td>$4.18</td>
<td>One cashflow: Strike versus the arithmetic average of the daily first nearby WTI settlement prices during the term</td>
</tr>
<tr>
<td>European term settled</td>
<td>$5.21</td>
<td>One cashflow: Strike versus the settlement price of the respective WTI future on expiration date</td>
</tr>
<tr>
<td>Asian monthly</td>
<td>$5.61</td>
<td>Twelve cashflows: Strike versus the arithmetic average of the daily first nearby WTI settlement prices during the respective calendar month of the term</td>
</tr>
<tr>
<td>European monthly settled</td>
<td>$8.31</td>
<td>Twelve cashflows: Strike versus the monthly settlement price of the respective WTI future on expiration date</td>
</tr>
</tbody>
</table>

Source: Authors’ compilation.

Note: As of December 13, 2011. Indicative prices provided by a leading institution in the commodities markets; WTI: West Texas Intermediate. Reference spot price: US$100.14 per barrel. The strike ($87.50 per barrel) was set to exemplify the cost of an Asian term settled put option with a 25 delta.
West Texas Intermediate (WTI) is the most important benchmark in the crude oil market in the American continent. As such, financial derivatives with this crude as underlying are also more liquid. Nonetheless, WTI derivatives have significant drawbacks.

- Movements in WTI prices are subject to local conditions in addition to global fundamental factors. The distribution center for WTI is Cushing, Oklahoma, a location far from coasts and with limited storage capacity. Hence, a sudden buildup/drawdown of inventories can have a significant impact on pricing.

- The liquidity of WTI futures contracts, as well as the inclusion of these in broader commodity-indexed investment vehicles, has triggered a large participation of short-term investors in the WTI market. Consequently, WTI prices are also more susceptible to short-term fluctuations that affect WTI’s value relative to other crudes.

These inconveniences complicate the use of WTI derivatives to execute the hedging program. Using Brent might partially alleviate these inconveniences, but, in any case, basis risk can still be significant. Figures 15.7 and 15.8 illustrate that despite having a high correlation, the price differentials between WTI, Brent, and Maya can vary significantly through time. This was particularly obvious in 2011 when the price differentials among these three crudes were particularly high and unstable from any historical perspective.

Figure 15.7  WTI-Maya Spread and Monthly Correlation

Sources: Banco de México; Bloomberg; and Platts.

Note: m.a.: moving average; WTI: West Texas Intermediate.
**BOX 15.2 Selecting the Underlying Asset (continued)**

![Diagram showing Brent-Mayo spread and monthly correlation]

**Figure 15.8** Brent-Mayo spread and monthly correlation

*Sources: Banco de México; Bloomberg; and Platts.*

*Note: m.a.: moving average.*

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**Strike Price of the Maya Put Option**

The strike price of the option is determined in such a way that it hedges the oil reference price determined in the federal budget law for the next fiscal year. This reference price is determined from the average of the following components:

1. Average of
   - The arithmetic average of the monthly international prices for the Mexican Export Mix during the preceding 10 years.
   - The average of New York Mercantile Exchange (NYMEX) WTI future prices for at least 3 years forward, adjusted by the differential with the Mexican Export Mix.

2. 0.84 percent of the average of NYMEX WTI futures for the period that is being budgeted, adjusted by the differential with the Mexican Export Mix.

Usually, the strike price has been such that the put option to be purchased during the hedging program is an out-of-the-money (OTM) option, with a price sensitivity (delta) to the price of the underlying asset between 10 and 25 percent. This OTM feature has helped in meeting the program’s objective to hedge against extreme adverse scenarios, as well as in reducing the cost of the program (Table 15.4).

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2. The formula for the oil reference price is established in Article 31 of the Federal Law of Budget and Fiscal Accountability.

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Pricing of the Maya Put Option

As mentioned earlier, using Maya put options eliminates basis risk. However, the execution is more complicated given that there is no observable, screen-based market for Maya crude, as opposed to WTI or Brent.

The commercial branch of PEMEX, PMI, prices Maya in the international markets using an algebraic formula that includes the price of West Texas Sour crude, fuel oil, Light Louisiana Sweet crude, Dated Brent, and an adjustment factor $K$. In other words, Maya can be seen as a bundle of different energy products, and consequently, the value of a Maya put option is approximated by the cost of hedging such a bundle (Figure 15.9). However, some of these components may not have a tradable forward market, so financial institutions have to define

<table>
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<th>Strike</th>
<th>Delta</th>
<th>Premium</th>
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<td>46.45</td>
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<tr>
<td>70</td>
<td>5.89</td>
<td>$1.65</td>
</tr>
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</table>

Source: Authors’ compilation.
Note: As of December 14, 2011. Strike and premium in dollars per barrel, delta in percentage. Reference spot price: US$94.95 per barrel.

Figure 15.9 Proxy of Maya (Dollars per barrel)
Sources: Banco de México; Bloomberg.
Note: Maya = 38% WTI + 47% fuel oil + 17% Dated Brent – 4.98.

Table 15.4 Cost of WTI Put Options at Different Strike Prices

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$n^3$ The actual formula for pricing Maya crude is 0.40 (West Texas Sour crude + Fuel Oil No. 6 with a 3 percent sulfur content) + 0.10 (Light Louisiana Sweet crude + Dated Brent crude) + $K$. 

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their own methodologies to determine a Maya forward curve, to estimate the implied volatility of the Maya price, and to hedge their risks. Hence, the assessment of the value of the put option can vary significantly, which makes the price discovery process particularly challenging.

In fact, the pricing discrepancies among different counterparties can be significant, mainly under conditions of risk aversion and extreme volatility. Given these pricing difficulties, it is essential to have a good understanding of pricing models to determine which are the main drivers of the value of the option, as well as to trade with different institutions as a means of fostering competition to reduce the cost of the hedging program.

*Execution of the Hedging Program*

The execution of the hedging program is a complicated and time-consuming process that requires the full attention of a dedicated team. The objective is to minimize the cost of the hedging program; therefore, minimizing its visibility is extremely important. In doing so, the central bank also reduces the impact of its hedging activities on financial markets.

The program starts with a comprehensive analysis of the developments in the energy markets by Banco de México and the Ministry of Finance. In this process, staff from both institutions try to identify market trends, analyze new hedging vehicles or strategies, and determine the precise moment at which the put options must be purchased. A detailed analysis of the capabilities and potential price competitiveness of counterparties must be completed at this stage. This market intelligence effort is important and sets the stage for a smooth execution.

The purchase of the hedging vehicles requires a flexible hedging strategy to adapt the program to market conditions. It is the staff of Banco de México who decide the speed at which the hedging program is implemented. Sometimes, conditions in the market are such that speeding up the program might be convenient; in other circumstances, it might be preferable to adopt a more conservative approach. During the execution phase, having constant communication with counterparties is essential. Most often, these institutions have a good assessment of the liquidity and depth of the markets and can therefore offer insightful information for determining the timing, pace, and scale of the execution. The flexibility of the hedging program has allowed Banco de México to trade under favorable market conditions, including episodes of lower implied volatility and higher liquidity, thus reducing the program’s overall cost.

The actual trading of the put options by Banco de México is done in a very transparent manner. The trade is executed with the most competitive institution (lowest price). The transparency with which the hedging program is conducted, together with the strong governance structures of the Oil Income Stabilization Fund and Banco de México (as the program’s executing agent), has been essential for satisfying the information requirements of the auditing institutions of the Mexican government.
The execution of the hedging program carries important challenges. In fact, the execution has become more complex, not only because of extreme market conditions, but also because some of the particularities of the hedging program were made public in 2009.\textsuperscript{4} Press reports on the hedging program have become more frequent, and keeping the program confidential has become difficult. Most of these media reports include inaccurate information about the Mexican hedging activities, but nevertheless, they can have a negative impact on market conditions.

**Collateral Management**

Following the execution, the bank has to manage the collateral associated with the put options. The objective is to minimize counterparties’ credit risk through strict collateral and margin requirements. Such collateral management involves daily margin calls to account for the daily mark-to-market of the hedging program. In other words, if the value of the option increases, Banco de México requires additional collateral from its counterparties; in contrast, if the value of the option decreases, the central bank returns collateral in an amount that reflects the new price of the put option. Some important considerations include the definition of eligible collateral, which is often defined to include only the most liquid fixed-income securities issued by governments with highly rated credit. The definition of a threshold amount to require collateral is also relevant; a zero threshold amount reflects zero tolerance for credit risk. Some institutions might prefer to have a higher threshold amount to avoid the operational complexities of daily margin calls. For Banco de México, the most important aspect of collateral management is to make sure that in the case of a credit event or an event of default by any of the counterparties (as defined in the International Securities Dealers Associations contracts), the bank would be able to sell the collateral to cover any amount due.

Finally, the central bank is also responsible for preparing reports and presentations on the different aspects of the hedging program, including important developments on the commodities markets, the mark-to-market value of the hedging program, activity reports, and collateral position reports, among others. These documents are the official means of communication between the central bank, the oil price–hedging subcommittee, and the Ministry of Finance and also the best alternative for having a transparent record of the activities of the Oil Income Stabilization Fund for auditing-related purposes.

**Performance of the Hedging Program**

Given that large swings in oil prices can have a significant effect on public policies, it is extremely important to have a hedging program in place. The

\textsuperscript{4}The 2009 hedging program was very successful in offsetting the reduction of oil prices. It was also highly publicized.
objective of the program is to compensate for a decrease in government revenues in an adverse scenario for oil prices. Such will be the case if the options end up being in the money. However, if the options end up being out of the money, it implies that oil prices have been higher than the reference price used for the corresponding federal budget. In other words, oil income has been higher than expected.

Therefore, assessing the results of the hedging program using only the return of the hedging instruments would be misleading. There are many indirect benefits that, when factored in, favor its implementation. For instance, the hedging program has been an important element in providing certainty about the ability of Mexico to finance its current account deficit. Such certainty has had positive spillover effects on the performance of financial assets, on foreign direct investment, and more broadly, on economic growth and development. In fact, as mentioned earlier, the 2009 oil-hedging program proved to be a very important factor behind the consolidation of public finances and the resilient performance of Mexican markets in the aftermath of the financial crisis.

**FINAL COMMENTS**

The oil industry in Mexico is an important source of income for the Mexican government. Hence, the Ministry of Finance established the Oil Income Stabilization Fund in 2000. However, the small size of the fund and its limited scope relative to the size of the economy and to the importance of the oil industry argues in favor of other methods to self-insure against adverse movements in oil prices. One such alternative is the oil price–hedging program.

The objective of the program is to hedge the value of Mexican oil exports at a price that is consistent with the one determined in the federal budget law for the subsequent fiscal year. The hedging strategy is determined by the oil price–hedging subcommittee, which groups experts from the Ministry of Finance, PEMEX, the Ministry of Energy, and Banco de México. The strategy has evolved significantly throughout the years to account for new market developments and is reviewed on a continuous basis to determine the costs and benefits of new hedging vehicles or strategies. Lately, Asian term options on Maya crude have been chosen as the main hedging vehicle because these options essentially eliminate basis risk and allow the Mexican oil exports to be hedged throughout the year and not only at a particular expiration date. It is Banco de México, building on its expertise earned through the investment of its international reserve portfolio and through the execution of other hedging programs on behalf of the Mexican government, that executes the oil-hedging program.

The execution has been challenging but successful. The markets for hedging commodity prices have evolved significantly, becoming more competitive, more liquid, and deeper than before. Furthermore, the Mexican experience shows that the financial and commodities industries have evolved to allow the Mexican
government to hedge using the types of crude that Mexico produces, enhancing the efficiency of the program. Nonetheless, comprehensive reforms to increase the size and scope of the FEIP, and, above all, to diversify the sources of income of the Mexican government to make it less dependent on the oil industry must be a priority in the policymakers’ agenda in the years ahead.
PART V

What Can the International Community Do?
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INTRODUCTION

For the first time, food price volatility and food security have become major topics of international policy discussions and cooperation. Under the French presidency in 2011, the G-20 elevated these subjects as priorities, and the final declaration of the Cannes Summit in November 2011 included a number of provisions to address them. The G-20 declaration (Voituriez, 2012) was simultaneously hailed by some as usefully contributing to the issues at hand and charting a promising course of action and criticized by others for not addressing or being shy on fundamental issues such as speculation on food markets and the role of biofuels.

In fact, such an ambiguous perception naturally derives from some of the characteristics of crisis management. This chapter discusses the role of international cooperation on food security from a policy and political economy perspective, reviews some facts and controversies, and then turns to the political economy need for policy responses. The chapter ends by presenting a more normative stance on the role that the international community might usefully play and on the outcome of the G-20 in this area.

FACTS AND CONTROVERSIES

Over the last quarter of a century, food prices have risen at an unprecedented pace in real terms (compared with manufacturing prices; see Figure 16.1). The recent movement of prices highlights two potentially different issues—the level of prices and the volatility of these prices.

This chapter draws on a mission given by President Sarkozy in support of the French G-20 presidency in 2011 on how to alleviate the impact of food price volatility for developing countries. I unfortunately cannot list all the persons to whom I am indebted for very useful comments and suggestions, but I nonetheless wish to gratefully acknowledge the many discussions with colleagues at the French Development Agency; the support of Olivier Cattaneo, Emmanuel Comolet, and Pierre-Emmanuel Darpeix; and invaluable seminars organized by Patrick Guillaumont and his colleagues at the Fondation pour les études et recherches sur le développement international (FERDI).
Food Price Volatility: An International Policy Challenge?

From Figure 16.1, it appears that both the level and the volatility (or at least the amplitude of fluctuations) have increased since 2005. Volatility matters because it creates uncertainty about future prices and incomes, which can be a crucial issue for producers and for consumers. Before turning to some of the issues linked to both the price level and its volatility, it is useful to review some notions and known facts.

There are two distinct, albeit complementary, ways to approach volatility. The simplest one, which can be called “historical volatility,” looks at the observed historical time series. The volatility of any indicator is measured by the standard deviation of the time series for that indicator. When price volatility is discussed, however, two adjustments are needed. First, one generally looks at the time series of the logarithms of prices, so that the measure will be robust to changes of units. Second, it is necessary to distinguish trend movements in prices from the variability of prices around the trend. However, the identification of a trend is model dependent so that a preferred measure of price volatility will be the standard deviation of the variations of the logarithms of prices (the “returns”). Because the measure can be made on several time scales, it is generally annualized. Casual observation confirms that historical volatility has risen significantly in the recent past. In particular, the price volatility for wheat and maize rose constantly between 2004 and 2008, reaching close to 40 percent in 2008. The most spectacular rise, however, was for rice, notably due to the decision of some substantial rice exporters, such as Thailand, to ban rice exports in an attempt to improve national food security.

However, historical volatility tells little about the future evolution of prices and would be a poor measure of price unpredictability and therefore of uncertainty. There are two technical approaches to assess the implicit volatility of prices. First, one can build an econometric model of the time series to identify any systematic, predictable components of volatility and the nonpredictable part, which can be used as a measure of uncertainty. But this is model dependent and
not very robust, and it does not take into account the impact of changes in expectation regarding future events. The other approach consists of using the information drawn from derivatives prices, at least for products for which derivatives markets exist and have sufficient depth. Using the Black and Scholes price formula for options, for example, allows an estimate to be computed of future price volatility as expected by market participants. On all products for which option prices are available, the implicit volatility, thus calculated, has significantly increased over the last 10 years. Markets have clearly become more unstable.

Against this background, available studies of price behavior point to a number of stylized facts that are relevant for any policy discussion of price volatility. First, there is a positive correlation between price volatility and price level (Sarris, 2011). When the price level increases, price volatility also tends to be higher. Second, food price volatility is not a new issue, nor is it a surprising feature. The low price elasticity of both supply and demand of food products suggests that prices need to move significantly to maintain balance in the face of shocks. Since the 1700s, commodity prices have been more variable than prices of manufactured goods, and their volatility has not clearly risen since then (Jacks, O’Rourke, and Williamson, 2009). Similarly, recent research by Roache (2010) exposes a historical succession of periods of low volatility and periods of high volatility of real food prices (Figure 16.2) with volatility notably high in the wake of the two world wars, in the 1970s after the first oil shock and the demise of the Bretton Woods system, and, of course, since 2006. Roache also distinguishes high-frequency volatility movements (which include seasonal effects and climate

![Figure 16.2](image-url)
shocks) from low-frequency ones (which signal persistent changes in volatility). Periods of extreme fluctuations seem to recur periodically. In particular, the observation of real food prices over the very long term (e.g., since the end of the nineteenth century) does not seem to confirm any tendency of a rise in price volatility.

Price volatility is also time persistent—future volatility depends on the current one, so that there are volatility cycles that can be observed over long periods (Sarris, 2011). We may now be back in a cycle of high volatility. Gilbert and Morgan (2010) have documented that on average, the price volatility of agricultural commodities has been lower over the last two decades than over the two preceding ones, except in the case of rice. However, in recent years (since 2006), volatility seems to have significantly increased, notably for vegetable oils, cereals, and soybeans.

Finally, current prices depend on past prices. This autocorrelation can be explained in part by the dynamics of inventories (Deaton and Laroque, 1996), because the constitution of inventories supports current prices and smooths price shocks over several years. Even when shocks on production are independent, the existence of inventories leads to an autocorrelation of prices. The empirical observation confirms that price shocks are persistent, sometimes over several years. Cashin and McDermott (2002) found that the half-life of a shock to agricultural commodity prices (i.e., the average time needed for half of the effects to dissipate) is about 60 months. This suggests that attempts to stabilize prices around a fixed target can prove extremely costly and unsustainable. But it does not rule out the possibility of stabilizing prices around a moving average.

Controversies, however, abound and have resurfaced in the recent debates about policy options. They inevitably shape the national and international policy debate. This chapter cannot review them in adequate detail, but rather asks the question of what can be done given the existing controversies, assuming that most of them are not going to disappear. These bear on the analysis of the causes as well as the effects of price volatility. In addition to fundamental causes, such as demographic and economic growth, dietary changes, climate disasters, depletion of inventories, higher energy prices, competition from biofuel crops, and very low food stocks, speculation on agricultural markets has possibly fueled price volatility by spreading and amplifying a sense of panic (Gilbert and Morgan, 2010). But speculation is not likely to be the sole cause of the recent increase in volatility. It may also be seen as a signal that draws attention to the fact that fundamental issues have been ignored for too long. The historical recurrence of periods of high volatility suggests that there is much more to volatility than the relevance of any specific short-term cause of the recent burst. What we know, eventually, is that supply and demand are inelastic, that they may move in diverging ways, that the cushion of inventories is not always there to provide stability, that expectations of future evolutions do matter, and that there may be overshooting of prices in the restoration of market balance after any shock. But the state of academic knowledge does not allow the drawing of a precise and operational hierarchy of root causes of price volatility.
The second series of controversies addresses the impact of price volatility. Intuitively, there are two different sets of issues. One has to do with the impact of a hike in prices on poverty and vulnerability. There is little disagreement that unexpected price shocks result in increasing poverty and mainly affect the most vulnerable. However, this also says that food security is at least as much a problem of affordability as one of availability. Yet much of the attention goes to the need to increase production to feed a growing world. Although this prescription is probably valid—not the least because increased agricultural production is key to raising income levels in many predominantly rural developing economies—it misses one crucial aspect of food security, namely, the issue of food affordability for many poor households. Households tend to react to food price shocks through increased work by women and children, selling assets, an interruption of schooling and/or medical treatment, and a reduction in caloric intake. The cost of these shocks in terms of human capital is heavy, and even a transitory shock may have a permanent impact when households do not have the possibility of recapitalizing before the next crisis (Galtier, 2012).

The second set of issues deals with the impact of uncertainty (which is linked to unpredictability rather than instability; see, for example, Sarris, 2011) on producers’ decisions. This is part of a broader issue, namely, the link between volatility and growth. Jacks, O’Rourke, and Williamson (2009) have noted that there is ample microeconomic evidence that income volatility penalizes physical and human investment. There is a rich theoretical literature that provides mixed results but tends to confirm the theoretical costs of volatility in countries where financial markets are incomplete and underdeveloped, where investors are credit constrained, and where risk aversion is high (see the survey by Prakash, 2011). Fafchamps (1992) and Poulton and others (2006) have shown how volatility leads to a reduction in investments and creates a trap for poor farmers, who have to rely on themselves to feed their families and therefore concentrate their effort on self-production and staple food without the option of diversifying into higher-yield agriculture.

**CHALLENGES FOR INTERNATIONAL PUBLIC POLICY**

From 2006 to 2008, and again in 2010 and 2011, prices of food products soared to historic heights, leading to a food crisis and to food riots in many parts of the developing world. Wheat prices more than doubled between the first quarter of 2007 and the first quarter of 2008, according to the Food and Agriculture Organization (FAO). This price spike appeared as yet another feature of a crisis of global proportions, starting with the subprime and financial collapse and involving dire economic repercussions. In 2011, the food situation dramatically deteriorated in the Horn of Africa, with reports of severe food shortages in many parts of Somalia. Toward the end of 2011, there were also alarming reports about the food situation in the Sahel area, where food prices have continued to soar. Reports from international institutions have documented dramatic increases in poverty linked to the food price spike.
Policymakers and their constituents tend to focus on important issues at times of crisis (rather than at any other time). There are many reasons for this. Given the inability of the mind to focus on all issues simultaneously, it is understandable that short-term pressures will set the priorities. Short of a sense of urgency, there is ample room for debate and controversy, and any course of action will meet with strong opposition; in addition, policymakers are subject to intense media scrutiny and pressure to show that they are in charge and to provide relevant responses to issues at hand. It is therefore no surprise that the international agenda in recent years and especially during the 2011 G-20 meetings has partly been shaped by a concern over global food security.

However, the problem, namely, a widespread difficulty in accessing food products at times of rising prices—brutally revealed and amplified by the recent crisis—cannot be said to be new. Food security was at issue well before the rise in price volatility highlighted the vulnerability of poor people and made access to food even more problematic. As an example (Figure 16.3), the proportion of undernourished individuals in developing countries, as measured by the FAO, declined very substantially in the 1970s and 1980s, but this movement slowed in the mid-1990s, and the proportion seems to have plateaued around 15 percent, which implies that the number of undernourished individuals has increased since then, topping close to 1 billion people in 2011, according to early FAO estimates (the whole methodology of measurement, however, is currently under revision).

The increased attention to food security and food price volatility is therefore easily understandable (and even welcome), if not fully satisfactory, in view of the prevalence of food insecurity well before the crisis. However, acting under the pressure of a crisis may not naturally lead to addressing the longer-term underlying issues. A crisis reshuffles the respective influence of various actors (Bricas and

Figure 16.3 The Extent of Undernourishment
Source: Food and Agriculture Organization statistics online (February 2012).
Daviron, 2012), revisits old controversies, and opens new games of persuasion, building on the designation of a culprit to blame and against which possibly to ally. In this case, as in many other historical instances, the speculator became the obvious culprit, and derivatives markets were blamed; regardless of whether they were guilty of anything, they were delivering an unwelcome message of unsustainability that had not been heeded in time by earlier public policies. Naming and shaming the culprits were ways to indicate that the crisis was fully understood and straightforward to address. However, such debates may be counterproductive—they revive ideological oppositions, they point to easy culprits to blame for the current ills, they suggest quick measures against designated foes as if they were commensurate with the nature of the crisis, and they distract from attention to fundamentals.

Posturing and bickering do not make controversies disappear. There is a need and a pressure to act, but stakeholders diverge on the underlying causes and on what to do. Academic research is there to document the issues, but it seldom points to “the” correct way to interpret the situation: How much of a role did markets for derivatives play, what is the responsibility of “speculators,” how should the impact of the “financialization” of agricultural markets be assessed, and how much did biofuel production, however subsidized, contribute to tightening market conditions and to a food shortage? In many ways, these debates raise important issues. Some of them (such as biofuels and financialization) are new: There has been a dramatic evolution of international agricultural markets over the last decade, and commodities have partly evolved as a new class of financial assets. Understanding the implications does matter. Others are indeed very old, such as the potentially destabilizing role of speculation and of derivatives markets. The paradox is that derivatives were invented on agricultural markets in the second part of the nineteenth century precisely to help mitigate price uncertainty.

There was thus little chance that, under the pressure to act to respond to the crisis, policymakers and major constituencies would reach an agreement on such fundamental, albeit controversial, issues. A further difficulty is that on each of these issues, academic research will lead to nuanced views rather than universal truths and Manichean perspectives. Because of this fundamental inability to agree on the underlying causes and to enact the appropriate pieces of reform, the pressure to act and to reach agreement will generally be deflected toward dealing with the symptoms. Moreover, the public and political pressure bears on “deliverables,” that is, specific, visible, easily explainable actions that promise fast results. For example, responses to famines will have to include fundamental humanitarian components, such as food aid and transfers. They may also include measures on improving logistics for future humanitarian responses. But they are less likely to include a reflection on what might be done to avoid the next famine, that is, the underlying causes of the famine itself.

Another limitation of crisis management is that there is a great deal of pressure to announce visible and global solutions. Beyond improving the capacity for, and nature of, emergency responses, there is little room for one-size-fits-all approaches with respect to food security and price volatility. Moreover, many policy issues
are to be decided locally, rather than at the international level, so that it is unclear how and how directly the G-20, as a group, may contribute. More than a single set of approaches, there is a sort of toolbox of various market-based and policy-based instruments to deal with volatility and uncertainty. From the 1860s on, the Chicago Board of Trade introduced market-based instruments to hedge risks, such as forward contracts, futures, and options. These have been expanded considerably. More recently, insurance products have also been developed, and a new type of index-based insurance contracts has emerged.

One of the objectives of the G-20 was to facilitate the use of such instruments by developing economies. However, there are many obstacles: Entities in developing economies are constrained by size, by a lack of knowledge about market hedging and insurance instruments and about how to use them, by the costs of such instruments, and also by the fact that existing instruments may not be adapted to the nature of the risks that they face. This discrepancy between local and international risks, known as reflecting the “basis risk,” stems from many sources—exchange rate fluctuations, imperfect trade integration, specificity of the local commodities in terms of nature and quality, existence of purely domestic shocks and of additional risks linked to the local environment in terms of weather conditions, and also the state of infrastructure. The importance of the basis risk in developing economies suggests that few existing international hedging instruments may be relevant, even if there is a possibility of surmounting the other difficulties, and that only a tailor-made approach can really be valuable for these countries. The basis risk is not a theoretical curiosity; it has been empirically observed through the diversity of transmissions of international price shocks to domestic prices throughout the recent price crisis (see, for example, Daviron and others, 2011).

On the policy front, advanced economies, most notably the United States and member countries of the European Union, have developed farm policies that played a crucial role in the formidable expansion of agricultural productivity and production in the second half of the twentieth century. Over time, these policies, especially the EU common agricultural policy, have been singled out for their costs and some perverse effects linked to the distortions they entailed in regard to the functioning of national and international markets, and for the last 25 years, the main discussion has essentially been on the nature and pace of the necessary reforms. Still, they have made a major contribution, and their necessary reform was too easily interpreted as a necessary shift toward a retreat of the state and as a negation of the role of public policies.

The prevalence of exogenous risks in agriculture remains a powerful case for public policies, especially in underdeveloped countries. However, there are lessons to be drawn from our own policy interventions. They have been costly, which prevents an easy extension to developing countries, and they were in some cases based on objectives of price stabilization that were untenable and overly costly; there was a sort of confusion between targeting a price level, which may easily go against market trends, and stabilizing the movements of prices around a trend, which smoothes market signals but allows actors to heed these signals. In the
current context, there is a need to conceive of much more market-based public policies, which further points toward public-private partnerships.

Part of the disappointment expressed in the media is misplaced because it is based on a misunderstanding about what the G-20 may and should do, and this misunderstanding is unfortunately often maintained by official declarations. First and foremost, the G-20 is a political body of the highest level and therefore capable of formulating a shared vision and of providing political leadership and powerful incentives. It is therefore more of a catalyst and a facilitator than a direct decision body. The central contribution it may make is not so much in doing things as in getting things done by the myriad of relevant stakeholders, both public and private. It is in this spirit that the G-20 in 2011 focused on food price volatility.

The dilemma is how to move from a positive analysis, characterized by the few things we know, the many we do not know, and the prevalence of huge controversies (regarding the organization of markets, the role of speculation, the choice between conflicting uses of land, the demands of the environment, the impact of climate change, etc.), to a normative discussion of what the international community might do, such as through the political momentum generated by the G-20.

As argued previously, ignoring the controversies or trying to force agreement will not help; the best that can be done is to encourage more research to see whether a partial consensus can emerge occasionally. On most of the controversies, however, it is likely that both sides are right part of the time and in some circumstances. Consequently, one of the major contributions that the international community might make is to facilitate the search for local and evolving solutions rather than to try to think of a new grand design, even though the media and political pressures may push toward the latter. From this perspective, the G-20 in 2011 made very useful contributions. This chapter looks at three dimensions that received G-20 attention and may be pursued in a promising way, both in following up on the G-20 decisions in 2011 and through the G-20 meetings in Mexico and beyond.

Support Agricultural and Food Security Policies in Developing Economies

There are many reasons developing economies need consistent and coherent farm policies, connected with other public policies and with a focus on food security.1 In advanced economies, farm policies have played a key role in agricultural development, and it is hard to imagine that such development could take place in developing economies without active farm policies. The demise of such policies

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1 Alain de Janvry made this suggestion in a seminar at the Fondation pour les études et recherches sur le développement international (FERDI) on February 16, 2011. This approach can be compared to the establishment of Poverty Reduction Strategies as central coordinating mechanisms. A key for success, as argued in this chapter, is local ownership.
over recent decades has not produced success. Of course, policies may err, but it certainly does not imply that they cannot be useful. The recent succession of crises suggests that agricultural development has suffered from a lack of public policy focus, and the development simply did not happen properly on a spontaneous basis.

There are at least two central issues that need to be addressed. One is to provide vulnerable populations with an adequate safety net in the case of food price hikes such as those of 2007–09 and 2010–11. The other is to move from a crisis management mode to one of risk management and crisis prevention. The idea of crisis prevention means not only actions to try to reduce the likelihood of crises, but also a series of measures to be in a better position to face the next crisis.

However, there is a key concern in the design of policies, namely, ownership. The temptation has been great, on the donor and international community side, to approach policymaking in developing countries from a prescriptive mode, based on strong advice and even conditionality. This ignores the extent of the local actors’ commitment that is necessary to make any public policy work. It also ignores the fact that policy can improve only through a learning process that is itself locally owned: Prescriptions from the outside are not likely to translate into authentic conviction unless they are themselves part of a locally organized learning process made of trial and errors. This is why an important suggestion is to move toward a results-oriented, rather than process-oriented, framework of policy support to assist developing countries in the formulation of their own domestic policies.

There has been a significant effort in this direction by many African countries in the context of the African-led Comprehensive Africa Agriculture Development Programme (CAADP) within the New Economic Partnership for African Development (NEPAD). One of the key processes at work within CAADP is the organization of national roundtables that involve public and private actors as well as donors and lead to an agricultural development compact, a pact between donors and governments from which country investment plans can be derived.

These multistakeholder pacts must address four main pillars, namely, land and water management, market access, food supply and hunger, and agricultural research. They must also meet the targets adopted by African governments to increase public investment in agriculture to at least 10 percent of their country’s budget (according to the 2003 Maputo declaration that had also adopted the [missed] deadline of 2008) and to raise agricultural productivity by at least 6 percent.

CAADP has set up a very worthwhile process. Close to 30 countries have now established their national compacts and formulated the country investment plans. However valuable, the agricultural compacts hardly consider risk assessment and risk management. Their existence, however, provides a unique opportunity to start integrating a risk-based approach in agricultural development. This would benefit both consumers and producers and facilitate the implementation of the investment plans. NEPAD sent a request to the G-20 in September 2011 for assistance in capacity building for mainstreaming risk assessment and risk management in countries’ CAADP national agriculture investment plans, and it has
proposed to start anchoring this approach in the two regional programs adopted by the Common Market for East and Southern Africa and the Economic Community for West African States as well as with a limited number of voluntary member states in these regional communities.

Create a Joint Donor Platform for Risk Assessment and Management

Donors have individually accumulated substantial experience in risk management in agriculture. A team at the World Bank has worked on instruments and risk coverage in developing countries for many years. More recently, index insurance has received considerable attention, and a number of pilot projects have been engaged to start investigating its usefulness and relevance in developing country contexts. Swiss and Dutch cooperation has financed the creation of a website on agricultural risk management (the Forum for Agricultural Risk Management in Development or FARM\textsuperscript{D}),\textsuperscript{2} which was put in place and is administered by the World Bank. In 2008, the International Fund for Agricultural Development and the World Food Programme jointly launched a Weather Risk Management Facility. As part of the G-20 exercise, the World Bank Group’s International Finance Corporation has launched an Agricultural Price Risk Management Product, which facilitates risk hedging by entities in developing countries through a risk-sharing agreement between the corporation and major investment banks.

In cooperation with the African Union, in the context of the African Risk Capacity initiative to capitalize on the natural diversification of weather risks across Africa, the World Food Programme has developed the Africa RiskView software to translate satellite-based rainfall estimates into real-time cost estimates. The French Development Agency (AFD) has focused on lending instruments that take into account the vulnerability of developing country borrowers to external shocks. AFD’s countercyclical loan allows borrowers to benefit (on request) from five additional grace periods when facing a shock to their export receipts (defined as a fall of more than 5 percent from a five-year moving average of export receipts). There are other types of risk-mitigating instruments, such as the cotton price-smoothing mechanism also sponsored by the AFD in Burkina Faso. Risk management is therefore a lively area, and a great deal has been done already.

There are, however, several limitations to current efforts. First, there is a lack of coordination and experience sharing. There have not been systematic and shared evaluations, and it would seem very worthwhile to network on a systematic basis and on the basis of careful identification of what exists and serious evaluations of what works. This is why initiatives such as FARM\textsuperscript{D} are so valuable and should be better known, strengthened, and scaled up. There is a need for a unique location for finding information on risk management instruments, approaches, and innovations in regard to their respective benefits and shortcomings, existing and past projects, evaluations, emerging good practices, and so forth.

\textsuperscript{2}www.agriskmanagementforum.org.
Second, past initiatives were naturally based on trial pilots to test instruments and products. Although this is necessary and very informative, it is also largely supply determined: One starts from an existing hedging or insurance product and tries to assess its relevance in a developing economy context. Through evaluation, these pilots provide a better knowledge of how the various instruments may work and on how to design them so that they will meet a local demand. However, they involve a partial approach to risk management, as opposed to a holistic, demand-based approach.

Given the variety of risks faced by developing economies in terms of agricultural development and food security and given the largely idiosyncratic character of these risks, there is a need for a careful risk mapping, which would then lead to asking what kind of policy measures and what kind of instruments or combinations of instruments (such as on standardized markets or tailor made) might help manage these risks. To put it differently, advice, support, and capacity building should be provided to establish such mapping of risks, to identify the relevant approaches and instruments, and to assist countries in implementing them. This would essentially be a demand-based and locally owned approach, whose essence would not be to test instruments, but to start from the problems that the configuration of risks creates for developing countries and ask how best to manage these risks.

Third, in the same line, there is no global issue–based attempt to propose innovative approaches on issues on which there might be a strong potential interest from our developing country partners and to expand the existing toolbox of risk management instruments and approaches to orphan subjects, for which there is no easily available set of instruments or solutions. For example, can any proposal be made to better manage the price risk on rice for African rice importers?

Finally, there is no systematic approach to risk management in agriculture. It would be very useful to provide developing countries with a place to turn to in order to find information and advisory services in regard to risk assessment and management. This is why the G-20 has asked international organizations to work together to provide expertise and advice to low-income countries on risk management. At a meeting in Washington, D.C., on September 22, 2011, the World Bank, the International Fund for Agricultural Development, the Inter-American Development Bank, and AFD jointly decided to explore the creation of a joint platform for agricultural risk management whose major purpose would be to collect and disseminate relevant information on instruments, approaches, existing expertise, and evaluation of existing pilots; to connect developing countries’ demands for risk assessment and management to existing expertise and relevant networks; to organize the provision of advice and of training services; and possibly to commission studies to complement the existing knowledge when necessary.

Beyond such coordination, donors should also continue investing in financial innovations for agriculture finance toward a better contribution to risk management. The countercyclical loan put in place by the AFD would have interesting stabilizing virtues if it was adopted, in one form or another, by other donors: It would then provide an automatic, optional, and unconditional reserve of
liquidity in case of an exogenous shock. Attempts at providing safety nets through international agreements (such as the Système de stabilisation des recettes d’exportation, or Stabex) have largely failed to achieve their countercyclical objectives because they were not automatic and conditional. Incorporating an automatic countercyclical mechanism in existing loan instruments might be very valuable to address core vulnerability characteristics of developing countries.

There are many other routes for financial innovation that might usefully be explored, such as through the combination of loans and insurance or risk-hedging products. It is likely that the platform discussed above, through the exchange of experience and the advisory role played toward developing countries, would help create a momentum for demand-based financial innovation.

Create a Public-Private Partnership for Risk Management and Food Security

Private actors, both domestic and foreign, play a major role all along the food value chain and therefore in improving food security. Even though they are not driven by philanthropy, many realize that responsible investment and contributing to food security are worthwhile objectives to pursue from a business point of view because they strengthen their position by making them appear as contributors to the common good. There is, therefore, room for innovative public-private partnerships in which public policy measures aim at engaging the private sector in the pursuit of a public interest objective, here, food security. This requires exchange between groups of agribusiness firms, local firms, farmers, and public authorities, and a sort of contractual framework emerges.

Worthwhile initiatives have taken place along these lines since 2009 and in the context of the G-20. The World Economic Forum has set up a New Vision for Agriculture initiative through which 17 global companies have pioneered a multi-stakeholder approach, on a global and a regional basis, to promote market-based and business-led solutions for sustainable agricultural investment and development. The avowed goal is to envision agriculture along three complementary dimensions—contribution to the environment, creation of economic opportunities, and achievement of food security. An interesting feature of this approach has been the inclusion of country programs, involving the public and private sector, donors, and the civil society, which set the initiative in the context of country-based and -owned development plans. In 2011, the World Economic Forum worked with the G-20 both to boost this approach and to see how it can contribute to the G-20 objectives and assist with the expression of the business community of the G-20 through the “B-20.” The idea of a global public-private partnership for agricultural development and food security has thus received a strong impetus.

3The B-20 is an international group of companies and business representatives from G-20 countries. It addresses current global issues, formulates concrete proposals, and sends them to the G-20 for consideration in the G-20 summits.
However, the dimension of risk management deserves a better focus. The business sector can help with finding concrete and innovative solutions to manage agricultural risks in many ways. For one, financial companies are best placed to devise instruments that better hedge local risks than existing ones and to devise tailor-made, index-based insurance products. But beyond that, the business sector has a major role to play in investigating the development of contract-based agriculture. Contracts are a powerful way to manage risks over a given time horizon. They may result from a private-private decision, but there are many instances in which the public sector, both the local government and possibly donors, can promote private contracts by providing a conducive regulatory framework, by deciding complementary investments, by investing in training and capacity building, or by providing partial guarantees.

CONCLUSION

Even though they were not explicitly formulated, there are five key messages in this chapter about the international policy challenge in regard to food security and price volatility. First, the objective of food security and a successful approach to food price volatility requires active public policies. However, these policies do not exist and need to be developed, keeping several characteristics in mind—there is no one-size-fits-all model, so that the design and nature of these policies will have to be local, with local ownership an essential element, and the nature of these policies will not resemble the top-down and exclusive nature of past public policies in developed countries. The rules of the game have changed, both in advanced economies and in developing countries, and successful public policies must now be based on the involvement of the various stakeholders. The state therefore appears as a coordinator and a catalyst.

Second, a key ingredient of such policies will be a successful, revisited public-private partnership. The private sector should increasingly be tied by memoranda of understanding and contracts with governments, through which they commit their contribution to a common goal within a sector-based program in exchange for specific regulatory, pricing, and other guarantees and for complementary public investments that will also strengthen their own effectiveness and profitability.

Third, this multistakeholder, catalytic approach can also be applied at the international level, where the G-20 can play (and has played) a significant role in aligning actions and priorities. The G-20 thus appears more as a process, conducted at the highest political level, than a world directory, and it may uniquely provide leadership, inspiration, and direction. Much pedagogy is necessary to disseminate such an interpretation to the media, to the general public, and to government circles as well as to align expectations with the reality.

Fourth, much more attention needs to be paid to agriculture risks. Risk-based approaches, so far, have been essentially addressed through specific instruments leading to implementing pilots in developing countries, whereas farm policies and much donor financing (outside such pilots) have tended to ignore the risks. Risk
is a crucial aspect of agricultural development and of food security, and its management is not simply a question of finding the right instrument, but is a core of the nature and effectiveness of development programs. But risk is also multi-dimensional and needs to be addressed in a holistic way. It includes, among others, price, weather, pests, and climate risks, and dealing with just one of these factors would be insufficient. Proper risk management requires a new culture of public policy, well beyond a necessary, conceptual, and practical knowledge of available financial instruments.

Finally, a key message is the need for more coordination among actors (both domestic and international), who tend to work in silos, across sectors, and between policies.

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INTRODUCTION

Prices of grains and other storable commodities are characterized by long periods in the doldrums punctuated by short but intense price spikes (Deaton and Laroque, 1992). Those spikes are of concern, not least because they can have large impacts on poverty in developing countries (Ivanic and Martin, 2008). Accounts of the food price spikes of 1973–74, 2006–08, and 2010–11 include discussion of a wide range of contributing factors such as exogenous shocks to supply or demand, below-trend stock levels, speculative behavior, and trade policy responses to the shock. Johnson (1975) emphasized policy responses in his analysis of the 1973–74 price spike, as have most of the available assessments of the 2006–08 shock (Robles, Torero, and von Braun, 2009; Baffes and Haniotis, 2010; Bouët and Laborde, 2010; Hochman and others, 2010; Timmer, 2010). Several suggest that export restrictions (and possibly also import subsidies) played an important role in these price spikes, just as intensified export subsidies and triggered import restrictions played a significant role in 1986–88 when international food prices slumped. However, we are unaware of any attempts to quantify the aggregate contribution across countries of trade policy responses to international price surges.

In this chapter, we address this issue directly. Following Freund and Özden (2008), we assume that national trade policy responds to the risk of losses for significant groups by insulating the domestic market to some extent from international price fluctuations for staple foods. This is consistent with the behavior of many governments, and it provides an economic rationale for the econometric estimation of price transmission elasticities. We use a standard conceptual
framework to derive a simple equation that provides at least a rough way to estimate the contribution of market-insulating policy behavior to international price spikes for homogenous farm products. We subsequently examine evidence from two major upward price spikes (1973–74 and 2006–08) for the key commodities of wheat and rice. We then discuss the policy implications in the final section of the chapter.

INTERNATIONAL PRICE VOLATILITY AND NATIONAL POLICY RESPONSES

Consider a weather- (or financial market–)induced exogenous shock to the global market for a food staple that causes a surge in its international price. Suppose that, in response, exporting countries impose or raise an export tax or tighten export restrictions (or lower any export subsidy), and importing countries reduce their tariff or other import restrictions (or introduce or raise an import subsidy) to reduce the rise in their domestic price. If both sets of countries try to reduce the impact of the shock on domestic prices to the same extent, their attempts will be collectively futile. This is very easy to show graphically in the case in which first the exporters and then the importers seek to block completely the effect of an increase in the price of food resulting from an initial shock.

For an individual small exporting country, the effect of the increase in its (explicit or implicit) export tax is to reduce the domestic price relative to the newly raised world price. The same effect occurs in a small importing country that reduces its (explicit or implicit) import tariff. If a sufficient number of exporting countries intervene in this way, their export restrictions cause the world price of the good to rise further, thereby reducing the impact of each country’s initial action on its domestic price. This situation is depicted in Figure 17.1, where the excess supply curve of the exporting-country group is ES and the excess demand curve of the importing-country group is ED following the exogenous shock but prior to any changes to trade restrictions. If an export tax is then applied, the world price needed to obtain any given level of exports is higher, because part of the export price is paid to the exporting government. This is reflected in the ES curve moving up to ES’, the effects of which are to raise the world price from \( P_w \) to \( P'_w \) and lower the domestic price from \( P_d \) to \( P'_d \).

In the situation depicted in Figure 17.1, the exporting-country group gains from the improvement in their export price. However, production incentives are

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1 If quantitative export restrictions were imposed instead, the rights to export would become valuable, with the holders of the export rights receiving the benefits that would accrue to the government if an export tax had been used.
reduced and consumers have an incentive to increase their demand, even though export prices are higher. The global social cost associated with these incentives is given by the triangle abc. That can be subdivided into a loss to private agents in the importing group of area $bcP_w'P_w$, a loss to private agents in the exporting group of area $baP_dP_w$, and a gain to the government or export quota holders in the exporting-country group of area $acP_w'P_w$. Whether the exporting countries as a group enjoy a net gain from restricting exports depends on whether the upper rectangle (the terms of trade gain) is larger than the lower triangle (the social cost). Because the social costs rise with the square of the export tax equivalent ($P_w' - P_d$), while the terms of trade gain is likely to rise roughly linearly with the rate, the benefits to the exporter group will become negative if the export tax rate becomes sufficiently large. By contrast, importing countries unambiguously lose from the export restrictions as they transfer income to the exporter and reduce net consumption.²

In Figure 17.2, exporters attempt to completely offset the impact of the initial increase in the price of the good by shifting the ES curve to $ES'$. Importers seek to achieve the same insulation by reducing tariffs (or paying import subsidies) so as to shift the ED curve to $ED'$. As is evident in Figure 17.2, the combined effect of these policy changes is to leave domestic prices in both importers and exporters at their postshock level ($P_d$ and $P_w'$ to $P_w''$). Despite the attempts of both the importing- and exporting-country groups to fully offset the original increase in price to $P_w$, domestic prices and quantities are unchanged at their postshock level ($P_d$ in Figure 17.2). The only effect of these

²See Martin (1997) for approaches to measuring this welfare impact.
policies is to compound the terms of trade shift against the importing-country group and in favor of the exporting group, generating a transfer from the former to the latter of \((P_{w}'' - P_{0}) \cdot Q\) in Figure 17.2 (in addition to that caused by the initial exogenous shock). This is in sharp contrast with a move from autarchy toward free trade, which is able to substantially reduce price risk through diversification of market outlets because the correlations between commodity output shocks across countries are very limited (Johnson, 1975).

**WHEN COUNTRIES PARTIALLY INSULATE AGAINST GLOBAL PRICE CHANGES**

The empirical evidence based on a large sample of developing countries over the period 1995–2007 (Anderson, 2009) using a price comparison methodology (Anderson and others, 2008) indicates that agricultural distortions differ substantially across commodities and countries, with rates for individual commodities changing over long periods and year-to-year changes being negatively correlated with movements in real prices. This evidence suggests that average rates of protection at any time differ substantially across commodities in response to political economy pressures and that the average rate of protection for commodities may trend upward or downward depending upon the evolution of these pressures. In addition, it appears that policymakers attempt to smooth domestic prices of some key commodities relative to international prices. This preference for policies that insulate domestic prices from short-term changes around a desired level that differs from world prices in a way that rewards politically influential interest groups has been represented typically using relatively ad hoc...
combinations of average protection rates and price insulation coefficients. It seems desirable to be able to specify a welfare function that motivates such preferences.

An objective function that can represent this type of preference builds on Jean, Laborde, and Martin (2010a) and is closely related to Freund and Özden (2008). Suppose that policymakers in a single small country seek to minimize the following money-metric political economy welfare loss function:

$$W = (p - \bar{p})' \alpha (p - \bar{p}) - b'p + e(p, u) - g(p, v) - z_p (p - p^*)$$

(17.1)

where higher values of $W$ indicate greater costs of deviating from the policymakers’ preferred equilibrium in which domestic prices are aligned to the strength of different interest groups and do not deviate from their desired long-term levels; $p$ is the domestic price vector; $\alpha$ is a matrix representing the political economy costs of deviations from the vector of desired domestic prices under the intervention regime, $\bar{p}$; $b$ is a vector of weights that represents the preference for higher, or lower, average domestic prices for individual commodities; $e$ is the expenditure function; $g$ is the GDP function representing the value of output in the country; $z = e - g$ is the net expenditure function; and $z_p$ is the derivative of this function and, hence, by duality, the country’s vector of net imports; and $p^*$ is a vector of world prices. The $(p - p^*)$ term is a vector of border price interventions such as trade taxes and subsidies or quantitative trade restrictions.

Note that the last three terms of equation (17.1) are a standard Anderson and Neary balance of trade function. If policymakers seek to minimize this function alone, the optimal tariff, $p - p^*$, will be zero and the balance of trade function can be used to measure the cost of deviations from zero tariffs. As shown by Jean, Laborde, and Martin (2010b), inclusion of the $h'p$ term makes the political economy function consistent with nonzero interventions.

The $h$ function captures in a reduced form a wide range of political economy incentives for intervention such as the relative ability of particular sectors to lobby for assistance (see Hillman, 1982; Anderson and Hayami, 1986; Lindert, 1991; and Anderson, 2010). This formulation captures the essence of the policy preference for sector-specific profits in Freund and Özden (2008) in a more general, but less specific, context. It allows factors such as countervailing lobbying by downstream users and the differential impact of protection on returns to factors emphasized by Anderson (1995) to be taken into account. As shown by Jean, Laborde, and Martin (2010a, 2010b), the values of $h$ can potentially be inferred from information on relative levels of protection across sectors and the price responsiveness of traded quantities.

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1In the current context, $h$ depends on the average rate of protection.
The first term in equation (17.1) represents the cost of deviations from average domestic prices. These arise from a range of factors, including the inherent risk aversion of particular groups, and credit market imperfections that make it difficult to smooth consumption in response to income or expenditure shocks. The diagonal elements of this matrix would generally be expected to be positive—because deviations from average domestic prices (which include the effects of the chosen tariff) raise costs to some groups and hence induce some political pain. The off-diagonal elements might be positive or negative depending upon whether changes in other prices alleviate or exacerbate the political pain.

Equation (17.1) is very similar to the social welfare function in Freund and Özden’s (2008) equation. One major difference is that equation (17.1) is based on deviations from the expected domestic price, rather than a reference price. A second is that equation (17.1) punishes deviations in either direction from the expected price. A third is that the cost of deviations enters quadratically rather than linearly. These differences in formulation reflect the particular situation of agricultural commodities, especially in developing countries. The expected price can be seen as a rational expectations counterpart of the reference price in Freund and Özden (2008). With agricultural commodities in poor countries, deviations in either direction from the expected price involve social costs because staple foods make up a large share of the incomes of poor consumers with limited access to credit as well as being important for the income of some poor producers.

In contrast to the puzzling situation in the manufacturing trade, where only antitrade interventions are frequently observed (Rodrik, 1995), we also observe export subsidies and import subsidies in different states of agricultural markets as well as antitrade measures such as export and import restrictions. It also seems likely that the costs of being away from the expected domestic price level are increasing in the size of the deviation. One piece of evidence for this hypothesis is the dramatic increase in the incidence of export restrictions and import subsidies when prices increase sharply (World Bank, 2008).

If we differentiate equation (17.1) with respect to prices, we obtain

$$\frac{\partial W}{\partial p} = 2\alpha(p - \bar{p}) - h - z_{pp}^{-1}(p - p^*) = 0. \quad (17.2)$$

This yields

$$(p - p^*) = z_{pp}^{-1}(2\alpha(p - \bar{p}) - h). \quad (17.3)$$

The expected value of $(p - p^*)$ is therefore given by

$$E(p - p^*) = (\bar{p} - \bar{p}^*) = -z_{pp}^{-1}h. \quad (17.4)$$

Rearranging equation (17.3) and substituting for $\bar{p}$ from equation (17.4), we obtain

$$z_{pp}(p - p^*) = 2\alpha(p - z_{pp}^{-1}h - \bar{p}^*) - h, \quad (17.5)$$
which can be rearranged to get

\[ z_{pp}(p - p^*) = 2\alpha(p - p^* + p^* - \bar{p}^*) - 2\alpha z_{pp}^{-1}h - h, \tag{17.6} \]

\[ (z_{pp} - 2\alpha)(p - p^*) = 2\alpha(p^* - \bar{p}^*) - (2\alpha - z_{pp}) z_{pp}^{-1}h, \tag{17.7} \]

and finally,

\[ (p - p^*) = -(2\alpha - z_{pp})^{-1}2\alpha(p^* - \bar{p}^*) - z_{pp}^{-1}h. \tag{17.8} \]

Equation (17.8) is difficult to interpret in its general form, and in reality, it seems unlikely that policymakers or analysts would have good information on either the full matrix of slopes of the import demand function, \( z_{pp} \), or penalties, \( \alpha \), for deviations from the average domestic price. In applied work, the typical response to this problem (see Feenstra, 1995) is to focus only on the diagonal elements of the relevant matrices. If we do this with equation (17.8), we are left with a relationship between the price distortion rate and deviations from the average world price of a particular commodity:

\[ (p_i - p_i^*) = -\frac{2\alpha_i}{(2\alpha_i - z_{ii})}(p_i^* - \bar{p}_i^*) - (\bar{p}_i - \bar{p}_i^*). \tag{17.9} \]

Because \( \alpha_i \) is positive and \( z_{ii} \) is negative, the coefficient on \( (\bar{p}_i - \bar{p}_i^*) \) in equation (17.9) lies between zero and one. Its (highly plausible) implication is that the higher the world price relative to its trend value, the lower will be the rate of distortion. This coefficient is, in fact, one minus the coefficient of price insulation used by Tyers and Anderson (1992). Equation (17.9) generates the potentially testable hypothesis that policymakers minimizing an objective function such as equation (17.1) will adjust their rates of agricultural price distortion to partially offset deviations of world prices from their trend value. This provides a rationale for the popular approach of characterizing policies using simple, apparently ad hoc approaches such as the elasticity of price transmission.

The extent to which countries can reduce the instability they face by transferring it to other countries will depend on which countries seek to insulate and what reaction other countries make to these insulating policies. Tyers and Anderson (1992) made an ambitious attempt to assess the extent to which the policies adopted by major participants in the world market for grains and other agricultural staples affect the volatility of world market prices and of domestic market prices. They concluded that the coefficient of variation of world prices for food would fall from 34 to 10 if all countries agreed to eliminate their price-insulating policies. In most of the 16 developing economies they considered, the coefficient of variation for domestic prices would fall substantially if all countries refrained from using the type of price-insulating prices they have used in the past. In a number of these cases, such as Bangladesh, South Africa, and Thailand, the reductions in domestic price instability were estimated to be dramatic, with the
coefficient of variation in Bangladesh, for instance, falling from 26 to 8. In the few cases in which the coefficient of variation of domestic prices was estimated to rise, the increases were much smaller.

If policymakers in importing countries were concerned primarily about the impact on their terms of trade of the imposition of export restrictions, they might respond by raising tariffs on their imports. However, during episodes of international food price spikes, the response has typically been the opposite: Tariffs on food imports are reduced in an attempt to avoid adverse impacts on domestic consumers. This response reduces the cost imposed on the importing-country group by its own protectionist barriers. However, it will compound the increase in world prices resulting from the initial price shock and the policy response by exporters. It will also add to the exporter group’s terms of trade benefits resulting from the initial upward price shock and from its own imposition of export restrictions.

**GLOBAL IMPACTS OF PRICE INSULATION**

Insulation generates a classic collective-action problem akin to when a crowd stands up in a stadium to get a better view: No one gets a better view by standing, but any that remain seated get a worse view. This collective action is, unfortunately, not just completely ineffective—it generates an international public “bad” by amplifying the volatility in the world price of the product, and hence the volatility of the income transfers associated with terms of trade changes.

To assess the implications of price insulation for a homogenous product’s international price, \( p^*_i \), we begin with the global market equilibrium condition:

\[
\Sigma_i (S_i(p_i) + v_i) - \Sigma_i D_i(P_i) = 0,
\]

where \( S_i \) is the supply in region \( i \), \( p_i \) is the region’s producer price, \( v_i \) is a random production shift variable for that region, \( D_i \) is demand in region \( i \) (assumed to be not subject to shocks from year to year), and \( P_i \) is the consumer price in region \( i \). We assume that \( p_i = (1 + t_p)p^*_i \), where \( t_p \) is the distortion rate between the producer price and international price, and that \( P_i = (1 + t_c)p^*_i \), where \( t_c \) is the distortion rate between the consumer price and international price. With a focus on border measures, we can use a single variable for the power of the trade tax equivalent, \( T = (1 + t) \), where \( t = t_p = t_c \).

Totally differentiating equation (17.10), rearranging it, and expressing the results in percentage change form yields the following expression for the impact of a set of changes in trade distortions on the international price:

\[
\hat{p}^* = \frac{\Sigma_i H_i \hat{v}_i + \Sigma_i (H_i \gamma_i - G_i \eta_i) \hat{T}_i}{\Sigma_i (G_i \eta_i - H_i \gamma_i)},
\]

where \( \hat{p}^* \) is the proportional change in the international price, \( \hat{v}_i \) is an exogenous stochastic shock to output such as might result from better or worse
weather than average, \( \eta_i \) is the elasticity of demand, \( \gamma_i \) is the elasticity of supply, \( G_i \) is the share at international prices of country \( i \) in global demand, and \( H_i \) is the share of country \( i \) in global production. That is, the impact on the international price of a change in trade distortions in country \( i \) depends on the importance of that country in global supply and demand, as well as the responsiveness of its production and consumption to price changes in the country, as represented by \( \gamma_i \) and \( \eta_i \). With large proportional changes in trade policies and other shocks, the effects are no longer purely additive as in equation (17.11), and we need to take into account the interaction between these two proportional changes.

A notable implication of equation (17.11) is that a uniform policy response by all countries (\( T^i \) is the same for all \( i \)) will make the elasticities of supply and demand irrelevant to the impact on international prices—if all countries alter their distortions by a uniform amount, the international price will change by an exactly offsetting amount, leaving domestic prices unchanged.

If we assume that output cannot respond in the short term and that inventory levels are low enough that stock adjustments have limited effect, then \( \gamma_i = 0 \). If we further assume that the national elasticities of final demand for the product (\( \eta_i \)) are the same across countries, then equation (17.11) suggests that we can estimate the contribution to international price changes resulting from changes in national trade policies as simply the negative of the consumption-weighted global average of the \( T^i \)s.

Incidentally, if we consider the case in which protection varies endogenously in response to changes in the international price, trade distortions are no longer an exogenous source of shocks, and international prices will change only in response to exogenous shocks such as weather-induced shocks to output. In this case, the counterpart to equation (17.11) is

\[
\dot{p}^* = \frac{\sum_i H_i \dot{p}_i}{\sum_i (G_i \eta_i \theta_i - H_i \gamma_i \phi_i)},
\]

(17.12)

where \( \theta_i \) is the elasticity of transmission from the international price to the consumer price in country \( i \) and \( \phi_i \) is the elasticity of transmission from the international price to the domestic producer price. Where we focus only on trade measures, such that these elasticities of price transmission are the same, it follows that the impact of price insulation on the international price is larger the smaller are those price transmission elasticities. If the short-term elasticity of price transmission is, for instance, 0.5 in all countries (a finding in line with that of Anderson and others [2010b], for key commodities such as rice and wheat since 1985 and consistent with the results in Tyers and Anderson [1992] for earlier periods), the impact of any exogenous shock on the international price will be twice as large as it would be with full price transmission.

In this situation, the variance of the international price will be four times as large as it would be in the absence of price insulation. If all countries used the price transmission elasticity of 0.15 implied by the 85 percent compensating duty under the proposed Special Safeguard Mechanism (Hertel, Martin, and Leister,
2010), then the impact of any shock on the international price would be magnified by a factor of 6.7 and the variance by a factor of 44.

The Uruguay Round agreement of the World Trade Organization attempted to address this problem by banning variable import levies and other directly insulating policies and by counting protection provided by measures involving administered prices under both the market access and domestic support measures. However, the Uruguay Round bindings on import tariffs and subsidies are at levels well above historically applied rates in most cases, providing room for countries to raise applied rates without infringing their WTO commitments. Furthermore, no effective disciplines yet apply in the WTO to variations in export restrictions. With that in mind, we turn now to seeing how much of a contribution insulating behavior of national governments had on international prices of rice and wheat in price spike periods before and after the Uruguay Round, that is, around 1974 and 2008.

THE CASES OF RICE AND WHEAT

The two food commodities that have received the most attention because of price surges are the key staples of wheat and rice. The length of their international price spikes around 1974 were broadly similar to those around 2008, but the height of the spike—particularly for rice—was greater in 1974. The recent price rises were more gradual except in the final months, so we consider an extra year in the lead-up to the 2008 spike.

Estimates of the $T_i$s are available for all key rice and wheat countries in the form of nominal assistance coefficients (NACs) from three sources. Anderson and Valenzuela (2008) provide them through 2004 for developing countries and through 2007 for high-income countries (summarized in Anderson [2009]). They are similarly available for high-income countries for 2008 in OECD (2010). For developing countries, Anderson and Nelgen (2010b) provide estimates based on FAO and World Bank data on producer and border prices, respectively, for 2005–08. The most recent developing country estimates are less reliable than the NAC estimates in Anderson and Valenzuela (2008) for several reasons. One is that the coverage is not as extensive because domestic prices are not available for some countries. Another is that the FAO’s producer prices and World Bank international prices are not always as reliable as previously used domestic and border prices from national statistical agencies. The FAO (2010) producer prices in U.S. current dollars were converted into an index set at 100 for 2004, and the 2004 U.S. dollar prices in Anderson and Valenzuela (2008) were updated using the changes in these indices through 2008. Likewise, the Thailand 5 percent broken rice and Canadian wheat prices from the World Bank were converted to indices set at 100 for 2004, and the 2004 border prices in Anderson and Valenzuela (2008) were updated using changes in those indices through 2008.
These NAC estimates are reported in Table 17.1 for the two upward price spike periods. For each of the regions shown, as well as for the world as a whole, the patterns are strikingly similar; that is, the NAC fell as the international price rose. The proportional changes in NACs in the first half of each spike differ across products and country groups, however. As shown in Figure 17.3, the proportional change was very similar for high-income and developing countries in the 1970s spike, albeit only half as large for wheat as for rice. In the more recent spike, the proportional change for high-income countries was somewhat smaller in the case of rice and very much smaller in the case of wheat than that for developing countries.

Assuming that output was able to respond only to a limited degree in the first half of each spike and that the national elasticities of demand (including stock demand) are similar across countries for each product, we set the $\gamma_i$s to zero and use the equation

$$\hat{p}^* = \frac{\sum_i H_i \hat{v}_i + \sum_i (H_i \gamma_i - G_i \eta_i) \hat{T}_i}{\sum_i (G_i \eta_i - H_i \gamma_i)},$$

to estimate the contribution to international price changes of price-insulating behavior resulting from national price-insulating policy behavior is the (negative of the) consumption-weighted global average change in the national $T_i$s. For rice, the cumulative decline shown in the world row of Table 17.1 was 46 percent between 2005 and 2008, which is in the same order of magnitude as the decline between 1972 and 1974 of 58 percent. For wheat, the globally weighted $\hat{T}$ was −28 percent over the 2005–08 period, compared with −30 percent in 1972–74.

According to World Bank price data, the world price of rice increased by 127 percent between 2005 and 2008, and the price of wheat increased by 114 percent. By taking the interactions between the proportional changes in trade policy and other factors into account, we can estimate the magnitude of the nontrade shocks. Comparing these with the estimated trade shocks suggests that in 2005–08, more than 45 percent of the explained change in the international price of rice was due to the changes in border restrictions that countries used in an attempt to insulate themselves from the initial increases in price. For wheat, the corresponding estimate was 29 percent. In 2008 alone, the change in protection on rice explains almost half of the 90 percent increase in rice prices observed for that year.

One important and encouraging difference between the 2008 price surge and the earlier one around 1974 is an apparent sharp reduction in the extent of price insulation in high-income countries. For rice, their NAC declined 45 percent between 1973 and 1974, whereas it fell only 8 percent between 2007 and 2008. In the case of wheat, the comparable numbers were 28 percent and 12 percent.

Although desirable, the reduction in insulating behavior by these countries has a very limited beneficial impact in the world market for rice because members not classifying themselves as developing countries in agriculture account for only 3 percent of world rice consumption. For wheat, for which these countries account for 27 percent of world consumption, the benefit is likely somewhat
### TABLE 17.1

Weighted Average $T_i$s for Rice and Wheat,¹ 1972–76 and 2005–08

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<td>0.93</td>
<td>0.54</td>
<td>0.90</td>
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<td>3.35</td>
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<td>0.99</td>
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<td>Latin America and the Caribbean</td>
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<td>1.08</td>
<td>0.89</td>
<td>0.90</td>
<td>0.98</td>
<td>1.51</td>
<td>1.46</td>
<td>1.39</td>
<td>0.86</td>
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| Wheat                     | 1.15 | 0.81 | 0.81 | 0.95 | 0.94 | 1.19 | 1.14 | 1.02 | 0.86 |
| High-income countries     | 1.11 | 0.83 | 0.80 | 0.90 | 0.92 | 1.20 | 1.17 | 1.04 | 1.03 |
| Developing countries      | 1.22 | 0.77 | 0.81 | 1.02 | 0.96 | 1.18 | 1.13 | 1.00 | 0.75 |
| Asia                      | 1.33 | 0.82 | 0.88 | 1.02 | 0.94 | 1.21 | 1.15 | 1.01 | 0.70 |
| Africa                    | 1.03 | 0.75 | 0.63 | 0.82 | 0.92 | 1.15 | 1.03 | 0.93 | 1.08 |
| Latin America and the Caribbean | 0.95 | 0.57 | 0.67 | 1.11 | 1.07 | 1.02 | 1.02 | 0.97 | 0.84 |

Source: Anderson and Nelgen (2010b).

¹ Weights are consumption shares for the sample countries.
greater. However, it is clear from these trade shares that the key trade policy influence on the stability of world markets is what happens in developing countries.

Within the group of developing countries, there are also very substantial differences in the extent of price insulation. As shown in Figure 17.4, it appears that domestic price rises for wheat in the 2006–08 period were restrained much more in Asia than in other world regions. This suggests that, in contrast with the case
are rice and wheat representative of other farm products in terms of insulating behavior by governments? There is no global database for all farm products for the most recent spike period, but there is a database for the upward spike of 1974–76 and the slump of 1984–88. Anderson and Nelgen (2010a) decomposed the nominal rate of assistance (NRA) estimates for the overall agricultural sector of all 75 countries in the Anderson and Valenzuela (2008) database into the various border and domestic measures for developing and high-income countries.
The annual estimates summarized for the upward-spike period of 1972–76 and the downward-spike period of 1984–88 are reported in Table 17.2.

In both of these periods, export restrictions were the dominant instrument for developing countries; they became more and then less important in the upward-spike period of 1972–76, and conversely in the downward-spike period of 1984–88. In high-income countries, there were virtually no taxes or other restrictions on exports, but export subsidies followed the same path as import tariffs over those spike periods; that is, U-shaped during the upward spike, inverted U-shaped in the downward spike. Together these estimates suggest that the experiences with rice and wheat were not inconsistent with the pattern for farm products in general, especially when bearing in mind that the NRA estimates in Table 17.2 include numerous nontradable products whose NRAs tend to remain close to zero and hence dampen year-to-year fluctuations in the aggregate estimates.

CONCLUSIONS AND POLICY IMPLICATIONS

Trade policy changes—and particularly export restrictions—are frequently discussed as contributing factors to food price surges. This chapter examines the role of trade barriers in contributing to surges. It first highlights the collective-action problem associated with the use of these measures as stabilization policies, noting that the use of these measures by all countries would be ineffective in stabilizing domestic prices, while magnifying international price instability associated with exogenous shocks to food markets. We develop a simple approach to assessing the contribution of price-insulating trade policy actions to international price changes for individual agricultural commodities and use this approach to estimate the extent to which changes in trade policy measures have contributed to price surges for the key staple foods of rice and wheat.

Our analysis shows that changes in trade policies contributed very substantially to the increases in world prices of these staple crops in both the 1973–74 and 2006–08 price surges. In the 2006–08 surge, insulating policies affecting the market for rice explain 45 percent of the increase in the international rice price, whereas almost 30 percent of the observed change in the international price of wheat during 2006–08 can be explained by the changes in border protection rates.

The evidence in Figure 17.3 suggests that at least high-income countries altered their NACs less in the most recent price spike period than in the two previous ones. That is not inconsistent with the fact that the Uruguay Round Agreement on Agriculture, which came into force with the creation of the WTO in 1995, involved commitments to bind tariffs and subsidies. The finding that developing countries are still very active users of variable border measures and especially export restrictions is also not inconsistent, given that developing country bindings are well above applied rates and that the WTO has no effective restrictions on agricultural export measures. However, more comprehensive
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<td>46</td>
<td>52</td>
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Source: Anderson and Nelgen (2010b).
Note: NRA: nominal rate of assistance.

1 All entries were generated by dividing the producer subsidy equivalent of all (including domestic price, non-product-specific, and “decoupled”) measures by the total agricultural sector’s gross production valued at undistorted prices.
empirical analysis over a broader range of products is needed before it would be possible to say how much of these changes can be attributed to the presence or absence of WTO disciplines.

Because bindings on import tariffs and subsidies, even for many high-income countries, were made at levels well above historically applied rates, plenty of “wiggle room” for countries to raise applied rates without infringing their commitments to other WTO members remains. Furthermore, with no effective disciplines yet being applied to export restrictions, the WTO membership has yet to address the other half of this “beggar-thy-neighbor” problem. If a special safeguard mechanism were to be introduced as part of a Doha Development Agenda agreement, the problem would become even worse (Hertel, Martin, and Leister, 2010). An obvious solution is to seek a collective agreement to limit the extent of price-insulating policy use. Perhaps the most recent experience with price spikes in 2006–08, and again in 2010–11, will make WTO members more willing to address this issue.

REFERENCES


The Role of Transparency and Civil Society in Managing Commodities for Inclusive Growth and Development

ANTOINE HEUTY

INTRODUCTION

In 2008, aid flow to sub-Saharan Africa reached US$36 billion per year. Natural resource rents, by contrast, stood at US$240 billion. Over three-quarters of Africa’s subsoil assets have yet to be discovered. If such estimates are confirmed, oil, gas, and mining are likely to represent the single most significant untapped source for financing development in resource-rich low- and middle-income countries. Capturing these mineral rents and putting them to effective use will require many resource-rich countries to strengthen institutions and policies. Civil society, parliamentarians, and the media all have a critical role to play in ensuring revenues are used for the public good.

Countries that are rich in oil and minerals but poor in economic and political governance pay a high price for their lack of transparency and accountability, as a recent report on Angola by the International Monetary Fund documented. For the period from 2007 through 2010, the IMF found US$32 billion in unaccounted-for government funds, equivalent to a quarter of Angola’s annual GDP. In response, the government is preparing a report on the discrepancy between receipts from Sonangol, the national oil company, and the budget.

This incident follows previous allegations of corruption involving western companies (Global Witness, 1999), which led to significant reforms to increase the transparency and openness of Angola’s licensing process (Heller, 2007). Despite its vast wealth in natural resources, Angola ranked 148th out of 187 countries in the United Nations Development Programme’s 2011 Human Development Index (UNDP, 2011). The mismanagement of the oil sector there and in other...
resource-rich LICs shows the costs of opaqueness. The lack of transparency also undermines the ability of governments to use revenues from the extractive sector to stabilize their economies against commodity price volatility. After the financial crisis of 2008–09, price volatility forced the government of Angola to accept financial support from international financial institutions.

Transparency, the “increased flow of timely, good-quality and reliable economic, social and political information which is accessible to all relevant stakeholders” (Bellver and Kaufmann, 2005), is a critical component for improving the quality of institutions responsible for the management of natural resources (Arezki, Hamilton, and Kazimov, 2011). The IMF report on Angola illustrates the role that international financial institutions and international civil society organizations can play in enhancing transparency in the management of oil, gas, and mining revenues. However, it also emphasizes the poor access of civil society, parliamentarians, and the media in Angola and other resource-rich countries to the necessary information about oil, gas, and mining to hold their governments accountable.

Civil society organizations have played a central role in the design of transparency norms for the extractive sector. Since 1998, groups such as Global Witness, Human Rights Watch, and the Revenue Watch Institute have led a global campaign calling for companies and governments to disclose petroleum and mining revenue data (Global Witness, 1998; Human Rights Watch, 1999; Tsalik, 2003). In 2002, a group of civil society organizations formed a coalition called Publish What You Pay (van Oranje and Parham, 2009). Its current membership numbers over 600 organizations in 30 countries.

The IMF and the World Bank have also contributed to the transparency agenda through the World Bank’s Extractive Industry Review (Salim, 2004; World Bank, 2004), the review of the International Finance Corporation’s Sustainability Framework, and the IMF’s (2005) Guide to Resource Revenue Transparency. This guide codifies principles for resource-rich countries in handling resource revenue and tailors the IMF’s Code of Good Practices on Fiscal Transparency to the specific needs of resource-rich countries. It identifies and explains generally recognized best practices for transparent resource revenue management.1

International financial institutions have a critical role to play in advancing transparency in oil, gas, and mining fiscal management.

In 2002, British Prime Minister Tony Blair announced the Extractive Industries Transparency Initiative at the World Summit for Sustainable Development in Johannesburg. Countries’ voluntary commitment to the initiative implies the regular disclosure of resource revenue payment and receipt data from companies

1The guide’s set of good practices is divided among four pillars, including clarity of roles and responsibilities for legal frameworks, fiscal regimes, revenue flows and borrowing, national resource companies and subnational governments; open budget processes for multiple aspects of fiscal policy and resource revenues; public availability of information regarding financial information from budget documentation to debt and assets to fiscal risks; and assurance of integrity regarding internal controls and audits, tax administration, company oversight, and company and government revenue flows.
and governments, respectively. The EITI has been implemented by 35 countries and is supported by the majority of large extractive companies, a wide pool of donor countries, and a significant group of investors.

Recent innovations may offer new opportunities to strengthen the governance of oil, gas, and mining revenues for the public good. The 2010 U.S. Dodd-Frank Act requires petroleum and mining companies listed on the Securities and Exchange Commission to disclose how much they pay to governments. In October 2011, the European Commission adopted a legislative proposal that would require EU-based companies to disclose their payments to governments for oil, gas, minerals, and logging on a country-by-country and per-project basis.

Although the last decade has seen significant progress, too many countries still fall well short of their potential. In the more than 50 countries that are classified as resource rich by the IMF, more than 1.5 billion people are living on less than US$2 a day. The record of resource-rich countries with weak institutions shows that governments fail to earn what they should from their natural resources and fail to maximize the impact of the revenues on development. In Nigeria, as oil revenues doubled between 1981 and 2006, annual per capita income fell by US$300. Timor-Leste has a US$8 billion oil savings account, but close to 50 percent of its children under the age of five are stunted from malnutrition. Without better management of revenues, the dividends of natural resources are often poverty and conflict.

This chapter makes the case for transparency as a critical element for managing commodity price volatility and fostering inclusive growth. It provides a framework for understanding the role of oversight actors in managing the oil, gas, and mining sectors. It demonstrates that transparency is important, not only because it can facilitate fiscal policies that lessen the effects of commodity price volatility and raise resource allocation efficiency, but also because it can empower citizens to ensure that the benefits of growth are redistributed and not captured by a favored few. A critical assessment of existing transparency initiatives and a review of innovations in natural resource governance show opportunities to enhance the role and impact of parliaments, civil society, and the media in managing these natural resources for development.

**WHY TRANSPARENCY AND OVERSIGHT ACTORS IN NATURAL RESOURCE MANAGEMENT MATTER**

Increasing dependence on revenues from hydrocarbons in a growing number of countries tends to undermine transparency and accountability. In many oil-producing countries, the share of hydrocarbon revenues in the government budget has significantly increased over the last 10 years. The number of commodities-dependent LICs and MICs rose more than 30 percent between 1996 and 2010, from 46 to 61 countries (Haglund, 2012). For example, in the Democratic Republic of the Congo, the share of oil revenues in total revenues and grants increased from 50 percent in 1995 to 70 percent in 2009. The
contribution of resource revenues to the budgets of resource-rich countries in sub-Saharan Africa increased from 11.7 percent of GDP in 1980 to 24 percent of GDP in 2005. In contrast to the case in resource-dependent countries, fiscal revenues of resource-poor developing countries in sub-Saharan Africa have experienced little change over the same period—more evidence that extractive revenues are driving growth of total fiscal revenues.

Isham and others (2005) found that countries that are rich in point source natural resources tend to have weaker institutional capacities. Sala-i-Martin and Subramanian (2003) illustrate the negative correlation between resource intensity and economic growth in Nigeria. The Revenue Watch Institute’s Revenue Watch Index (2010), which assesses the information that 41 resource-rich governments disclose about oil, gas, and mining, found that a majority of countries provide limited public information on their natural resource sector. Brautigam, Fjeldstad, and Moore (2008) established a link between developing countries’ reliance on revenue from natural resources and weak institutions. Fiscal opacity in oil-producing countries directly stems from the way the state finances itself. Normal channels of public accountability are often missing in resource-dependent countries because the government has an autonomous source of revenue not dependent on taxing its citizens. This approach implies greater public and parliamentary oversight over the collecting and spending of the resource rents. A more radical approach would involve directly redistributing windfalls to citizens and then taxing citizens to finance public expenditures to restore the social contract (Devarajan and others, 2011).

In a majority of countries—with notable exceptions such as the United States—natural resources are public assets. Article 1 of the International Covenant on Civil and Political Rights states that “all people may, for their own ends, freely dispose of their natural wealth and resources” (Wenar, 2008). The government is the custodian of natural resource wealth. The specific challenges of countries rich in oil, gas, and mining provide a compelling rationale for comprehensive citizens’ oversight of natural resource management. As Kaufmann and Bellver (2005, p. 2) explain:

[The] social contract between the state and its citizens by which citizens grant power to the executive and demand accountability in return lies at the core of the development process. Yet in countries where state capture or predatory leadership remains a challenge, transparency reforms are likely to be resisted by certain groups in society and within the institutions themselves. In these cases, entry points for reform would lie in civil society and in building new alliances with the potential beneficiaries of disclosure.

Understanding the implications of secrecy and the fragility of the social contract in resource-rich developing countries requires disentangling multiple asymmetries of information between extractive companies, governments, and citizens.

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2The Revenue Watch Institute has developed a series of case studies (forthcoming) on existing systems of cash transfers in Alaska, Bolivia, Mongolia, and Timor-Leste (www.revenuewatch.org/cashtransfers). The Center for Global Development has developed an initiative and a paper series on “oil-to-cash” (www.cgdev.org/section/initiatives/_active/revenues_distribution).
Governments from LICs generally have much less geological and economic information regarding their natural wealth, which creates a power disequilibrium when negotiating the terms of a resource deal. The lack of openness of governments around oil, gas, and mining (Revenue Watch Institute, 2010) further unbalances the relationship between citizens and governments and within the government itself. The asymmetry of information undermines accountability and creates incentives for officials to use their power for personal gain rather than the public good. Within the government, information asymmetries also fuel capture by state-owned companies and resource ministries, which undermines the rational allocation of public resources.

The lack of transparency in oil, gas, and mining management has direct adverse consequences for managing commodity price volatility, economic growth, and development. Government spending tends to move with commodity prices in oil-, gas-, and mining-dependent countries (Cuddington, 1989). The procyclical fiscal stance in a number of resource-rich countries limits their ability to respond to commodity price shocks. Arezki, Hamilton, and Kazimov (2011) have underscored the role of political institutions in mitigating against volatility. The asymmetries created by the lack of transparency help explain its adverse impact on fiscal policy.

For instance, inadequate information regarding the oil sector in Nigeria prevents the Ministry of Finance from making sound revenue forecasts. It also politicizes decisions by the parliament around the oil price benchmark, which underpins the revenue envelope in the budget. As a result, the difference between estimated and actual oil revenues in Nigeria reached 39 percent in 2011. The case of Nigeria also highlights the interconnectedness between transparency and accountability in natural resource governance. The inability of governments to develop countercyclical fiscal policy undermines public investment effectiveness and hurts economic growth.

Weak transparency and oversight also result in the inefficient allocation of resources and lower economic performance. Corruption is the most obvious case of waste and mismanagement of resource windfalls at the expense of growth and development. Arezki and Bruckner (2011) found that oil rents were correlated with corruption in a group of 30 oil-exporting countries between 1992 and 2005. Lack of transparency enables politicians to approve “white elephant” projects (Robinson and Torvik, 2005). Resource-rich countries’ tendency to underinvest in education (Gylfason, 2001) provides further evidence of how resource dependency undermines policies for public investment. The need for resource-dependent economies to diversify their sources of growth has sometimes led to the development of opaque and unaccountable investment funds and institutions. In Kazakhstan, the National Welfare Fund Samruk-Kazyna failed to channel the windfall into productive investment outside the resource sector, and it fueled a

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3The Revenue Watch Institute, the International Senior Lawyers Project, the IMF, the World Bank, and other international institutions provide technical assistance and capacity building to governments to improve their capacity to negotiate extractive deals.
The Role of Transparency and Civil Society in Managing Commodities

financial and real estate bubble, forcing the government to bail out the banking sector (Heuty, 2011).

The nexus between transparency, accountability, and inequality illustrates the role of citizens’ empowerment and oversight over oil, gas, and mining management. Berg and Ostry (2011) found a direct link between economic growth performance and income distribution in Cameroon, Ecuador, and Nigeria. In all three cases, the opacity of the resource sector enabled capture of the rents by the political elite at the expense of long-term economic growth. Following Gupta, Davoodi, and Alonso-Terme (1998), Gyimah-Brempong (2002) has demonstrated the link between corruption, economic growth, and income inequality in 21 African countries principally rich in oil, gas, and minerals.

The linkages between natural resource windfalls and economic and development outcomes stress the key role of transparency and accountability against commodity price volatility and of increasing the efficiency of public spending. Empowering citizens, parliamentarians, and the media is also a critical condition for safeguarding against capture by the elite and for ensuring a more transparent distribution of the rents. The next section reviews existing transparency initiatives, particularly the EITI, to assess their current and potential impact on growth and development.

DO EXISTING TRANSPARENCY INITIATIVES, PARTICULARLY THE EITI, HELP LICs IMPROVE ECONOMIC AND DEVELOPMENT OUTCOMES?

In the past five years, transparency and accountability in the management of extractive resources have come to the forefront of the policy agenda at the national, regional, and international levels. This is a testament to the efforts of international civil society, progressive companies, and supportive governments. Proper governance of the extractive sector is now seen as critical to the economic success of resource-rich countries. Since its launch in 2003, the EITI has emerged as a global norm for revenue transparency in oil, gas, and mining. It has now been implemented by a majority of resource-rich countries, including Indonesia, Iraq, and Norway. The United States also recently committed to implementing the initiative.

The EITI monitors and reconciles company payments and government revenues at the country level. Each implementing country creates its own EITI process, which is overseen by a multistakeholder group composed of participants from the government, companies, and national civil society. An international board and secretariat oversee the application of the methodology and the credibility of the process. EITI represents a major opportunity for opening up the resource sector and revealing the windfall from oil gas and mining. The EITI reconciliation process identifies discrepancies and potential sources of revenue leakages that support inclusive growth. For instance, the first Liberia EITI report identified a US$100,000 underpayment by a company that was subsequently recovered by the government. Nigeria’s 2005 report showed that over US$500 million in oil
taxes had not been collected or had gone missing—more than seven times the amount the government spent on agriculture that year. In Tanzania, EITI showed that companies paid lower taxes than the withholding tax on income payments to employees in 2008.

Beyond revenue transparency, the EITI multi-stakeholder process provides a framework for policy dialogue and for aligning incentives among all stakeholders. Unlike Poverty Reduction Strategy Papers (PRSPs) or Environmental Impact Assessments, the EITI gives civil society a seat at the table and a vote in critical decisions. A survey of civil society organizations participating in EITI (Dykstra, 2011) has shown that the civil society participation and policy dialogue enabled by the multi-stakeholder framework are the most successful aspects of EITI. Civil society participation directly addresses the information asymmetry across stakeholders and limits potential collusion against the public interest. The multi-stakeholder forum also offers a space for discussing the discrepancies identified in the audit report, which helps citizens hold their government to account and can help strengthen the social contract and public trust over government stewardship of natural resources.

Country ownership over EITI and the flexibility of the methodology enable governments to tailor implementation to their specific needs as long as the minimum criteria of the initiative are respected. Liberia decided to include forestry into the scope of the national process, and Nigeria has added a physical and process audit that enables more complete analysis of the oil and gas sector in the country. Nigeria and Liberia have also passed EITI legislations that codify their innovations and further affirm the commitment and sustainability of the initiative.

The first Iraq EITI report published in 2011 innovated by applying the reconciliation process to export sales. The report reconciles the volumes and values of the crude oil sold by the government with the amounts received and paid by the buyers. By doing so, Iraq has become the first country to integrate export sales into the EITI regime. However, it contains no data on payments made by producing companies, which is a major gap in comparison to other EITI reports and the requirements of the initiative.

Most big oil producers earn far more revenues from export sales than royalties or taxes. Typically, national oil companies receive payments of large quantities of crude oil because they have retained ownership over some or all of the production or because they receive the oil as profit from the operating companies. Two categories of transactions then ensue. First, the state company must decide to whom they want to sell (options include a wide range of foreign refineries, commodity traders, or domestic refineries) and the price of that oil. This determines the amount that the national oil company earns in return for selling its oil. Second, the national oil company will revert a portion of these earnings to the state treasury through direct payments, dividends, or other payment types. How much they transfer, when, and to whom has major revenue implications for a major oil-exporting country. Iraq EITI also underscores the lack of similar reporting in other countries—especially given the scale of the transactions—and the need for
complete information not just about sales, but also about how these earnings become state revenue.

Implementing the EITI can also play a “signaling” role to encourage investment, reduce the cost of borrowing, and stimulate economic growth. Esanov and Heller (2011) have shown that the spread of Nigerian yields above U.S. Treasury bonds dropped from 13 to 6.9 percent between 2002 and 2003 and continued to decline steadily through 2006 as Nigeria implemented the EITI and adopted a number of strong transparency measures. This finding is consistent with Glennerster and Shin’s (2008) finding that countries that choose to become more transparent experience lower borrowing costs.

However, assessments of the EITI (Ölcer, 2009; Kolstad and Wiig, 2009; Shaxson, 2009) question its impact on resource-dependent countries. The diversity and scale of the benefits anticipated from transparency initiatives such as the EITI (trust, anticorruption, public service delivery, participation, and so on) illustrate the expectations that accompany transparency initiatives (Mejia Acosta, 2010). Gillies and Heuty (2011) have also underscored the absence of a clear model of change for understanding the causality between transparency and a variety of outcomes and have discussed the measurement issues that undermine a robust examination of the actual impact of transparency interventions such as the EITI. A critical assessment of the EITI also suggests five reasons for its limited impact on economic and development outcomes.

Because of its international credibility, the EITI is sometimes implemented by governments to receive international rewards. As a result, the design and implementation of the EITI may be focused more on the asymmetries of information between external actors and the government than on citizens. In practice, the EITI was a condition for participation in the Heavily Indebted Poor Countries Initiative in a number of countries, including Cameroon, Chad, the Democratic Republic of Congo, the Republic of Congo, and Sierra Leone. Although such “governance conditionality” may create the necessary impetus for reforms, it requires the existence or the development of a genuine domestic constituency and demand for transparency to be sustainable. The mainstreaming of EITI information into the media and its use by parliaments appears quite limited. The EITI criteria require publication of results in a variety of public media. However, communication campaigns often summarize for publication a large set of raw financial data which is difficult for citizens to understand.

The ability of civil society, media, and parliamentarians to use available information to hold their governments accountable is a critical condition for the EITI to have an impact on economic growth and development. Parliaments often lack understanding of the applicable fiscal formulas, which precludes their analysis of petroleum or mineral investment agreements. And civil society groups often lack the expertise required to use the information disclosed in the reports published through the EITI in various countries.

Political constraints and capture of the EITI process can weaken the credibility and relevance of the initiative. For example, Azerbaijan publishes regular
information on its natural resource fund and on the fiscal transfers of revenues to its regions (Revenue Watch Institute, 2010), yet the government does not provide citizens with opportunities to discuss the management of revenues from oil and gas and the quality of public spending in the country. On the other extreme, the cooptation of civil society by the government can compromise the legitimacy of the EITI exercise. Gauthier and Zeufack (2011) discuss the conflict of interest created by the generous compensation given to all members of the EITI multi-stakeholder group in Cameroon.

The quality and usability of EITI reports are low and prevent disclosures from being used. Gillies and Heuty (2011) analyzed revenue data from the 50 reports published by 23 countries and concluded that “until EITI reports are produced regularly, contain comprehensive and reliable data and have a basic level of comparability, their value as a source of information will remain compromised” (p. 38). The weak quality and user-unfriendliness of the reports is not surprising given their externally oriented nature—countries with strong reports receive the same levels of credit as those with weak ones.

The current scope of the EITI and other transparency initiatives is a major impediment to empowering citizens from resource-rich countries to hold their governments accountable on how they use the windfalls from oil, gas, and minerals. The EITI is restricted to revenue transparency, which captures only part of the money generated by the extractive sector. It often does not involve scrutiny of fiscal revenues from the granting of licenses and concessions, the management of collected revenues (particularly natural resource funds and state-owned companies), and the actual distribution of the rent through the budget process. Kolstad and Wiig (2009) emphasized that the EITI may only chase corruption from the revenue to the spending side of the budget, which significantly weakens its capacity to limit leakages and stimulate efficiency in resource allocation. The magnitude of off-budget mechanisms can further diminish the relevance of a narrow focus on money flowing through the budget. In Venezuela, the combination of Petróleos de Venezuela, S.A. (PDVSA) spending on social programs, Fondo de Desarrollo Nacional (FONDEN) development investments, and other transfer mechanisms represented over one-third of the total oil rent in 2006, which was equivalent to 37 percent of the government expenditure executed through the national budget (Manzano and Scrofina, forthcoming). The Natural Resource Charter offers detailed guidelines for fostering transparency in natural resource management. It builds on existing initiatives such as the EITI and the Ecuador Principles to provide the tools and knowledge necessary for governments and civil society groups to avoid the mismanagement of diminishing natural riches and ensure the realization of their benefits now and in the future. The charter

4 The Natural Resource Charter (www.naturalresourcecharter.org) is a set of principles for governments and societies on how to use the opportunities created by natural resources effectively, drafted by a group of leading academics and practitioners in the field of natural resource governance.
represents a more comprehensive approach to oil, gas, and mining management than existing initiatives. However, it still lacks a clear operational framework for driving reforms in resource-rich countries.

The EITI is also unable to foster greater transparency in the management of natural resource funds—a subset of the so-called sovereign wealth funds—which would help resource-rich countries develop more significant fiscal buffers against commodity price volatility. SWFs managed US$4 trillion in assets as of December 2010. The Organisation for Economic Co-operation and Development expects assets under SWF management to reach US$10 trillion by 2015. About 70 percent of the assets managed by SWFs comes from oil, gas, and mining windfalls (Preqin, 2010). The financial clout of these funds, the lack of transparency in many of them, and the fear that some governments may invest their assets with political or geostrategic rather than purely financial objectives have attracted the attention of market participants and politicians alike. In October 2008, a group of 26 SWFs committed themselves to transparency, good governance, and accountability standards by signing a voluntary code of principles, called the Generally Accepted Principles and Practices for SWFs, also known as the Santiago Principles.

The key transparency elements of the framework require SWFs to disclose their legal framework, define and disclose their policy purpose, and publish their funding and withdrawal arrangements. However, the implementation of the principles is left to the discretion of individual SWFs, which explains the wide diversity of compliance with the framework. For instance, SWFs in Bahrain, Kuwait, Qatar, and Russia provide scant information about their compliance with the principles. In Africa, only 3 out of the 15 SWFs (in Botswana, Equatorial Guinea, Libya) are signatories to the Santiago Principles (Triki and Faye, 2011). The African resource-rich governments that signed the Santiago Principles rank very low against its benchmarks.

The framework provides another example of external accountability toward the market rather than to citizens of resource-rich countries (Heuty, 2011). Because natural resources are public assets, their proceeds and management should also be subject to public scrutiny. The rationale for secrecy in the management of natural resource funds appears unfounded. A recent report by the International Forum of Sovereign Wealth Funds (2011) noted that “some Members still face constraints regarding the information they can disclose” and implicitly recognized that only half of the 26 members of the group “confirmed that transfers and withdrawals are determined as part of the annual budget process” (pp. 14–15).

In February 2011, the EITI International Board adopted more rigorous requirements for the initiative. Will the new rules address the gaps of the current framework and increase the impact of the initiative? The new framework establishes stricter rules that will foster civil society’s role and participation in the EITI and improve the timeliness and usability of the information disclosed in EITI reports (Saunders, 2011). Countries will now have to create a multistakeholder group that includes civil society representatives from the onset of the process, which will guarantee that civil society is involved from the earliest stages,
including in the design and approval of a work plan. After achieving “compliant status,” countries have to produce a report each year using data from the previous two fiscal years. The new rules also clarify the definition of materiality thresholds for resource payments and requires more comprehensive reports—including information on subnational transfers, barter deals, and social payments where relevant.

The application of the new framework should strengthen the relevance of the EITI and facilitate greater involvement of civil society in the process. However, EITI reports are most useful when they break down revenues by company, revenue stream (royalties, profit tax, etc.), commodity (oil, gas, etc.), and project. Company-by-company and project-by-project data can help identify the cause of reporting discrepancies and may indicate whether contracts between governments and companies are fair and beneficial to local populations. Twelve countries implementing the EITI voluntarily disclose their data by company, but many countries do not, and the new rules still do not require it. Such limitations curtail the usefulness of EITI reports and do not integrate the legislative implications of the Dodd-Frank Act in the United States and the EU legislative proposals regarding disaggregated reporting.

**RECENT TRANSPARENCY AND ACCOUNTABILITY INNOVATIONS SUGGEST NEW OPTIONS FOR HARNESSING TRANSPARENCY TO INCLUSIVE GROWTH AND DEVELOPMENT**

**Country-by-Country Reporting in the United States and the European Union**

Recent transparency and accountability innovations—often driven by civil society organizations—offer an opportunity for improving the management of oil, gas, and mining for the public good. In July 2010, the U.S. Congress passed Section 1504 of the Dodd-Frank Act, a measure requiring all companies registered with the U.S. Securities and Exchange Commission to publicly report how much they pay governments for access to oil, gas, and minerals in each country in which they operate and for each project. In 2011, the European Commission issued draft directives requiring companies listed on the EU stock exchanges and large private companies based in member states to disclose payments made to governments for oil, gas, minerals and timber, again on a country-by-country and per-project basis. Together, these standards would cover roughly half of global extractive sector market capitalization.

These reporting rules will go a long way toward closing a door on corruption in this area. The EU proposals especially, for their recognition that reporting rules

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5The Central African Republic, the Democratic Republic of the Congo, Ghana, Guinea, Liberia, Mongolia, Niger, Nigeria, Norway, Peru, Sierra Leone, and Timor-Leste.
for companies must account for revenues that are material to subnational and local communities, will help ensure that citizens are able to monitor development directly and empower investors to properly assess development risks.

But disclosure of official royalty, bonus, and tax payments as required by the U.S. law and EU proposals is not sufficient to ensure positive returns on development for resource-rich countries. Equally important are regulations and safeguards to ensure that oil, gas, and mining companies are paying governments what they owe. Research shows that in addition to government corruption, the tax evasion and avoidance practices of multinational enterprises represent an enormous loss of income to developing countries, potentially on the scale of over US$1 trillion a year (Dev and Freitas, 2011). Extractive industry companies are among the most vigorous users of tax havens and aggressive tax planning strategies. And there is reason to believe that resource-rich countries, especially in Africa, experience outflows of illicit capital at greater rates than developing countries overall.

Detailed, reliable financial information from companies, in addition to their disclosure of on-the-books payments to governments, can help tax authorities and citizens ensure that companies are meeting their fiscal obligations. For this reason, the international Publish What You Pay campaign and others have recommended that mandatory country-by-country reporting standards should extend beyond payments to governments to require that companies publish data on profits, production volumes, sales, intragroup trade/financing, assets, and staffing information in all countries where they have a trading presence. Were this information public across jurisdictions, oversight in general would increase enormously, and developing countries in particular would be in a better position to judge whether they are getting a fair return on the sale of their natural resources.

The Emergence of a Contract Transparency Norm

Under pressure from civil society and parliamentarians, governments are making extractives contracts public. Contract transparency is critical to enable citizens to assess whether they are getting a good deal for their resources. The Revenue Watch Institute (2010) has made the case for contract transparency and deflects the arguments for secrecy. Publish What You Pay and other civil society organizations have called for the establishment of a contract transparency norm to ensure greater public scrutiny of the deals that are signed between governments and extractive industry companies. Liberia, Peru, and Timor-Leste have been disclosing their contracts without deterring investment in the natural resource sector. A number of additional countries have made firm commitments to publish their most important oil and mining agreements.

Following a strong advocacy campaign from local civil society groups, the new constitution of Niger mandates publication of all oil and mineral contracts in the country’s official gazette. Sierra Leone passed a new petroleum act that requires

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publication of all oil contracts. Ghana’s Ministry of Energy has made the country’s most important petroleum agreements available for download online. The Democratic Republic of the Congo has published dozens of its mineral and petroleum contracts. Guinea passed a new mining code that requires the publication of all contracts, both in the official gazette and on a government website. And in Iraq, the Kurdistan Regional Government published all of its petroleum production-sharing agreements. Countries that have already put contracts online or in print must ensure that the practice is maintained and that new agreements are subject to the same public scrutiny. Civil society and researchers must take advantage of disclosure and use the contracts for better analysis.

Broader transparency and broader citizens’ engagement can also have significant financial returns for the private sector. Henisz, Dorobantu, and Nartey (2011) found that close to two-thirds of the market capitalization of 26 publicly traded gold mining companies was a function of on-the-ground stakeholder engagement practices and political risk, whereas only 37 percent was a function of the value of gold they control.

**Sovereign Wealth Funds Governance**

Broadening the scope of transparency initiatives can empower citizens to play a more active role in monitoring oil, gas, and revenues put into natural resource funds. Greater citizen and parliamentary oversight provides a complement to the Santiago Principles, which can improve the management of SWFs against commodity price volatility and ensure funds are used for the public good. The recent creation of the Public Interest and Accountability Committee in Ghana (see Box 18.1) illustrates the role civil society can play in ensuring more effective fiscal management of natural resources.

**Strengthening Demand for Transparency at the Local Level**

The development of transparency mechanisms to monitor the transfer and use of oil, gas, and mining rents at the subnational level can increase domestic accountability and facilitate greater connection between governance reforms and improvements in service delivery and development outcomes. Although the chain of causality between disclosure of resource revenue and actual service delivery (health and education) is admittedly very complex and difficult to track (Gillies and Heuty, 2011), the expansion of multistakeholder initiatives such as the EITI at the regional and local levels can foster new modes of accountability toward citizens.

National governments are distributing a larger share of the revenues from oil, gas, and minerals to state and local governments, and, with this distribution, greater responsibility to provide basic public services. These revenues, however, are not always transferred in a transparent manner or on a regular schedule, and the capacity of state and local governments to manage the funds is often low.

In Peru, where the EITI is implemented at the national level but no template for its adaptation at the subnational level exists, the organization Grupo Propuesta
Ciudadana (GPC) has developed a comprehensive system for monitoring the transfer and use of the oil, gas, and mining rents redistributed to regional governments and municipalities. GPC has also collaborated with regional authorities to build government officials’ capacity to forecast revenues and mitigate the impact of volatility. In Indonesia, the Centre for Regional Information and Studies created a local multistakeholder platform in two new oil-producing districts (Blora and Bojonegoro) to ensure regular budget disclosure. In both countries, local initiatives increased the predictability of transfers and put pressure on the government to use windfalls for development. For instance, Bojonegoro’s education budget increased by 27 percent in 2011. This local transparency and accountability mechanism provided a model and motivation for Indonesia’s EITI candidacy at the national level. Such initiatives are part of a broader effort to increase social accountability to stimulate the “demand” for good governance and better public service delivery.7

BOX 18.1 Ghana’s Public Interest and Accountability Committee

In 2007, commercial quantities of oil were found off the coast of Ghana. Oil started flowing in December 2010. With proven reserves of 500 million barrels and estimated peak production of 120,000 barrels per day, Ghana is poised to become a minor oil-producing country. In April 2011, the Parliament adopted the Petroleum Revenue Management Act (PRMA) to regulate management of money earned in Ghana’s new oil production sector. The law commits the nation to saving a minimum of 30 percent of its oil revenues in Heritage and Stabilization Funds that will both protect the economy against oil price volatility and put aside earnings from this finite resource for future generations.

Under the bill, the remainder of oil revenues will not be relegated to overseas accounts, but will be invested in productive sectors of the Ghanaian economy. Civil society participation in the debate on oil revenue management resulted in the adoption of strong transparency and governance provisions. The PRMA established rigorous rules for reporting on oil fund assets and investments and created an independent regulatory body, the multistakeholder Public Interest and Accountability Committee (PIAC), to monitor compliance with the law.

The objectives of the PIAC are threefold. First, it will “monitor and evaluate compliance of this act [PRMA] by government and other relevant institutions.” Second, it will “provide a space and platform for public debate . . . on whether the use of [oil] revenues conforms to development priorities.” Third, it will “provide an independent assessment on the management and use of petroleum revenues” (Government of Ghana, 2011, p. 24).

The role of the PIAC is advisory, and it has no formal powers to force government to alter its spending policies. Potentially, it does have significant leverage with government, because the committee consists of 13 high-standing members of Ghanaian society with a sizable public backing. Represented on the committee are religious, traditional, and professional bodies; civil society and community-based groups; trade unions; and the Ghana Extractives Industries Transparency Initiative. The committee publishes biannual reports on the performance of government and concerns in society.

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7See Gillies and Heuty (2011), pages 36–37, for a more detailed discussion of social accountability tools.
New Technologies for Transparency and Accountability

New technologies can also increase the timeliness, usability, and relevance of the information disclosed through the EITI and other transparency initiatives. Over 50 reports have been produced by EITI countries, and these reports contain valuable data on oil and mining revenues, but they are underutilized by citizen groups due to capacity constraints and by investors due to the low quality of the reports. The Revenue Watch Institute has created an online database for viewing and sharing report data and analyzing the quality of reports. This tool\(^8\) presents EITI report scorecards and permits the user to see country summaries, view analysis by indicator, and compare results by country. The connection between EITI figures and new sources of data, such as revenue figures reported in IMF Article IV consultation reports, would enhance citizens’ ability to hold their governments accountable by comparing what is reported through the EITI process and the flow of funds entering the budget.

More regular, systematic disclosure of data—standardized and in an electronic format—by the IMF could also allow citizens to compare the figures to the revenues going to SWFs, kept by national extractives companies, or diverted to other off-budget instruments. This knowledge could generate a strong debate about money from oil, gas, and mining placed into natural resource funds and kept by national extractives companies. The Dodd-Frank Act will generate additional company data that can inform advocates and investors and fuel policy debate about revenues from the extractive sector. Innovative approaches can also empower citizens through mapping of fiscal transfers.

CONCLUSION

We are at the beginning of an era of new opportunities to create transparent, accountable, and effective management of oil, gas, and minerals in countries that are rich in natural resources but, in many cases, are fragile and poor. The EITI has emerged as a strong revenue transparency norm. The credibility and relevance of the process requires the active and knowledgeable participation from civil society. The growth of the Publish What You Pay civil society coalitions has been instrumental to the progress of the EITI. Yet the impact of transparency initiatives on economic growth and development has been limited. To address the asymmetries of information between citizens, governments, and companies, a more comprehensive and systematic set of transparency and accountability norms is warranted.

Strengthening the capacity of civil society, parliamentarians and media is a prerequisite for bridging the gap between transparency, accountability, and socio-economic change. An environment allowing citizens to use available information to hold their governments accountable is also a major condition for greater impact. International financial institutions and donors have a responsibility to

\(^8\)Available at www.revenuewatch.org/eitireports.
foster oversight actors and encourage governments to allow their citizens freedom of information and expression.

Broadening the scope of transparency initiatives will help develop a coherent and harmonized global transparency norm for oil, gas, and mineral management. A number of governments of resource-rich countries have started to disclose extractive contracts on a routine basis. Systematic disclosure of contracts and comparison with data available from the EITI and country-by-country legislation in the United States and Europe would help curb corruption and increase financing for development in LICs. More progress is needed to make state-owned companies and SWFs transparent and accountable, as existing frameworks limit oversight over large resources that flow out of the budget process and prevent citizens, parliamentarians, and the media from tracking the money.

Revenues from oil, gas, and minerals far outstrip foreign aid and have far greater potential to finance poverty reduction and development objectives. Those revenues must be harnessed and put to good use. Empowering civil society, parliamentarians, and the media is fundamental to transforming natural wealth into well-being.

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