

---

# 3

## Dealing with Changing Commodity Prices

As discussed in chapter 2, the rise in primary commodity prices between 2003 and mid-2008 was much larger and more sustained than those of earlier decades. Although commodity prices have fallen sharply from their recent highs, they remain well above their levels in the early 2000s and are projected to remain high relative to their levels in the 1990s for a significant period of time.

The boom in commodity prices has generated dramatic transfers of income within and among countries. While high commodity prices have imposed a severe burden on many consumers, they have also created significant opportunities for producers. The short-term macroeconomic, balance of payment, inflationary, and growth implications of these higher prices were discussed in chapter 1, while long-term prospects for commodity markets were discussed in chapter 2.

This chapter focuses on the challenges that prolonged periods of high and then low commodity prices pose for developing countries. In particular, it evaluates the policies adopted by both commodity-producing and -consuming countries during this boom, as well as the potential role of the international community in managing the commodity price boom to maximize the development impact and protect the most vulnerable.

The main messages arising from this analysis are:

**Commodity dependence need not hurt long-term growth. Indeed, high commodity prices provide a development opportunity but only if the proceeds are not squandered and if the right policies are adopted.**

- Although commodity-dependent economies have, on average, grown more slowly than more diversified economies, for most economies dependence on commodities is the result of slow growth, not the cause. Several countries have achieved rapid development based on the exploitation of natural resources.
- To achieve the growth potentially inherent in commodity riches, countries need to implement policies that minimize the potential disruptive effects of volatile export revenues, exchange rate appreciation that can erode the competitiveness of manufacturing, and incentives for rent seeking and corruption.

**Higher food prices, while damaging to urban consumers, may help lower poverty in the long run.**

- Higher agricultural prices provide additional income in the rural economy, where more than 75 percent of the world's poor live. Some of this income will go directly to

farmers, potentially helping them move beyond precarious forms of subsistence agriculture. Another part will go to raise incomes of farm workers and increase demand for related services such as transportation, inputs, and processing.

- For these potential gains to be realized government will need to pursue policies that invest in infrastructure, including roads and marketing institutions to move farm products to markets and inputs to farmers.

**Resource-dependent developing countries have done a better job than in the past of managing the macroeconomic consequences of rapidly rising foreign currency earnings.**

- Government spending in most countries has responded more prudently to increased commodity revenues than in the past. Instead of spending temporary windfall reserves, many governments have accumulated foreign reserves, and created and augmented sovereign wealth funds. As a result, real effective exchange rates in most resource-rich countries have appreciated by less than in the past. Finally, resource-dependent countries are less corrupt and more transparent when compared with more diversified economies than in the past.
- As a result, the nonresource sectors of these countries are more likely to have avoided a large deterioration in international competitiveness, and a strong procyclical cut in spending is less likely to accompany the recent decline in commodity prices. Improvements in governance may also have contributed to these developments and have increased the chances that revenues are being allocated toward projects that enhance the long-term development potential of countries.
- Although in aggregate the story is encouraging, some countries are experiencing strong inflationary pressures that may reduce their competitiveness and the sustain-

ability of growth. Others that lack a long history of oil or mineral development have pursued less prudent policies that may have sown the seeds of future difficulties.

**High food and oil prices may have increased the number of people living in extreme poverty by between 130 and 150 million.**

- High food and fuel prices have implied enormous transfers in incomes between producers and consumers. High fuel prices have reduced real incomes in oil-importing developing countries by some \$162 billion dollars but increased them by some \$400 billion in oil exporters. With the exception of a few import-dependent countries, food is mainly consumed in the same country where it is produced. As a result, the redistributive impact of high food prices is mainly between domestic producers and amounted to some \$277 billion between January 2007 and August 2008.
- Within countries, the largest poverty impacts have been among urban populations, which have not benefited from increased earnings to the same degree as the rural population. Impacts were also larger in countries with fewer domestic alternatives to internationally traded grains, whose prices rose the most (maize, wheat, and rice).

**To mitigate the poverty impacts of higher food prices in a fiscally responsible way, countries need to respond with targeted measures. The record so far is mixed at best.**

- Strict targeting of assistance programs is essential to reach those most affected while limiting the strain on fiscal accounts. The costs of fully compensating people in developing countries for higher food and fuel prices would be prohibitive both to countries and to the aid community. Costs range between 6 and 27 percent of the GDP of individual countries.

- Many policies imposed by countries so far (lower taxes, export restrictions, and price subsidies) have been costly and have impeded adjustment. Increased fiscal outlays have exceeded 2 percent of GDP in many countries. Moreover, policies designed to keep domestic prices low have exacerbated and prolonged high market prices by reducing incentives to increase production and reduce consumption.
- Countries should seek to expand or create more-targeted safety net programs. Food subsidy programs, fuel subsidies, and tax exemptions tend to be regressive, with most of the benefits accruing to the non-poor. In contrast, well-targeted schemes, involving some form of means testing or selection mechanisms such as geographic targeting or a work requirement, are most successful in reducing costs and concentrating benefits among the poor.

**Some modest steps have been taken, but the international community can do much more to mitigate the impact of high prices and reduce the likelihood of further spikes and new commodity booms.**

- Given the magnitude of the problem, international efforts to assist the poor need to focus on the most vulnerable. One approach would be to direct aid to assisting the extreme poor in IDA-eligible countries (countries whose poverty and lack of access to market-based finance make them eligible for concessional lending and grants from the World Bank Group). The cost of compensating the poor in these countries for the rise in food prices between January 2005 and December 2007 would be about \$2.4 billion.
- International agreement is needed to place more effective restrictions on the use of export bans, which have become too common. These bans have increased global food price volatility and reduced confidence in the reliability of world food mar-

kets, with potentially long-term impacts on food policies.

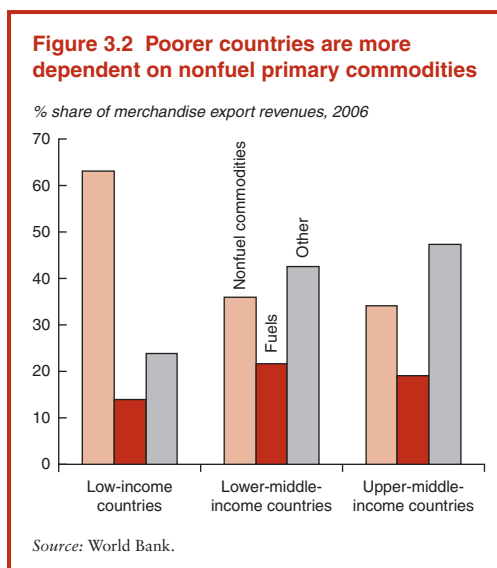
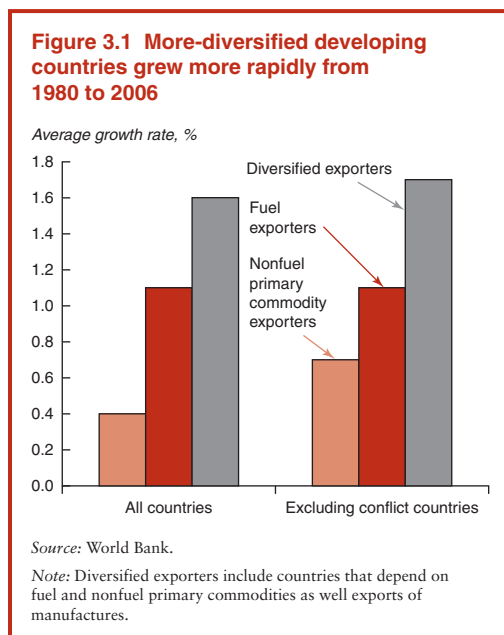
- Efforts to improve information about and coordination of global grain stocks could reduce the probability of another food crisis. Similarly, the effectiveness of humanitarian aid would be enhanced if the World Food Programme (WFP) were provided with a stable source of financing and a line of credit that would allow it to respond rapidly to emergencies.
- Biofuels policies that subsidize production, impose high tariffs, and mandate consumption need to be reconsidered in light of their impact on food prices and their trade-distorting effects. Such policies have led to rapid expansion of biofuels production from food crops, such as maize and vegetable oils, and have contributed to higher food prices as well as to environmental degradation. These policies have also reduced opportunities for lower-cost developing-country producers to expand production and exports.
- A successful conclusion to the World Trade Organization's Doha Round will not reduce food prices in the near term, but it does offer the prospect of greater discipline in agriculture and more-rapid income growth in developing countries.

The remainder of this chapter is organized as follows. The next section considers the perspective of commodity-producing countries, evaluating the extent to which their policies have succeeded in coping with volatility from commodity prices, thus avoiding some of the pitfalls that have typically caused such countries to grow less quickly than resource-dependent countries. The following sections examine the boom from the perspective of consumers, focusing on the impact of high prices on the poor and the effectiveness of the antipoverty measures imposed and their impact on long-term adjustment. The chapter then considers the international response to the rise in food prices and sets out some concluding remarks.

## Commodity dependence and growth

Economic dependence on primary commodities has been long associated with slow growth in development.<sup>1</sup> While commodity booms are often associated with a pickup in growth, countries heavily dependent on the exports of commodities have slower growth over the long term than those with more diversified exports (the so-called resource curse). This section argues that this relationship should not be interpreted as causal and is, in fact, far from inevitable. Provided the right policies are adopted, the resource-rich developing countries have much to benefit from a period of high commodity prices.

The idea that there exists a resource curse derives from the observation that countries dependent on primary commodities for their export revenues have tended, on average, to grow more slowly than more-diversified exporters (figure 3.1). Developing countries, which in 1980 derived more than 70 percent of their export revenues from nonfuel primary commodities, increased their per capita GDP by only 0.4 percent a year between 1980 and



2006, and countries that mainly exported fuels raised their per capita GDP by 1.1 percent a year (figure 3.2). By contrast, more-diversified exporters achieved per capita growth of 1.6 percent a year. The same relationship holds if countries severely affected by conflict are excluded, although the nonfuel primary commodity exporters fare somewhat better in this case.

Moreover, low-income countries tend to be more dependent on nonfuel commodity exports than high-income countries (see figure 3.2). More than 60 percent of the exports of low-income countries derives from nonfuel commodities compared with about 33 percent for high-income countries.

### *Resource dependency reflects low GDP, not resource wealth*

However, resource dependence is not the same as resource richness. Most countries that are resource dependent (measured as the share of non-oil primary commodities in exports) actually have relatively poor resource endowments (measured as per capita income derived from non-oil primary commodities). Conversely, many countries that are rich in resources have low resource dependencies because, in addition to having ample resources and large

**Table 3.1 Non-oil or resource-rich countries have higher per capita incomes than resource-dependent countries, 2006**

	Real GDP per capita (US\$)	Share of nonfuel primary commodities in exports (percent)	Net nonfuel primary commodity exports per capita (US\$)
<b>Top countries dependent on non-oil primary commodities</b>			
1 Gambia, The	320	97	-81
2 Uganda	275	91	17
3 Cuba	—	85	49
4 Ethiopia	146	84	6
5 Niger	168	83	3
6 Malawi	145	82	24
7 Jamaica	3,357	81	276
8 Rwanda	262	80	-4
9 Chile	5,896	79	2,596
10 Burundi	102	79	-4
<b>Top countries rich in non-oil primary commodities</b>			
1 New Zealand	15,199	62	2,597
2 Chile	5,896	79	2,596
3 Australia	23,262	48	2,389
4 Netherlands	25,678	16	1,447
5 Norway	41,446	14	1,436
6 Ireland	30,736	10	1,265
7 Denmark	32,484	23	1,142
8 Canada	25,894	17	1,082
9 Estonia	6,938	26	675
10 Kazakhstan	2,166	28	533

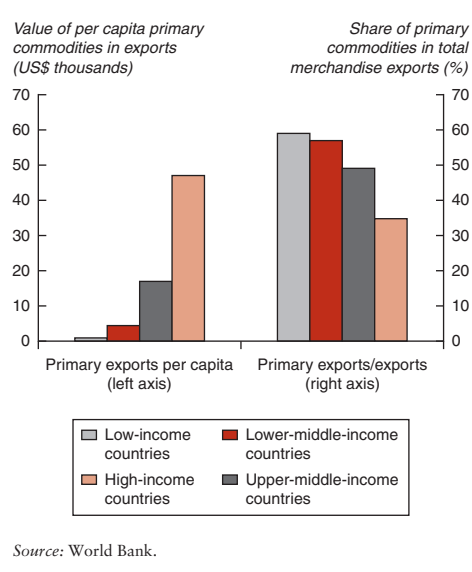
Source: World Bank.  
Note: — = Not available.

resource sectors, they also have thriving industrial and service sectors. Oil-exporting countries are excluded from this comparison because most of them are both resource rich and resource dependent.

Resource dependency primarily reflects low levels of GDP, not resource richness. While the top 20 non-oil resource-dependent countries have an average annual per capita income of just \$1,099, the annual income of the top 20 resource-rich countries is 11 times higher (table 3.1). These trends are reflected more broadly. Even when oil exporters are included in the mix, low-income countries have the highest dependence on primary commodities, but the lowest level of primary commodity exports per capita, and the inverse is true for rich countries (figure 3.3).

Considerable efforts have been made to determine if, after controlling for other determi-

**Figure 3.3 On average, poor countries are dependent on commodities but relatively resource poor**



nants of growth, dependence on primary commodities is associated with slower growth. Several authors have found a negative relationship in cross-section regressions between natural resource abundance and growth.<sup>2</sup> Others find that natural resource abundance is not responsible for the slow growth of resource-rich developing countries (Manzano and Rigobon 2007), and that there is a positive relationship between resource abundance and both short-term (Collier and Goderis 2007) and long-term growth (Lederman and Maloney 2007) after accounting for other growth determinants.

### *Commodity dependence may, but need not, result in slower growth*

While the causality behind these correlations remains unresolved in the literature, there is consensus about the channels through which commodity dependence could contribute to weaker growth. These include:

- A tendency for significant fluctuations in export revenues, often exacerbated by

## Box 3.1 The impact of severe shocks on economic progress

As discussed in chapter 2, at the national level the revenues from commodities tend to be much more volatile year to year than at the global level, and they are more volatile than manufactures. As a result, countries for whom primary commodities represent a large share of exports experience higher levels of GDP volatility than countries with more diversified exports.<sup>a</sup> Indeed, export revenues, the real exchange rate, and per capita output were all more volatile over the past 25 years among those developing countries where primary commodity exports represented more than 70 percent of total exports (box figure).<sup>b</sup>

High volatility in these annual data reflects pronounced economic cycles that can have adverse implications for growth and development.<sup>c</sup> Sharp booms and busts can lead to unemployment and underutilized capital during downswings and to bottlenecks during upswings. High levels of uncertainty concerning future prices and demand can depress

the average level of investment over the cycle. Higher risks may bias lenders toward shorter maturities, further raising the risks of investment. And volatility of consumption reduces welfare directly if most consumers are risk averse.

For countries with the same level of primary commodity dependence, less-developed economies tend to be more sensitive to such swings because they lack the means of coping with volatility. In countries with more-developed financial systems, individuals can borrow to smooth consumption over the cycle, firms can borrow to sustain operations in bad times, and governments can run countercyclical fiscal policy to reduce the macroeconomic implications of adverse shocks. By contrast, in less-developed countries with underdeveloped domestic financial systems and weak access to international finance, these adjustment mechanisms tend to function poorly. As a result, the impact of volatility on long-term growth and welfare is more severe.

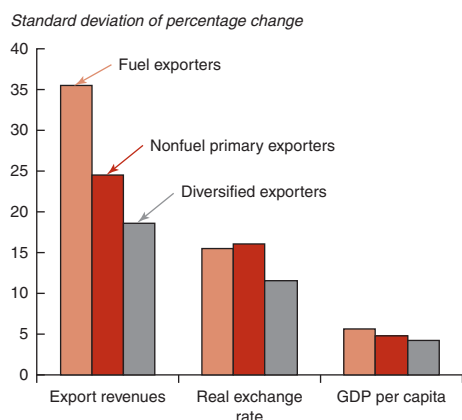
Moreover, poor households suffer most from adverse shocks, because they tend to have lower levels of savings, have limited access to credit (and interest rates from informal lenders tend to be high), and must therefore respond to negative shocks by cutting into already low levels of consumption. In addition, if workers lose labor experience and connections and children leave school, these permanent losses in human capital may increase long-term poverty (Ocampo 2003).

Whether month-to-month or day-to-day volatility has similarly deleterious economic impacts is less clear. High-frequency volatility tends to increase transaction costs and reduce activity levels, but it is less likely to cause the kind of cycles in investment behavior and economic activity described above. Moreover, high-frequency volatility is easier to overcome through traditional financing mechanisms, such as short-term credit and inventory adjustments.

An illustration of the difference between economic cycles and measured volatility based on more frequent data is provided by the recent boom in commodity prices. While this was the longest and largest commodity price boom in the past 100 years (see chapter 2), price volatility, as measured by changes in monthly data, increased only modestly

**Box figure 3.1 The impact of severe shocks on economic progress**

Economies dependent on primary commodities experience more volatility



Source: World Bank.

Note: Volatility is defined as the standard deviation of percentage changes over time (annual data). Commodity concentration measured in 1980. Excludes countries with population of less than 1 million.

until 2008. Indeed, only some of the commodities that have experienced a sharp rise in price experienced greater volatility during the price rise than they did previously (box table). Volatility did increase for almost all of the principal commodities in 2008, reflecting the rise in prices earlier in the year and their subsequent decline.

### Price volatility has not increased systematically

Average absolute monthly percent price change

	Crude oil	Copper	Aluminum	Coal
2000–03	8.4	3.4	3.1	4.0
2004–07	6.9	6.2	4.6	5.7
2008	7.6	6.3	6.5	15.0
	Wheat	Corn	Rice	
2000–06	4.5	5.0	2.9	
2007	7.9	6.1	1.8	
2008	9.5	9.4	18.3	

Source: World Bank.

Note: Volatility is defined as the average of the absolute value of the month-to-month percentage change in detrended prices.

a. See Turnovsky and Chattopadhyay (1998) and Van der Ploeg and Poelhekke (2007) among many others. Cashin, Cespedes, and Sahay (2002) show that volatile commodity prices increased the volatility of real exchange rates for 58 countries over 1980–2002.

b. The more diversified exporters include countries that depend on both fuel and nonfuel primary commodities, as well as exporters of manufactures.

c. In cross-country regressions, Aghion and others (2005) find that real exchange rate volatility lowered growth performance in developing countries over 1960–2000. Fatas and Mihov (2005) find that variability in inflation and government spending were related to lower growth in a cross-section of 91 countries. Aizenman and Marion (1996) find a negative relationship between volatility and private (but not total) investment, and Bleaney (1996) and Ramey and Ramey (1995) find a negative relationship between volatility and growth but not between volatility and investment. Empirically, there is a relatively robust negative relationship between high volatility of growth rates and the level of development (Koren and Tenreyro 2003). However, the direction of causation is unclear. Rather than suggesting that volatility causes underdevelopment, the greater dependence of poorer countries on relatively volatile primary commodities may explain the correlation.

procyclical government spending, to accentuate economic cycles, tending to depress growth over the medium term (box 3.1);

- A tendency for exchange rate appreciations associated with commodity booms to weaken the competitiveness of the non-commodity sectors of the economy (the so-called Dutch disease); and
- A tendency for high commodity revenues to incite individuals to attempt to appropriate the wealth generated by the resource without investing in productivity or value-enhancing activities (rent-seeking behavior) or, in the worst cases, to engage in outright corruption.

Of course, abundant commodity wealth, or a large rise in the value of commodities stemming from higher prices, can also contribute to a country's development, if the implied income generated is fruitfully invested—for example, in infrastructure, education, and health or in additional productive capacity when the

rents accrue to the private sector. Although more easily said than done, when government controls the resource rents, care must be exercised to avoid forcing the economy down an artificial capital-intensive path instead of using the commodity rents to exploit the economy's comparative advantage, which could be based on a combination of commodities, commodity-intensive sectors, and labor-intensive services.

What determines whether resource wealth generates wider development is the extent to which the proceeds are consumed (appropriate for a permanent increase in income) or saved (appropriate for a temporary increase); whether they are invested in high- or low-return enterprises; the extent to which rents accrue to the population at large or are channeled through the government; and whether they are deployed responsibly and transparently by governments, or used to fund a bloated civil service or are even stolen outright.

Overall, an abundance of natural resources does not necessarily impair development and can in fact promote it, but it does present particular challenges that require appropriate policies to overcome.

## Managing primary commodity booms

While dependence on primary commodities does not condemn a country to slow growth, it does require careful management of macroeconomic policy to reduce the impact of volatile export revenues (see box 3.1).

In past decades, the governments of several developing countries failed to react appropriately to commodity price booms, increasing public expenditures on inefficient, import-intensive investment projects (Cashin, Cespedes, and Sahay 2002) and borrowing excessively—expecting export revenues to remain high for longer than was the case.<sup>3</sup> As a result, many of them faced severe economic difficulties when prices declined. For example, the seeds for the Latin American debt crisis of the 1980s were sown by the accumulation of debts by countries during a period of high commodity prices. The payments for these loans proved to be unsustainable when interest rates rose and commodity prices declined, resulting in years of slow growth or economic stagnation (Manzano and Rigobon 2007).

### *Commodity revenues and fiscal spending*

The tendency for a temporary rise in revenues to be reflected in an unsustainable rise in government spending has historically been an important explanation for the poor long-term growth performance of commodity-dependent developing countries. Countries that are dependent on point resources—oil and metals—are particularly vulnerable because the government is the direct recipient of a large share of boom revenues, either through ownership of the resource or through taxing the rents accruing to a limited number of private firms. By contrast,

government revenues are less sensitive to booms in agriculture prices because agricultural export crops are produced in many locations by many producers, so production expands to the point where, in normal times, there are no rents for governments to appropriate and no special tax regimes (Collier 2007).

Although the evidence is not conclusive, the tendency for government spending to rise with windfall revenues, while still present during the current commodity boom, is less pronounced than in the past. This in turn suggests that perhaps the strong growth that has been associated with higher commodity prices this time may prove more sustained than in past booms.<sup>4</sup>

### *Resource-rich developing countries have shown greater fiscal restraint during the current boom*

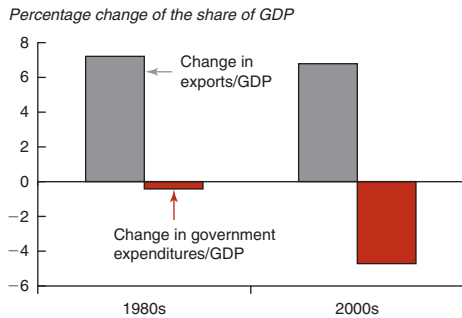
During this boom, resource-rich developing countries appear to have shown greater fiscal restraint than they did during earlier booms, thereby reducing the risk of a procyclical cut in government spending now that commodity prices are declining.<sup>5</sup> The average general government budget surplus of oil-exporting countries improved from 0.6 percent of GDP in 2001 to 7.7 percent in 2007. Among developing-country exporters of oil, minerals, and agricultural products, public consumption has increased more slowly than private consumption, external debt has risen more slowly than during past booms, and government borrowing has increased more slowly than private borrowing (IMF 2008b).

While fiscal policy responses have been extremely diverse,<sup>6</sup> government expenditures of primary commodity exporters have increased less strongly than during the 1980s, a period like the current boom when the export revenues of resource-dependent developing countries increased by about 7 percent of GDP (figure 3.4).<sup>7</sup>

In the 1980s, government spending tended to increase procyclically—rising in line with the boom in GDP caused by windfall commodity revenues. As a result, the ratio of



**Figure 3.4 Government spending by primary commodity exporters responded less to export booms in this decade than in the 1980s**



Source: World Bank.

Note: The country sample includes developing countries where primary commodities account for more than 70 percent of merchandise exports. The figures represent the percentage point change in merchandise exports divided by GDP, and government expenditures divided by GDP, during the boom.

government expenditure to GDP was broadly stable. On a cyclically adjusted basis, however, government spending rose. Because much of the additional money went to government spending and transfer programs of a quasi-permanent nature, the increased spending proved hard to reverse when GDP slowed and commodity prices reversed. Governments were either obliged to cut spending procyclically as commodity prices fell, which exacerbated the cycle, or allow the deficit and debt to build up, increasing their macroeconomic vulnerability

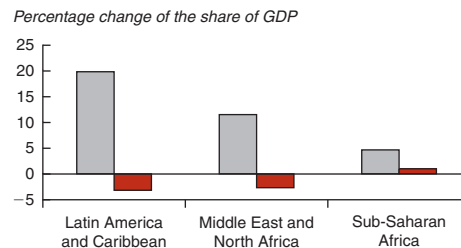
Most recently, governments have reacted much more prudently. As a consequence, while government expenditure has increased in real terms, it has declined as a share of GDP by almost 5 percentage points. Government expenditure among nonfuel exporters has declined the most, perhaps reflecting concern that nonfuel commodity prices would remain high only temporarily and the tendency for governments to absorb a smaller share of windfall revenues from high prices for nonfuel commodities than from those for hydrocarbon resources.<sup>8</sup> Fuels (and minerals) exporters

have also taken steps to increase the share of the windfall revenues that accrue to the state, although care must be taken to avoid harming incentives for production (box 3.2).

Much of the difference between the two periods reflects more prudent behavior by governments in Sub-Saharan Africa. During the 1980s boom, government expenditures in countries dependent on primary commodities in Sub-Saharan Africa rose even more quickly than GDP. In this decade, the ratio of government expenditures to GDP has declined by almost 8 percentage points (figure 3.5). This trend contrasts with the spending pattern in Latin America and the Caribbean and the Middle East and North Africa (other regions have too few observations to report useful

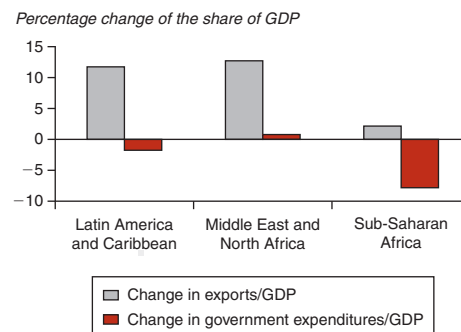
**Figure 3.5 Public expenditures in Sub-Saharan Africa grew much less quickly in the 2000s than in the 1980s**

a. 1980s



Source: World Bank.

b. 2000s



Source: World Bank.

## Box 3.2 Efforts to capture a larger share of windfall commodity revenues

As commodity prices increased, a number of countries sought to increase the share of the windfall that accrues to the state. Several energy producers (including Argentina, Bolivia, Colombia, Ecuador, and República Bolivariana de Venezuela) have increased, or are considering increases in, the rates for royalties or taxes. A few countries have forced the renegotiation of contracts or nationalized exploitation rights, which has had a chilling effect on investors' willingness to participate in some markets. Developed-country governments (for example, Alaska in the United States and Alberta in Canada) also are increasing their revenue share.

The governments of several metal-producing countries also have attempted to increase their share of the rising profits in recent years (UNCTAD 2006). For example, Mongolia instituted increased rights for the government to acquire equities in new ventures. The Democratic Republic of Congo is reviewing contracts for mineral extraction signed since 1995 with the purpose of increasing the government's stake. Governments, including Chile, Mongolia, Peru, South Africa, and Zambia, have taken steps or are considering proposals to raise mineral taxes or royalty fees.

Countries that contract with private (often international) firms to exploit nonrenewable resources have revised contracts to reflect higher prices. The danger here is that arbitrary changes in their share of

revenues will reduce the companies' incentive to invest and lower confidence in the broader investment climate. An alternative approach, which is now being considered by several countries, is to base the government's revenue share on the price. For example, Colombia has proposed imposing an additional 5 percent tax on every \$30 increase in the price of a barrel of oil, thereby raising the tax rate to 75 percent when oil exceeds \$140 a barrel. This kind of arrangement holds some promise of creating a stable framework so that firms can evaluate investments accurately and governments can capture a fair share of windfall revenues when price increases.

It is understandable that countries wish to capture a rising share of revenues from nonrenewable resources as prices increase. However, such efforts need to be carefully calibrated to maintain appropriate incentives for making new investments and maximizing current output. Countries with state-owned companies that control resource extraction have to ensure that incentives facing these companies encourage efficiency. For example, whereas some state-owned energy firms (for example Brazil's Petrobras) continue to enjoy very positive relations with service-providing firms and are efficiently managed, others (such as in Mexico and República Bolivariana de Venezuela) face very high effective tax rates that have resulted in chronic underinvestment, declining output, and poor efficiency.

averages), where government spending has been more procyclical—rising at about the same rate as GDP as during the 1980s.

*Surprisingly the extent to which governments are saving from increased oil revenues is only loosely correlated with the size of their reserves*

For countries dependent on nonrenewable resources, the optimal fiscal response to primary commodity price booms in part depends on the importance and expected life span of the resource.<sup>9</sup> Some countries, such as República

Bolivariana de Venezuela, could continue to produce oil at current rates until almost the end of this century before exhausting all of the oil deposits detected under their soil (table 3.2). However, other countries that are heavily dependent on deposits of oil or mineral resources could exhaust their reserves (as currently estimated) within one or two decades.<sup>10</sup>

If resources are viewed as a national asset of both current and future generations, then countries with low reserves should be saving a much larger proportion of permanent (and windfall) revenues—investing them in either

**Table 3.2 Ratios of reserves to production vary greatly among oil exporters (Percent)**

Countries	Share of oil in merchandise exports	Ratio of oil reserves to current production
Algeria	95.7	16.8
Angola	92.0	17.6
Azerbaijan	85.1	29.3
Equatorial Guinea	83.8	13.8
Gabon	71.1	25.3
Iran, Islamic Rep. of	89.8	86.7
Iraq	88.1	157.6
Kazakhstan	52.8	76.5
Libya	98.7	61.9
Nigeria	95.6	40.3
Oman	85.2	20.5
Congo, Rep. of	92.1	19.9
Sudan	74.8	44.2
Syria, Arab Rep. of	58.3	19.7
Turkmenistan	81.0	9.2
Venezuela, R. B. de	80.5	77.6
Yemen, Rep. of	80.9	20.0

Source: World Bank, British Petroleum.

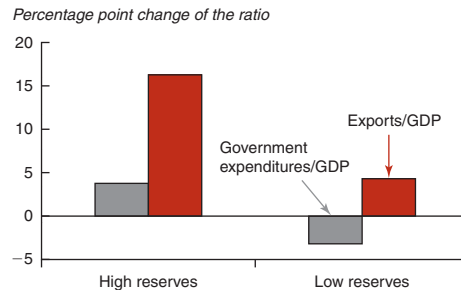
productive potential or financial assets that will continue to generate an income even as the original resource is depleted.<sup>11</sup> To a degree, this is what countries are doing. The share of government spending in total GDP among countries with low reserves has declined, whereas those with high reserves have been more procyclical (figure 3.6).<sup>12</sup>

Countries like Algeria, Angola, the Republic of Congo, Turkmenistan, and the Republic of Yemen, all of which have less than 20 years worth of reserves and rely upon hydrocarbon exports for 80 or more of their merchandise exports, face serious challenges. Unless their savings from oil revenues are high, associated expenditures are likely to lead to exchange rate appreciation, with serious negative impacts on the non-oil sectors of their economies (see below).

### *Private sector saving from commodity revenues*

While governments appear to be saving more of the windfall than they did in the 1980s, private sector spending is rising rapidly—especially among non-oil primary commodity

**Figure 3.6 Oil-exporting countries with large reserves spent a smaller portion of their revenue from the recent boom in oil prices, 2000–06**



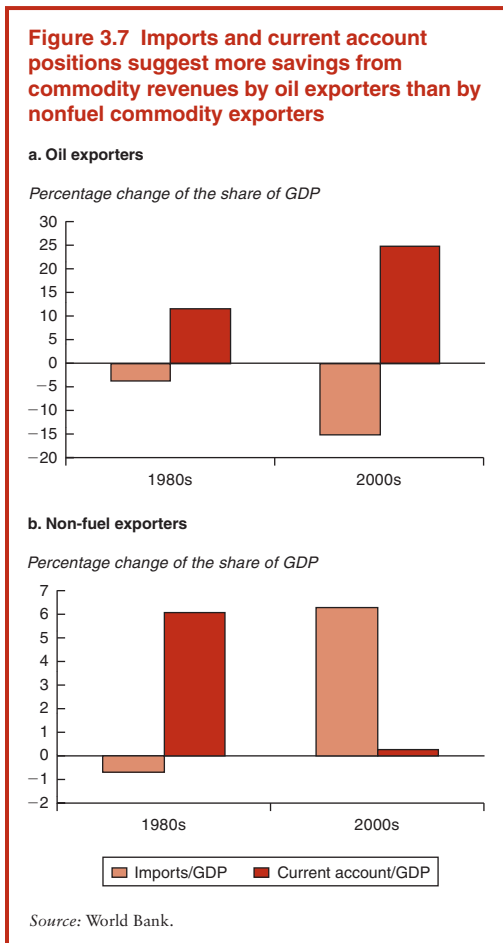
Source: OPEC Secretariat, *World Oil, Oil and Gas Journal*, World Bank staff calculations.

Note: Includes countries where oil accounts for more than 70 percent of merchandise export revenues and data on oil reserves, oil production, and government expenditures are available (Angola, Republic of Congo, Equatorial Guinea, Islamic Republic of Iran, Kazakhstan, Libya, Nigeria, Oman, Syrian Arab Republic, Turkmenistan, República Bolivariana de Venezuela, and Republic of Yemen).

exporters. However, much of the demand is going to investment goods. Investment demand in commodity-dependent economies increased 7.5 percentage points faster during this boom than during the 1980s. As a result, the current private sector boom should be increasing domestic productive capacity that will help countries sustain the high growth of the past several years.

Reflecting the large share of commodity revenues that accrue to the government in oil-exporting countries and the relative prudence that these governments have displayed, imports in these countries have increased less rapidly than GDP, and current account surpluses have improved significantly as a share of GDP during the recent oil price rise. This pattern is similar to, but more pronounced than, that prevailing during the 1980s boom (figure 3.7).

In part because the benefits of high agricultural prices accrue to a much wider segment of the population, the private sector in non-oil-commodity exporters appears to have increased spending sharply during the recent boom, with much of the increased demand



having been met through imports. The ratio of imports to GDP increased by 6 percentage points, and the current account balance has remained roughly stable despite a 23 percent rise in export revenues.

### Real currency appreciation

The rapid increase in imports and the stability of the current account in the face of rising export revenues and domestic demand is potentially disturbing, because it suggests that the domestic supply response in these countries has been relatively weak. This situation is especially problematic if the increased imports are consumption goods, and if they are associated with a real effective appreciation of the currency that has impaired the competitive-

ness of the noncommodity sectors of the economy. To the extent that the imports reflect investment, they are less worrisome if they are creating the future productive potential that will allow these countries to continue growing strongly when commodity prices and incomes weaken.

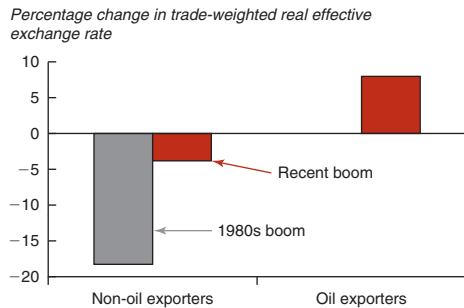
### Most resource-rich countries are showing fewer signs of real effective exchange rate appreciation

The relationship between export revenues and the exchange rate is complex. While a real exchange rate appreciation is the appropriate response to a long-term improvement in the terms of trade, it may have a deleterious impact on the economy if the appreciation proves short-lived. Potential negative effects include adjustment costs, such as increased unemployment or the bankrupting of marginal firms, and reductions in potential positive externalities in tradable goods sectors, such as

- More-rapid technological progress through learning by doing in industries characterized by firm-specific knowledge
- Demonstration effects, where the gains in efficiency of one firm are easily copied by others
- Increased incentives for accumulation of human capital
- More-stable and faster-growing markets in manufactures than primary commodities<sup>13</sup>

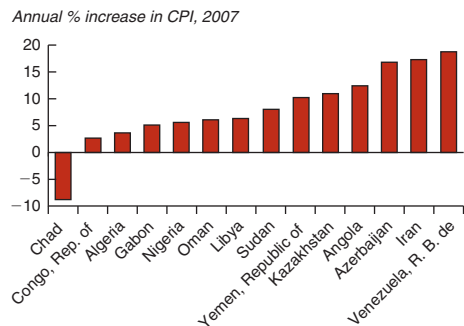
During the most recent boom, there is some evidence that developing countries have succeeded in limiting the appreciation of their currencies, thus reducing potential adjustment costs as prices decline (figure 3.8). On average, the currencies of non-oil primary commodity exporters have actually depreciated by a modest 4 percent in real effective terms, while the currencies of developing-country oil exporters have appreciated only 8 percent in real effective terms—although most recently domestic inflation has risen to more than 10 percent in Angola, the Islamic Republic of Iran, República

**Figure 3.8 Primary commodity exporters limited the real appreciation of their currencies during the recent boom**



Source: IMF data. World Bank staff calculations.

**Figure 3.9 Many oil exporters are suffering significantly higher inflation**



Source: World Bank data.

Bolivariana de Venezuela, and the Republic of Yemen (see chapter 1 for a discussion of inflation and commodity prices) (figure 3.9).<sup>14</sup>

The limited currency appreciation in response to the commodity price boom is in part attributable to the fiscal restraint discussed earlier. Government expenditures fall most heavily on nontraded goods. As a result, increasing government expenditures tend to raise the price of nontraded goods relative to traded goods, which causes the real exchange rate to appreciate.

Commodity-dependent countries also avoided real appreciations by sterilizing the inflows of foreign currency by converting

**Table 3.3 Assets in sovereign wealth funds grow in commodity-exporting countries (\$US billions)**

Country	As of mid-2008
Algeria	47.0
Azerbaijan	5.0
Botswana	6.9
Chile	15.5
Equatorial Guinea	2.9
Iran, Islamic Republic of	12.9
Kazakhstan	21.5
Libya	50.0
Mexico	5.0
Nigeria	11.0
Russian Federation	162.5
Timor-Leste	3.0
Trinidad and Tobago	2.0
Venezuela, R. B. de	22.0
Total	367.2

Source: Sovereign Wealth Fund Institute ([www.swfinstitute.org](http://www.swfinstitute.org)).

Note: Latest available information as of June 2008, but all estimates may not refer to 2008. Excludes funds with assets under \$1 billion. Data for Equatorial Guinea as of 2005.

them into foreign-denominated assets. Oil-exporting developing countries doubled their official foreign reserves from \$36 billion in 2000 to \$70 billion by mid-2008, or from about four months of import cover to around eight months in 2008. At the same time, some of these countries created new sovereign wealth funds (Algeria, Kazakhstan, and Libya) or greatly expanded preexisting sovereign wealth funds (Azerbaijan, Russian Federation, and República Bolivariana de Venezuela) (Griffith-Jones and Ocampo 2008). The assets of developing-country exporters of oil and minerals in such funds reached \$367 billion by mid-2008 (table 3.3).

#### *New entrants into oil production may be exceptions to these welcome trends*

Several resource-rich developing countries are enjoying the fruits of newly found natural wealth or are experiencing their first commodity boom as an independent state, notably the oil-producing countries of central Asia that were formerly part of the Soviet Union. These countries have less experience in

managing a resource boom than countries that have been producing substantial amounts of oil for many years.

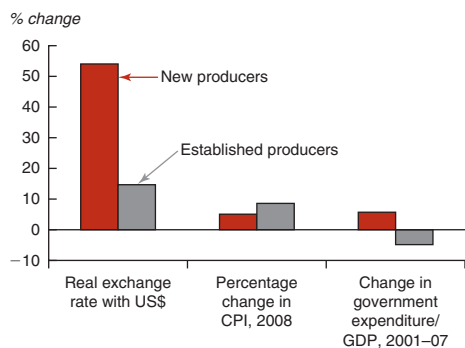
Perhaps because of this lack of experience, many of these countries show signs of experiencing the same kind of macroeconomic volatility that characterized developing, resource-rich countries in the 1980s. Their currencies have appreciated in real terms (against the U.S. dollar) by 43 percent from 2001 to 2007, their inflation rates are higher, and government expenditures have been rising in line with GDP (figure 3.10).

While these developments may be consistent with prudent management of newfound wealth and a careful investment strategy designed to enhance future production capacity, they mirror, disconcertingly, those of the 1980s among more established producers. New producers

must therefore pay particular attention to macroeconomic management going forward to ensure that the current downturn in primary commodity prices does not lead to a sharp reversal of economic progress.

Another troublesome aspect of the current boom, especially given the financial crisis, is the rapid increase in bank lending to commodity-dependent economies in Sub-Saharan Africa, in part to finance investments in oil and mineral projects. Despite enjoying substantial increases in their export revenues, many of these economies remain poor and need to be particularly careful in incurring foreign currency liabilities on market terms. Commercial bank commitments to these economies rose from an average of just under \$2 billion a year in 1995–2000 to more than \$5 billion a year in 2004–06, and to \$11 billion in 2007 (figure 3.11). These countries’ total stock of private-source external debt has not increased significantly above the \$35 billion level reached in 2000 and has fallen as a share of GDP. The downturn in commodity prices could result in disappointing returns to these projects and difficulties in servicing this debt on the part of firms, especially as existing loans come due in the current environment of much tighter credit conditions and higher risk premiums for developing countries. Should companies have

**Figure 3.10 New oil exporters are experiencing more macroeconomic volatility than established producers**



Source: World Bank and IMF data.

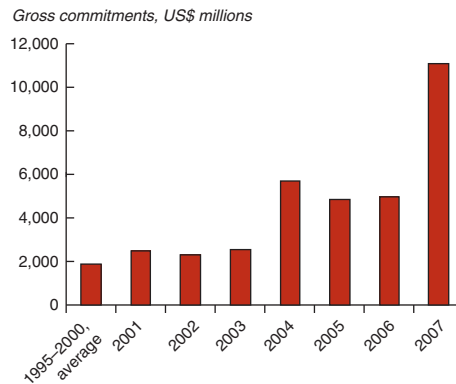
Note: New producers are defined as countries dependent on oil that began production after 1985 or were established as a country after 1985, including Azerbaijan, Chad, Equatorial Guinea, Kazakhstan, Sudan, and the Republic of Yemen (Turkmenistan lacks data for inflation and the real exchange rate). The established producers include Algeria, Angola, Republic of Congo, Gabon, Islamic Republic of Iran, Libya, Nigeria, Oman, and República Bolivariana de Venezuela. We use the real exchange rate with the United States (rather than the trade-weighted real exchange rate as in figure 3.5), to include sufficient countries for a useful comparison between the two groups.

a. Real exchange rate with the U.S. dollar, where increase indicates appreciation. Data for Equatorial Guinea are for 2001–04.

b. Percentage change in consumer price index in 2008.

c. Change in ratio of government expenditure to GDP from 2001 to 2007.

**Figure 3.11 Commercial bank lending to commodity-dependent economies in Sub-Saharan Africa is rising**



Source: Loanware 2008.

## Box 3.3 Combating the corrupting influence of high commodity revenues

A recent example of efforts to reduce the scope for corruption in commodity-rich countries is the Extractive Industries Transparency Initiative. Launched in 2002, it aims to increase the accountability of governments in resource-rich countries through the publication of company payments and government revenues from oil, gas, and mining. As of July 2008, 23 countries were in the process of meeting the conditions for transparency supported by the initiative, and 17 of 42 major oil companies

were supporting the initiative.<sup>a</sup> These developments could be strengthened if the home countries of multinational companies were to require these firms to account more explicitly for the funds they disburse to local governments.<sup>b</sup>

a. See the Transparency International Web site, [transparency.org](http://transparency.org).

b. Statement by Michel Roy, from the French NGO Secours Catholique, published in a press release from Publish What You Pay ([www.publishwhatyoupay.org](http://www.publishwhatyoupay.org)).

difficulty refinancing, this could transfer into a sovereign risk—especially in those cases where the debtor firms are state-owned.

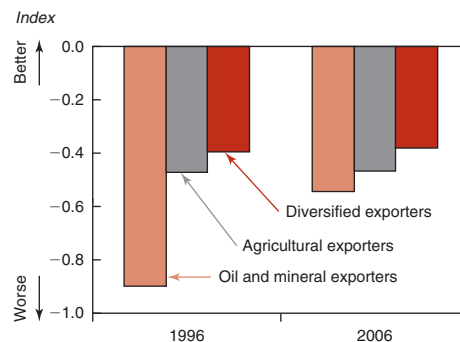
### *Governance and transparency*

Resource riches can yield disappointing growth outcomes by creating incentives and opportunities for corruption, mismanagement, and political instability. Resource wealth has been a source of political conflicts in Africa (Gelb 1998) that have been enormously destructive of wealth, while in countries with weak governance and institutions, the concentrated wealth deriving from point resources too often lends itself to corrupt practices by politicians and civil servants charged with overseeing the firms exploiting them.<sup>15</sup> Indeed, some econometric analyses have found that dependence on oil, metals, and minerals, where the government plays a central role in determining the allocation of rents, lowers the quality of institutions.<sup>16</sup>

Partly reflecting the influence of these incentives, countries dependent on nonrenewable resources (equal to more than 70 percent of merchandise exports) tended in 1996 to be more corrupt than those dependent on agricultural commodities and more diversified exports (figure 3.12).<sup>17</sup> More recently, corruption levels in the oil, metals, and mineral exporters have drawn much closer to the developing-country

average. These are relative rankings and thus cannot indicate absolute improvements in individual countries. Nevertheless, this progress may reflect the reforms instituted over the past 10 years to counter the corrupting influence of high resource rents and may also indicate that resource wealth is being more effectively deployed in promoting the overall development of these economies (box 3.3).

**Figure 3.12 Corruption is highest among fuel exporters, although the difference has narrowed**



Source: Kaufmann and others 2007; World Bank data.

Note: The lower the value of the index, the worse the level of corruption relative to other countries. Countries are classified as oil or mineral, or agricultural exporters if they earn more than 70 percent of merchandise export revenues from these sources. Diversified exporters are all other developing countries. Classification is based on shares in 2000.

## Box 3.4 Successful sovereign wealth funds

For a sovereign wealth fund to be successful, transparent procedures must be established for managing the allocation of resources to the fund and the investment of these resources. For example, clear rules for forecasting prices (necessary for the calculation of permanent income that underlies allocation decisions) and, where available, reliance on independent forecasts can help insulate allocation decisions from political pressures. National revenue funds in Norway and Botswana benefited from stable and democratic political systems that encouraged decision making based on long-term considerations (Eifert, Gelb, and Tallroth 2002).

Rules for the allocation of a share of resource revenues to a wealth fund must not be too rigid. Several countries have changed, bypassed, or eliminated such

rules when conflicts arose (IMF 2007). Such changes, although often needed, can limit the impact of the fund if they occur too frequently as has happened in Oman (UNCTAD 2006).

Transparency in the procedures governing the fund must be matched by overall strong governance to ensure that fiscal policy is consistent with the allocation of resources to the fund. For example, in some instances governments have effectively circumvented the goals of a sovereign wealth fund by borrowing (using the fund as collateral). In República Bolivariana de Venezuela, for example, resources were deposited in the national revenue fund according to the rules, but at the same time the government borrowed heavily to finance procyclical expenditures (Fasano 2000).

### *Sovereign wealth funds*

The increased prevalence of sovereign wealth funds among resource-rich countries is another recent innovation aimed at increasing the development impact derived from mineral wealth, both by increasing the returns that countries receive on their savings from resource revenues and by insulating those savings from procyclical spending and corrupt practices.

The success of these funds in managing natural resource revenue and reducing procyclical spending has been mixed (Asfaha 2007). In general, countries with sovereign wealth funds have tended to experience less-procyclical fiscal policies and less-volatile macroeconomic outcomes.<sup>18</sup> However, the commodity here is unclear. Such funds tend to be most successful in countries that are already fiscally prudent and are most likely to be established in countries with strong institutions. As such, sovereign wealth funds are no substitute for strong fiscal institutions (box 3.4).<sup>19</sup>

### *Dealing with revenue volatility*

The volatility of commodity prices and output means that revenues also tend to be volatile

(see chapter 2). At the macroeconomic level, this manifests itself as greater GDP, exchange rate, and export volatility (see box 3.1). For individual producers, this volatility increases the riskiness and quantity of investment, especially in developing countries where financial systems that could provide temporary financing to bridge shortfalls are underdeveloped. As a result, the overall production potential of the sector rises less quickly, which may be reflected in poor growth outcomes. Perhaps more importantly, for the poor who are dependent on farm-related incomes (close to 75 percent of all poor; see below) and living close to the subsistence level, the impacts can be particularly devastating.

Traditionally, developing (and developed) countries have sought to offset this kind of volatility with price stabilization schemes, marketing boards, and the like (box 3.5). However, the track record of these schemes has not been good and they have fallen into disfavor. More recently, countries are entering into more market-based mechanisms such as long-term contracting arrangements and market-based conditional contracts.



### Box 3.5 National and international marketing strategies

Marketing boards in developing countries typically got their start during colonial times as a way to facilitate the export of agricultural commodities to Europe and to stabilize prices for food crops. Newly independent governments generally retained marketing boards because they provided a convenient way for the governments to maintain control over the distribution of strategic commodities such as food staples and export crops.

Marketing boards are state-controlled or state-sanctioned entities legally granted control over the purchase or sale of agricultural commodities (Barrett and Mutambatsere 2008). They flourished in the 20th century in both developed and developing countries but have declined in number under pressure for domestic liberalization and international trade rules. Where reforms have been widespread and successful, marketing boards have vanished or retreated to providing public goods, such as strategic

grain reserves or insurance against extraordinary price fluctuations. Where reforms have been less successful, the weakness of private agricultural marketing channels has been revealed by the rollback of marketing boards, often leading to calls for reinstatement of the powerful boards.

Similar efforts to minimize volatility have been tried at the global level as well. These included the International Sugar Agreement of 1954 and international agreements for tin (1956), coffee (1962), natural rubber (1980), and cocoa (1981). These agreements used some combination of supply control, buffer stocks, and export controls to limit price changes. All of these commodity agreements broke down or lapsed in the 1980s and 1990s either because of their ineffectiveness or because of difficulties in coordinating production among members (Gilbert 2005).

#### *Long-term contracting provides large-scale producers with some protection from output volatility*

Over the past decade or so, a number of resource-dependent developing countries have entered into long-term contracts with client countries that guarantee sales volumes and in some cases prices. These contracts cover an extended period, sometimes with specific escalator clauses that ensure that prices, while more stable than market prices, do not vary too far from market norms, causing one partner or the other to renege on the deal.

Russia and oil-producing countries in Europe and Central Asia have engaged in such contracts with Hungary, the Czech Republic, Poland, and Ukraine as well as with several high-income countries. Because these contracts specify prices over the duration of the contract, these consuming countries have not observed as large a swing in energy costs as other countries (and supplier countries have not experienced as large a boom).

Such contracts are sometimes entered into in the context of a foreign direct investment deal by either the resource-exporting country or, increasingly, a resource-importing country hoping to gain security of future supply.<sup>20</sup> Several African countries have entered into such relationships with Brazil, China, India, and Malaysia, among others, in exchange for a stable demand-supply relationship and access to foreign capital (most often in the form of foreign direct investment) to develop domestic resources.

China, or Chinese state-owned firms, have taken equity positions in oil ventures in Africa equal to some \$13.5 billion as of early 2007. Investments have been made in Angola, Chad, Côte d'Ivoire, Equatorial Guinea, Kenya, Mauritania, Niger, Nigeria, São Tomé and Príncipe, Somalia, and Sudan, but the bulk of production is currently concentrated in Angola, Nigeria, and Sudan (Downs 2007). Chinese companies also have invested in the development of minerals, such as copper and

other resources in Zambia, and cobalt and copper in the Republic of Congo (Lyman 2005). Chinese companies also have invested in Latin America, with the bulk of this investment related to the production of primary commodities, such as oil in Ecuador (Caspary 2008).

***Market-based conditional contracts offer protection from both price and volume volatility for large-scale market participants***

Some countries are attempting to reduce the impact of volatile commodity prices through market-based derivative instruments. Unfortunately, developing-country producers, and particularly agricultural small-holders, have little access to the market-based risk management instruments now available, because of a lack of knowledge; lack of collateral for margins; the small scale of their operations; and the complexities of executing, monitoring, and administering hedging transactions.

These hurdles can be overcome through a large domestic entity that pools price risk from many small producers and hedges them in international markets. In Mexico, the government organization, ASERCA, does this to hedge price risks for cotton farmers. Through ASERCA, the government offers farmers the chance to participate in a program to guarantee a minimum cotton price for a fixed fee. ASERCA then hedges its price risk by using the fee to purchase a “put” option in international financial markets, which pays if the international price of cotton falls below the specified price. This payoff is in turn paid out to farmers, effectively providing them with market-based insurance against the cotton price falling below the specified minimum that is demand driven and inexpensive to administer (Larson, Varangis, and Yabuki 1998).

The over-the-counter market is very active for oil (over-the-counter risk management instruments are highly liquid and can extend as far as seven years in the future) and precious metals (contracts are considered competitive over the three-to-five-year time horizon). Exchange-traded instruments also exist for

highly traded tropical products such as coffee and cocoa, and for maize, soybeans, and wheat, which are produced and exported by the United States. However, the over-the-counter market is more limited for the base metals exported by many developing countries.<sup>21</sup> Moreover, many agricultural products produced and consumed by developing countries are difficult to hedge efficiently.

In any event, small-holders in developing countries have little access to these instruments. The provision of agricultural risk insurance to small-holders also has proven difficult. State-managed insurance schemes have been largely ineffective and unsustainable without subsidies to cover premiums. One hopeful development is the advent of index-based weather insurance. These schemes, which provide for a different way of underwriting, and transferring, weather risk to the market, are now being scaled up by private initiatives in India and elsewhere. In addition to the direct benefits these contracts provide to producers, by reducing overall revenue volatility, they reduce the risk by potential lenders and can improve farmers’ access to credit.

So far these efforts have been limited to large-scale farms. To bring similar benefits to small-scale producers, more direct government involvement may be required to ensure that supply-chain actors, who are the only actors large enough to enter into such contracts, have the incentives to share their benefits with small-holders.

***Food markets are more complicated politically***

Food markets present a particularly difficult risk management challenge, because the requirements (objectives) of consumers and producers are often in conflict. Historically, government interventions in food markets have had significant adverse effects on the supply side, creating strong disincentives for private sector storage, finance, and trade. All too often, the ensuing shortfall in private sector investment in these markets—and the correspondingly weak development of local and

## Box 3.6 Malawi government hedging of maize price and supply risks, 2005–08

In 2005–06, southern Africa experienced a severe drought-related food shortage. Affected countries included Malawi, Mozambique, Zambia, and Zimbabwe. Initial estimates suggested that as much as 2 million metric tons of maize imports might be required.

The government of Malawi, with assistance from the World Bank and the British government, used call options from the South Africa Exchange Market (SAFEX) to help cap the cost of managing the food shortage. The government was concerned about both high price increases and its ability to secure additional grain on world markets. As a result, a customized call option for 60,000 metric tons of white maize with a total value of approximately \$17 million and a premium payment of \$1.53 million was written. To ensure that the maize was delivered (if needed), the contract was written on a delivered basis, thus combining the price for white maize on the SAFEX exchange with the transport costs to Malawi.

In the event, with spot prices rising and the food shortage growing more severe in November and December 2005, the government exercised the call option, elected physical settlement, and allocated the

majority of the maize to humanitarian operations. During the delivery period, spot prices for a metric ton of white maize rose \$50–\$90 above the ceiling price of the contract following increases in the SAFEX white maize price and transport costs over the October–January period. The maize purchased through the option contract had a better delivery performance than most other procurement procedures.

Since then the government, facing a projected maize surplus, worked with the World Bank to structure contingent export contracts. These were put options structured to ensure foreign markets would take up any surplus grain and provide a price floor in the case that maize prices fell. Although the contracts were not taken up, they did demonstrate how contingent contracting could be used to help manage risk associated with surpluses. In May of 2008, the Malawi government issued a request for proposals for a repurchase option, which will be based on a trade finance structure for grain held in the country combined with a call option. The objective of this approach is to set up a second layer of grain reserves that operates financially through the private sector (Dana, Gilbert, and Shim 2006; Dana 2008).

regional trade—exacerbate the price and supply volatility that the interventions were attempting to mitigate in the first place.

More recently, governments have used customized price and supply risk management contracts to help reduce volatility and ensure security of supply in a way that strengthens rather than weakens private sector trade. Trading companies and banks in southern Africa are now offering contingent purchase agreements that use “call” options as a basis for physical supply contracts (box 3.6). Risk management can also be enhanced by more-open borders and private trade, as in the successful management of flood-induced rice shortages in Bangladesh in 1998.

## Poverty impacts of higher commodity prices

While resource-rich countries have faced challenges in capitalizing on the rise in commodity prices, poor consumers confront severe difficulties in coping with the substantial decline in real incomes. The rise in real commodity prices in developing countries was much less marked than in the United States (see chapter 1); nevertheless, the increases were substantial and imply severe consequences for the poor in developing countries.

The rise in food prices presents the greater challenge for the poor, most of whom spend more than half of their incomes on food. The

urban poor are most directly affected, both because they consume more commercially produced foods and because they are much less likely than the rural population to benefit from increased revenues from food sales or improved employment opportunities arising from higher food prices. The poor are less affected by rising fuel prices because they spend less of their incomes on fuel; however, high fuel prices are still a burden to the poor, especially those in colder climates.

The remainder of this section explores in more detail the impacts that higher prices have had on the poor in developing countries.

### *Higher oil prices and poverty*

As discussed previously, oil price increases since 2003 pushed up consumer spending in oil-producing developing countries by some \$400 billion in 2008, while the annual increase in the food bill due to the price increases between January 2007 and May 2008 was some \$240 billion—assuming in both cases that international prices were fully passed through to consumers. Of course not all of these price increases have been passed through. In these cases, the costs are either being borne by governments as increased expenditures or by firms in the form of forgone revenues when price increases are controlled.

Most estimates suggest that the poverty impact of higher oil prices was smaller than the impact of higher food prices, mainly because in most developing countries, the poor spend only about 10 percent of total household spending on energy, compared with 50 percent for food (Grosh, del Ninno, and Tesliuc 2008). For example, the poorest 20 percent of Bolivians, Malians, and Sri Lankans spend more than 40 percent of their income on food, but only 3 percent on energy (World Bank 2008a). Moreover, when energy costs rise, the extremely poor tend to turn to alternative sources of energy (principally biomass). Even where the poor receive subsidized fuel for cooking, consumption tends to be low, in part because they resell it on the black market.<sup>22</sup>

At the same time, the direct cost of higher energy prices may well underestimate their total cost. While direct energy consumption may be low, higher energy prices increase the prices of energy-intensive goods and services consumed by the poor. For example, surveys of poor communities in China, India, Indonesia, and the Lao People's Democratic Republic indicate that households have reacted to energy-induced increases in the prices of electricity and transportation by reducing lighting and increasing their isolation (UNDP 2007). Moreover, the switch to lower-cost biomass energy sources carries with it hidden costs in the form of increased indoor pollution, increased incidence of respiratory disease, blindness, heart disease, and obstetrical problems such as stillbirth and low birth weight (IEA 2002).

Many efforts to measure the poverty impact of higher oil prices have taken an indirect route because few household expenditure surveys have enough detail on the consumption of petroleum or petroleum products to estimate poverty impacts directly.<sup>23</sup> Some country studies have relied on input-output tables combined with household surveys, or on computable general equilibrium models, to estimate the impact of an oil price rise on poverty. The results are mixed, with most studies concluding that a 20 percent rise in oil prices could impose a 1–3 percent reduction in the incomes of poor households (table 3.4).

Global studies of the impact of oil prices on poverty have first estimated the impact of higher fuel prices on GDP and then the impact of lower GDP on poverty. For example, Herrera and others (2005) estimate that a \$10 increase in the price of a barrel of oil would reduce GDP in the short run by about 0.8 percent in developing-country oil importers. They calculate that poverty rates would increase in the more severely affected countries by a range of 1.4–1.5 percentage points.

A simplistic extrapolation of these results (which are based on an everything-else-equal assumption) to the \$110 increase in crude prices between 2003 and mid-2008, would

**Table 3.4 Country studies suggest that high oil prices have large poverty impacts**

Study	Country	Impact on poor of 20 percent increase in oil price (unless otherwise specified)
Coady and Newhouse (2005)	Ghana	Poor incomes decline by 3.6 percent
World Bank (2003)	Iran	Cost of living of rural poor rises by 3.1 percent
ESMAP Report done in 2001 <sup>a</sup>	Pakistan	Cost of living of poor rises by 1.15 percent
McDonald and van Schoor (2005)	South Africa	Rural households suffer drop in income of 0.76 percent, versus 0.83 percent for urban households, with poor households less affected than rich households
Clements, Hong-Sang, and Gupta (2003)	Indonesia	25 percent rise in oil prices reduces average real consumption by 2.5 percent, with high-income groups slightly more affected than low-income groups
ESMAP (2005)	Yemen	Increasing fuels to import parity (62 percent) increases household expenditures by 14.4 percent for poorest decile
Kpodar (2006)	Mali	Household expenditures of poor rise by 1.8 percent

Source: Kpodar 2006.

a. As cited in Kpodar (2006).

lead to the conclusion that the GDP in developing-country oil importers would have declined by more than 8 percent and that the incidence of extreme poverty in developing countries would have increased by some 15 percentage points. However, everything else was not equal and for most of the period during which oil prices were rising, GDP in oil-importing developing countries was expanding by more than 6 percent a year (much faster than in the past). At least for the initial increases in oil prices between 2003 and mid-2006, such a simplistic calculation substantially overstates the impact of higher oil prices on GDP and poverty.

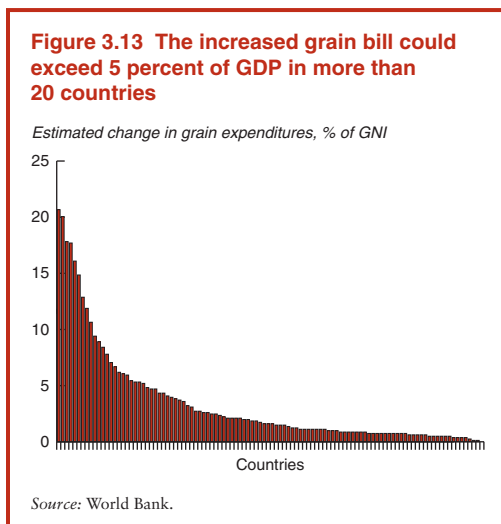
That said, the most recent oil-price hikes occurred under very different conditions than the initial ones. Global capacity was constrained, inflation was rising, and the initial cushions that allowed the first oil price hikes to be absorbed were exhausted (see chapter 1). Partly as a consequence, global growth in oil-importing developing countries slowed by 1.7 percentage points between 2007 and 2008. Although not all of that slowdown can be attributed to oil prices, if it were, applying the poverty elasticities used by Herrera and Pang (2006) would lead to a conclusion that the most recent hike in oil prices may have increased headcount poverty rates by as much as 1.7 or 2.0 percentage points.

### *The rise in the food bill is attributable to higher prices*

The balance of payments implications of the rise in food prices are important for a few countries, including some oil or metals exporters, a few countries beset by civil conflicts, and several small island states that sell services and import most of their needs, including food. However, with the exception of a few foods such as palm oil and a few countries, including several island states and some Middle Eastern countries, the bulk of food products are consumed in the same country where they are produced.

Nevertheless, the increased food bill facing consumers has been extremely large, equaling on average about 2.4 percent of gross national income in developing countries, or 8.0 percent of government expenditures. For some countries, the costs rise as high as 20 percent of gross national income, equal to the total of government expenditures (figure 3.13).

The magnitude of these costs would make it impossible for most governments (or the international community) to completely finance the rise in expenditures on grains required to maintain consumption at 2006 levels. As a result, the greater part of the adjustment must be borne by consumers, while government interventions need to focus on programs that strictly target the poor.



### *Higher food prices and poverty*

Although estimating the direct poverty effects of high oil prices is difficult, a more direct approach is possible for analyzing the poverty effect of higher food prices, because household expenditure surveys tend to provide more detail on the consumption of food.

Changes in food prices can affect poverty through consumption and income channels. On the consumption side, as food prices rise, the cost of a given basket of food increases and consumer welfare declines. However, for the segment of the population whose income depends directly or indirectly on agriculture (that is, farmers, wage workers in agriculture, and rural landowners), higher food prices represent an increase in income. Thus, for each household, the net welfare effect of an increase in food prices depends on the combination of a loss of purchasing power (consumption effect) and, for some households, a gain in income (income effect). At the country level, the poverty effect of higher food prices depends on

- The initial incidence and depth of poverty
- The proportion of the poor that have little or no direct income from agriculture, such as the urban poor

- The importance of food in the budgets of the poor
- Households' ability to substitute between food items

A rise in the price of food relative to other goods and services tends to raise poverty in the short term. The recent increase in internationally traded food prices (mostly grains and oilseeds) is estimated to have increased poverty in eight of nine developing countries studied by Ivanic and Martin (2008). This finding reflects the fact that most of the poor in developing countries (including those in rural areas) are net food buyers, as demonstrated by a number of studies based on detailed household surveys (Christiaensen and Demery 2007; Seshan and Umali-Deininger 2007; Byerlee, Meyers, and Jayne 2006).

Analyzing the poverty impact of higher food prices is complicated, however, because net sellers are disproportionately poor (Aksoy and Isik-Dikmelik 2008). As a consequence, high food prices can transfer income from richer to poorer households. Moreover, over the longer run, higher food prices that boost farm income may also increase other rural incomes by boosting employment and wages among the landless rural poor. Thus the impact of rising food prices on poverty can differ substantially between urban and rural areas.

### *Higher food prices increase urban poverty unambiguously*

The overall impact of higher prices on poverty may be complicated to sort out, but there is broad consensus that higher food prices increase urban poverty, mainly because most of the urban poor have no offsetting income effects. The upper panel of table 3.5 reports the estimated effects on urban poverty levels in the six World Bank regions of a hypothetical 10 percent increase in food prices. The estimates are calculated using the Bank's model for Global Income Distribution Dynamics (GIDD) (see box 3.7 for a discussion of the assumptions underlying this and other modeling exercises reported here).<sup>24</sup>

**Table 3.5 Higher food prices raise poverty more in urban areas than in rural areas**  
 Estimated change in poverty from a 10 percent increase in food prices

Region	Initial		Change	
	Poverty headcount (percent)	Income gap ratio (percent)	Poverty headcount (percentage point)	Income gap ratio (percentage point)
<i>Urban population</i>				
East Asia and the Pacific	13.2	20.3	2.9	1.2
Europe and Central Asia	2.5	8.7	0.6	2.5
Latin America and the Caribbean	3.7	37.6	0.3	0.0
Middle East and North Africa	2.7	17.8	0.6	1.1
South Asia	32.3	25.0	4.4	1.5
Sub-Saharan Africa	34.1	38.1	2.8	0.5
Developing world	15.3	27.1	2.2	0.8
<i>Rural population</i>				
East Asia and the Pacific	31.9	23.2	1.8	0.3
Europe and Central Asia	8.2	6.6	0.3	1.0
Latin America and the Caribbean	18.6	43.9	-0.2	0.2
Middle East and North Africa	15.4	22.9	0.3	0.2
South Asia	43.3	24.0	1.7	0.5
Sub-Saharan Africa	54.9	41.5	-0.2	-0.3
Developing world	37.1	28.2	1.2	0.1

Source: Computations using data from the World Bank's GIDD.

Note: The poverty line is set at 1.25 international dollars (2005) a day per capita. The ratio of food in total consumption among the poor is computed as described in De Hoyos and Lessem 2008. East Asia excludes China. The Middle East comprises only Jordan, Morocco, and the Republic of Yemen.

The largest impacts, both in the increase in the proportion of individuals in the urban population living in absolute poverty (the headcount poverty rate) and in the extent to which the average income of the poor falls below the poverty line (the income gap ratio), are observed in East Asia, South Asia, and Sub-Saharan Africa and are attributable to the heavy weight that food plays in the household consumption basket in these regions and to the high initial poverty headcounts in these regions (see table 3.5). The increase in headcount poverty in Sub-Saharan Africa is somewhat lower than in South Asia because food represents a smaller share of the urban poor's overall budget.<sup>25</sup> Low food shares in Latin America and the Caribbean and very low initial poverty levels in Europe and Central Asia mean that the urban poverty effects of higher food prices in those regions are close to zero.

In a similar exercise, Dessus, Herrera, and De Hoyos (2008) estimated that the increase in financial resources needed to alleviate

urban poverty arising from the recent increase in food prices is less than 1 percent of GDP for the majority of countries, rising to 3 percent of GDP among those most affected.<sup>26</sup> The authors find that around 90 percent of the increase in costs derives from a reduction in the real incomes of households that were poor before the price shock and that the rest is attributable to an increase in the number of poor caused by higher prices.

#### *Higher food prices also tend to raise poverty in rural areas, but by less*

Most households under the extreme poverty line live in rural areas. In 2000, 7 out of every 10 poor individuals lived in a household where agricultural activities represented the main occupation of the head, with lower average incomes among these households being a constant pattern across all regions and countries (Bussolo, De Hoyos, and Medvedev 2008).<sup>27</sup>

The lower panel of table 3.5 reports the effect on rural poverty of the same uniform

## Box 3.7 Critical assumptions underlying the estimation of the poverty impact of food price increases

The poverty analysis reported in this chapter is based on microsimulations using the World Bank's model for Global Income Distribution Dynamics (GIDD). The GIDD comprises household-level data for 73 countries covering around 60 percent of the developing world population.

In the reported simulations a number of simplifying assumptions had to be made.

1. All households within a country face the same increase in the real price of food, measured as the rise in the price of food deflated by the rise in the average price of all nonfood items. Data are taken from national consumer price indexes.
2. The income generated by the rise in food prices is redistributed to rural households in proportion to their agricultural-generated incomes. Information on the share of rural household income from agricultural activities is taken from the "Rural Income Generating Activities" (RIGA), a project of the Food and Agriculture Organization (FAO) and World Bank based on 17 Living Standards Measurement Surveys. This information is extended to the remaining 56 countries in the GIDD by estimating a simple polynomial relationship between the share of agricultural-related income and the level of income (at the centile level) across the 17 RIGA countries and then applying the estimated coefficients to the remaining countries in the GIDD.
3. One issue is whether self-employed workers and wage earners are likely to share in the rise in in-

come from higher food prices. Because it is not possible to identify which households are self-employed and which are wage earners, the additional income attributable to high food prices is distributed equally among them. This approach is equivalent to assuming that all of the income goes to the self-employed (i.e., assuming that agricultural wages and employment are constant) and that all of the agricultural wage earners in a given centile work for a self-employed farmer from the same centile.

4. Household-level information on food consumption is available for only 21 countries in the GIDD. Engel curves, relating food shares to household per capita income (or consumption) and other household characteristics (see De Hoyos and Lessem 2008) are estimated, and estimated parameters plus a randomly drawn residual are used to impute food shares in countries that do not report this information.
5. The simulations show the instantaneous impact of the rise in food prices, assuming no substitution or conservation on the part of consumers (or producers).

The technical annex to this chapter reports the sensitivity of the poverty estimates to variation in assumptions made concerning the size of the price shock and the distribution of resources within both the rural and urban sectors.

10 percent increase in food prices. It assumes that farm-related incomes of rural households also rise by 10 percent. This could be an underestimate, because total spending on food includes retailing and transportation margins. Assuming that all of the real increase in food prices was attributable to increased food commodity prices, then the percentage increase in farmgate prices would have been proportion-

ately larger than that of retail prices (see technical appendix).

In every region, the deterioration in the rural poverty indicators is milder than it is for urban poverty, primarily because of the effect of increased prices on the incomes of farmers. Rural poverty actually declines somewhat in Latin America and Sub-Saharan Africa, whereas it increases a fair amount in East Asia



**Table 3.6 Observed real price shocks and food shares of consumption vary across developing regions (Percent)**

Region	Price Shock	Food share among the poor
<i>Rural population</i>		
East Asia and the Pacific	12.4	71.5
Europe and Central Asia	-0.2	63.4
Latin America and the Caribbean	6.9	51.2
Middle East and North Africa	25.9	64.5
South Asia	5.0	65.3
Sub-Saharan Africa	9.6	68.0
Developing world	6.7	66.1
<i>Urban population</i>		
East Asia and the Pacific	13.8	67.5
Europe and Central Asia	-0.5	57.9
Latin America and the Caribbean	1.6	44.1
Middle East and North Africa	12.5	57.1
South Asia	4.8	64.4
Sub-Saharan Africa	4.9	53.0
Developing world	4.1	60.4

Source: World Bank.

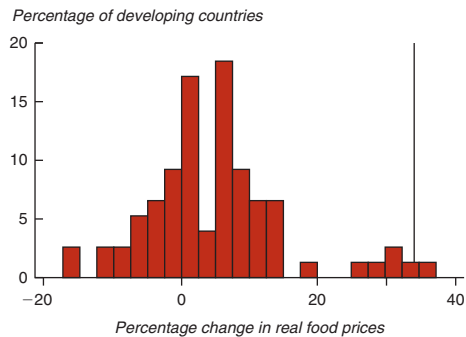
and South Asia, reflecting the greater importance of nonfarm incomes within the overall incomes of the rural poor in those regions and the large share of food in consumption (see the second column of table 3.6).

### *The actual extent of food price increases varies widely across countries*

The analysis so far has assumed that all food prices increased by a uniform 10 percent. In fact, observed changes have been very different. As discussed in chapters 1 and 2, while prices of internationally traded commodities denominated in U.S. dollars increased by as much as 74 percent between January 2005 and December 2007, the real increase observed in individual developing countries was much smaller. Indeed, among the 73 countries for which distinct monthly consumer price index and household survey data are available, the majority had real food price increases of 12 percent or less (figure 3.14).<sup>28</sup> Only four countries saw real food prices rise by as much

**Figure 3.14 Real food prices in developing countries rose less than prices of internationally traded foods**

Distribution of cumulative increases in relative food prices (Local currency unit, January 2005–December 2007)



Source: World Bank.

Note: Real local currency price increase of internationally traded food commodities is shown by vertical line.

or more than the average increase of real internationally traded food prices. The difference between domestic and international prices arises because internationally traded foods represent only a small share of total food consumption in most developing countries. Moreover, different foods have very different weights across developing countries, and many developing countries have policies that have prevented local prices from fully reflecting changes in international prices.

Table 3.7 reports the result of simulations of the poverty impacts of the observed increase in real food prices. Like the earlier simulations, it assumes that the farm incomes in rural households rise in line with the real increase in national food prices.<sup>29</sup>

As with the uniform shock, all regions except Europe and Central Asia and Latin America and the Caribbean experience a significant increase in the incidence and depth of poverty. At the global level, the headcount ratio increases by 1.3 percentage points, representing an additional 130 million individuals falling below the poverty line.<sup>30</sup>

The largest increases in the absolute number of poor are in Asia and Sub-Saharan

**Table 3.7 Poverty effects of the changes in relative food prices January 2005–December 2007**

Region	Initial levels:		Change in:	
	Poverty headcount	Income gap ratio	Poverty headcount	Income gap ratio
	(percent)		(percentage point)	
<i>Urban population</i>				
East Asia and the Pacific	13.2	20.3	6.3	2.7
Europe and Central Asia	2.5	8.7	0.0	0.2
Latin America and the Caribbean	3.7	37.6	0.1	-0.7
Middle East and North Africa	2.7	17.8	2.4	5.7
South Asia	32.3	25.0	2.0	0.5
Sub-Saharan Africa	34.1	38.1	1.7	0.3
<b>Developing world</b>	<b>15.3</b>	<b>27.1</b>	<b>2.9</b>	<b>0.5</b>
<i>Rural population</i>				
East Asia and the Pacific	31.9	23.2	4.9	0.7
Europe and Central Asia	8.2	6.6	0.0	0.0
Latin America and the Caribbean	18.6	43.9	0.1	0.1
Middle East and North Africa	15.4	22.9	0.7	0.9
South Asia	43.3	24.0	0.8	0.3
Sub-Saharan Africa	54.9	41.5	0.3	0.0
<b>Developing world</b>	<b>37.1</b>	<b>28.2</b>	<b>2.1</b>	<b>0.1</b>

Source: World Bank.

Note: Computations using data from the GIDD. Poverty line of 1.25 international 2005 dollars per day. The ratio of food in total consumption among the poor is computed as described in De Hoyos and Lessem 2008. East Asia excludes China. The Middle East comprises Jordan, Morocco, and the Republic of Yemen.

Africa, reflecting the large number of people in each of these regions living just above the poverty line. The share of the urban population in extreme poverty is estimated to double from 2.7 to 5.2 percent in the Middle East and North Africa and to increase by almost 50 percent in the East Asia and Pacific region.

Some caution should be exercised in interpreting the figure for East Asia because the GIDD data set does not include China, by far the largest country in the region. As a result, the GIDD model reports an initial poverty

headcount ratio of 24 percent for urban and rural populations combined, a figure substantially higher than the 18 percent reported in Chen and Ravallion (2008), which includes China. The impact that this discrepancy has on the global poverty estimates depends on the difference between the poverty effects of higher food prices in China and those effects in the average East Asian country. In the absence of household-level information for China, the underlying assumption is that the poverty impacts there (that is, the change in the headcount ratio and the income gap ratio) will be equal to the average poverty effects for the region.

Overall, the rise in food prices increases the global poverty deficit (the amount that a perfectly targeted poverty alleviation program would need to spend to bring all of those living on less than \$1 a day up to the poverty line) from 8.2 to 13.4 percent of developing-country GDP, or an increase of \$37 billion. The income gap ratio (the average difference between the incomes of poor people and the poverty line, expressed as a percent of the poverty line) rises by much more in urban than in rural areas, reflecting increased earnings in rural areas when food prices rise. The difference is particularly dramatic in East Asia and the Middle East, where the increase in the income gap ratio in urban areas is more than 4 times larger than it is in rural areas.

The results presented in table 3.7 hide important heterogeneities across countries. Indeed, the increase in the poverty headcount and the deficit resulting from the rise in food prices is less than one-fifth of a percentage point for almost half of the countries analyzed. In around 40 percent of the countries analyzed, higher food prices raise the headcount ratio by at least 0.2 percentage point; and in 6 countries, the change in relative prices reduces the incidence of poverty by at least 0.2 percentage point. In some countries, the measured impact of higher food prices on poverty is small, or even negative, because nonfood prices rose more quickly than food prices during the period in question.<sup>31</sup>

*Over the long term, higher food prices will raise incomes in the agricultural sector*

In most developing countries, higher food prices raise the number of poor and lower incomes of the existing poor in the short term. Over time, however, the impact on poverty becomes less clear. The increased incomes of food sellers will raise incomes in rural areas (where the majority of poor live). The simulations summarized here do not reflect the multiplier effects of higher food prices on incomes in the agricultural sector nor any long-term dynamic effects that may arise because agriculture has strong links to the rest of the economy. These include backward links, when farmers purchase inputs such as chemicals, fertilizers, and farm equipment for agriculture, and forward links, when agricultural production provides raw materials to food and fiber processing in the nonfarm sector.

Moreover, increases in agricultural incomes are usually spent on locally produced goods and services, which generate local employment. In many African countries, for example, on average for every \$1 of additional farm income, an additional \$1.47 in net income is generated in the wider economy, some of which accrues to the poor (Delgado, Hopkins, and Kelly 1998).

The long-term impacts of higher agricultural prices are difficult to measure because they are lengthy and complex (World Bank 2007). They depend in part on public investments in roads, markets, irrigation, infrastructure, education, and health as well as on investments in the main factors of agricultural production—land, labor, and capital—all of which take a long time to adjust. Over time, increases in agricultural prices relative to other sectors slow migration out of agriculture and increase capital investment, which results in increased agricultural output.<sup>32</sup>

To the extent that agricultural sectors do sustain more rapid growth because of higher food prices, rural poverty will be reduced, especially where the concentration of land ownership is low and labor-intensive technologies are used (Gaiha 1993; Datt and Ravillion 1998).

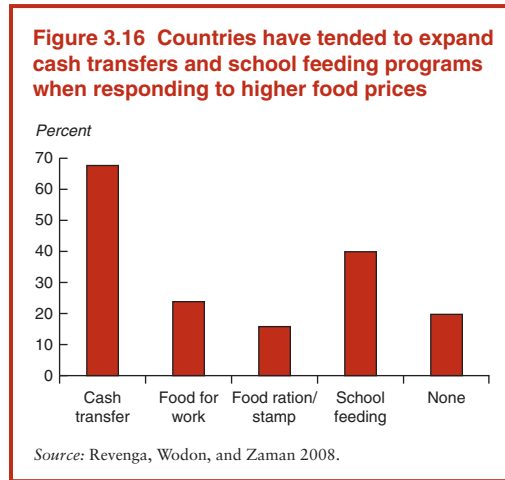
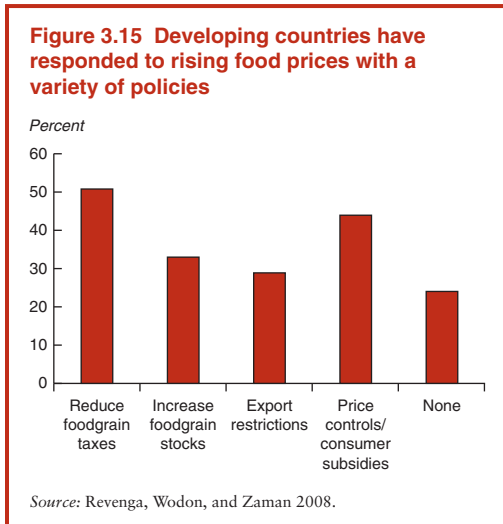
## Dealing with high food and fuel prices

The priority for governments is to address the immediate needs of the poor while minimizing the impact on already-strained budgets. Care must be exercised to do so in a way that does not exacerbate the crisis or impair the economic adjustment of the economy to higher prices. Given the necessity to respond quickly and the time and cost involved in gathering information on the poor, governments have tended to respond to the rise in food prices by increasing resources to existing antipoverty programs. While a logical response, in many cases care has not been taken to clearly define the temporary boost in spending to compensate for a temporary rise in food prices by announcing, for example, a limited time for improved benefits or by tying them explicitly to food prices to avoid creating an unnecessary, permanent, and unsustainable fiscal burden.

Over the medium term, governments need to put in place more efficient policies for protecting the poor and supporting agriculture, so that the next crisis can be met without seriously impairing incentives for production or ramping up wasteful spending. Such policies would entail better targeted and more efficient safety nets, along with steps to achieve the potential for strong improvements in agricultural production described in chapter 2, including investing in agricultural research and infrastructure, promoting the diffusion of best practices, and reducing carbon emissions to minimize the extent of climate change in the long term.

*The immediate response has been policies designed to mitigate the impact of rising food and fuel prices*

The immediate response of most countries to the rapid rise in food and fuel prices during the course of 2008 has included a mix of market interventions and the scaling up of existing antipoverty measures. Almost three-quarters of the 80 developing countries surveyed by the



World Bank in March 2008 have taken some policy action in response to the rise in food prices (figure 3.15).

The most common response was reduced tariffs on imports combined with price controls or consumer subsidies, followed by bans or restrictions on exports and decisions to add to official grain stocks. Most oil-importing countries have passed through all or more than all of the fuel price increases since 2003, but on average oil-exporting countries have passed through only about one-half of the increase (Mati 2008).<sup>33</sup> Indeed, as oil prices hit the \$140 range, the fiscal cost of fuel subsidies became very large in some oil-exporting countries and represented a significant challenge to fiscal sustainability. Some 36 countries responded to higher fuel prices by increasing subsidies and 43 by lowering fuel taxes (IMF 2008a). Those countries that have expanded existing safety net programs have favored cash transfers and school-feeding systems. Food for work and food stamps were also popular options (figure 3.16).

Overall, the additional fiscal costs of measures aimed at offsetting higher fuel and food costs varies from zero to a maximum of 4.8 percent of GDP, with food and fuel price subsidies the most costly measures implemented (table 3.8). However, individual coun-

**Table 3.8 Fiscal costs of selected antipoverty measures vary widely**

Measure	Number of countries where implemented	Maximum increase (percent of GDP)	Median increase (percent of GDP)
Food tax decreases	31	1.1	0.1
Food price subsidies	28	2.7	0.2
Targeted transfers	21	2.0	0.2
Public sector wage hikes	10	1.9	0.6
Fuel subsidies	38	4.0	0.7
Fuel tax reductions	37	1.3	0.3
Aggregate costs	79	4.8	0.7

Source: IMF 2008a.

try experience varied widely. Indeed, although the majority of countries increased spending—either because preexisting subsidy policies became much more expensive or because of direct measures—some actually reduced the scope of programs and cut into spending because of increased budgetary cost.

***Policies need to be more targeted and more supportive of medium-term adjustment***

Although subsidies and export restrictions have helped dampen the immediate impact of higher prices in the countries where they are implemented, they are very expensive and often poorly targeted. Moreover, they tend to exacerbate the extent and duration of the

crisis by reducing producers' incentives to increase output and consumers' incentives to reduce demand. Over the medium-term, policy makers need to redress the balance, placing more emphasis on well-targeted antipoverty measures and on policies that promote increased supply and more prudent use of natural resources.

***Subsidies and price floors are expensive and poorly targeted antipoverty measures***

Food and fuel subsidies tend to be costly and poorly targeted, even when steps are taken to make the subsidized material available only to certain segments of the population. For example, the Egyptian system of food subsidies is targeted at the poor by restricting access to subsidized flour to the truly poor, by locating distribution points in poor neighborhoods, and by using lower-quality products. Nevertheless, the system is very expensive (with an estimated financial cost of 2 percent of GDP) and ineffective (World Bank 2005a). Between one-quarter and one-third of the poor do not benefit from it, and fully 83 percent of the value of the food subsidies goes to the non-poor. Moreover, those poor and vulnerable households that do benefit receive so little that the net effect is to lift only 5 percent of the population out of poverty.

General fuel subsidies tend to be even more regressive and more costly than food subsidies because they involve substantial leakages of benefits to higher-income groups. A study of five countries from various regions found that on average 78 percent of fuel subsidies went to the richest 60 percent of households (Coady and others 2006). Even when targeted through voucher programs, fuel subsidies tend to be ineffective. In India, for example, about half of subsidized kerosene<sup>34</sup> (which is made available to poor families on a quota basis at 9 rupees a liter) is diverted to the black market where it is either sold at a higher price or is used to adulterate diesel, which sells for about 30 rupees per liter.<sup>35</sup>

More generalized price subsidies or price floors (including indirect ones such as man-

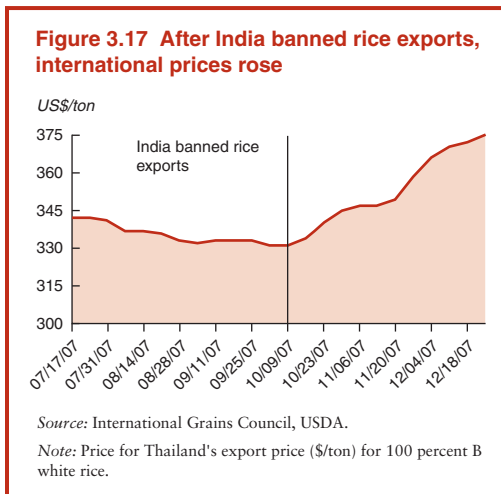
dating the national oil company to sell at below cost) are also common and can be very expensive.<sup>36</sup> Estimates suggest that India's total fuel subsidies amount to about 2 percent of GDP. Even after reform, the fuel subsidy in Indonesia is expected to total 127 trillion Indonesian rupiah (\$13.9 billion) in 2008 and make up about 13 percent of the country's total budget (more than the total of spending on education and health).

The imposition of export bans by food-exporting countries has the same basic goal of keeping consumer prices below the market level.<sup>37</sup> Some 20 developing countries have introduced such bans since 2007, including Argentina, China, Egypt, India, Kazakhstan, Pakistan, Russia, Ukraine, and Vietnam. Several different policies have been used, including export taxes on a particular commodity (India), taxes on transport (Kazakhstan), restricting licenses to export (Argentina), and a complete ban on exports (Vietnam).

***Price containment policies distort incentives, reducing supply, limiting conservation, and exacerbating and prolonging high prices***

While expensive and generally poorly targeted, all of these policies (price subsidies, price floors, and export bans) do succeed in limiting the immediate domestic impact of rising international prices. However, they do so at a cost. Not only are they fiscally unsustainable in many cases, but they also tend to exacerbate and prolong the price increase. Lower producer prices mean that less new supply is forthcoming, while lower consumer prices means that demand is not curtailed—both domestically and internationally. For example a series of steps taken by Serbia in 2007 to secure domestic supply, including a temporary ban on exports of wheat, maize, soybeans, and sunflower backfired. Serbia's wheat plantings fell to a 90-year low (partly because of bad weather) and prices rose (USDA 2007).

The problem with export bans is even more severe. Although they are domestically appealing, these bans decrease confidence of net



importers in the international trading system as a reliable source of food. For example, following India's ban on exports of premium rice on October 9, 2007, domestic prices remained well below international prices, but the withdrawal of supply from international markets sparked an almost immediate rise in international rice prices (figure 3.17).<sup>38</sup>

Although countries' food security concerns are legitimate, a widespread return to policies of food self-sufficiency could be very costly depending on how quickly it is achieved, the resource endowments of the country and the policies used to achieve it.<sup>39</sup> If investments in research and infrastructure are made to improve productivity, the costs may not be too high. Although the rate of return on such investments is high, it can take many years to raise production enough to achieve self-sufficiency.

If price policies are used to boost domestic production, the costs could be very high and the effectiveness uncertain. First, the supply response of the agricultural sector as a whole is low (Cavallo 1988).<sup>40</sup> Raising the total of agricultural production as opposed to production of a single crop takes many years. Thus, unless a policy is very carefully constructed, it risks increasing production in one food item at the expense of reduced production (and increased dependence) in another.

**Table 3.9 Increasing rice self-sufficiency can be more costly than relying on imports**

	Production	Consumption	Imports	Cost of rice consumption	
				Import strategy	Self-sufficiency
	(millions of metric tons)			(\$US billions)	
China	123.2	133.8	10.6	28.8	43.2
Indonesia	33.8	36.1	2.3	7.8	11.6
Nigeria	2.2	3.7	1.6	0.8	1.2
Iran, Islamic Rep.	1.6	2.9	1.3	0.6	0.9
Iraq	0.1	1.1	1.0	0.2	0.4
European Union	1.7	2.6	0.9	0.6	0.8
Philippines	8.7	9.6	0.9	2.1	3.1
Bangladesh	25.3	26.0	0.8	5.6	8.4
Senegal	0.1	0.9	0.7	0.2	0.3
Côte d'Ivoire	0.5	1.2	0.7	0.3	0.4
Total	197.2	217.9	20.7	46.8	70.3

Source: World Bank.

Moreover, using a price subsidy or import restrictions to boost domestic prices and induce additional production is often a costly alternative to importing (table 3.9). For example, to increase domestic rice output by 10 percent, a country would have to increase domestic prices by as much as 50 percent.<sup>41</sup> For the 10 largest rice importers over 2000–05 (who imported about 10 percent of their total consumption), achieving self-sufficiency in this way would imply a \$24 billion dollar increase in food costs compared with the current situation where the rice is imported—mainly because the extra 50 percent would have to be paid both on the rice currently produced domestically as well as on the new rice to be produced (currently imported).

A better approach would be to enter into long-term supply arrangements, such as those discussed earlier in the context of the oil market. Under these agreements, importing countries could agree to buy a minimum amount of grain or other food crop each year in exchange for a commitment by the exporting country to meet larger imports when needed. Alternatively, countries might make more intensive

use of the kinds of conditional contracting recently used by Malawi (see box 3.6).

***Over the medium term, countries need to move toward more flexible and targeted social safety net schemes***

Having weathered the initial consequences of high food and fuel prices, countries need to transfer more of the burden of dealing with high prices to better-targeted social safety nets and market mechanisms. Doing so will bring both fiscal and economic benefits, in the form of increased poverty reduction, reduced cost, and lower commodity prices.

There is no magic prescription for effective social safety nets, especially among developing countries where both fiscal and administrative resources are often in short supply. Successful systems usually consist of several individual programs that complement each other as well as other public or social policies. Ultimately, the particular policy mix put into place will depend on the country context.

Nevertheless, there is general consensus on the relative strengths and weaknesses of different forms of support. A loose ranking of programs would favor targeted cash transfers of adequate coverage, generosity, and quality as the best option and could include increasing pensions and unemployment benefits when they target the poor (box 3.8).

Emergency food aid distribution, used in places like Afghanistan and Angola, often in partnership with agencies such as the World Food Programme (WFP), ensure food security for vulnerable groups and are appropriate where markets are functioning poorly or where foreign assistance is only available in-kind, but the physical transfer and potential leakages can make these programs costly. School feeding programs can be used for a quick response, but these do not typically address child malnutrition at its most critical point—when children are in their infancy. Conditional cash transfer programs can help foster increased use of health and education services and are generally most efficient, but they are not always a feasible option in low-income

countries with weak administrative capacity. Finally, public works programs, in food or cash (such as in Cambodia and Mozambique), can be effective only for a few areas and for people who are currently unemployed.

Household targeting systems—such as proxy means tests or means tests, sometimes community-based decision making, or hybrids among these—can be effective in directing resources to the poor. Where a household targeting system is not in place, a combination of geographic targeting, self-targeting, or demographic targeting can produce at least moderately good results, reducing the cost of administrative targeting.<sup>42</sup> For example, school feeding programs targeted geographically to poor rural areas may have relatively low errors of inclusion. Self-targeting can be achieved by setting low wages for labor-intensive public works. Open market operations for food sales can be geographically targeted to slum areas, with a limitation on quantity and provision of an inferior staple commodity inducing some degree of self-targeting. Fees for networked electricity can be differentiated by use level or neighborhood. Provision of fortified weaning foods that are culturally acceptable for only very young children is a good use of demographic targeting.

***Although the economics of reform are solid, eliminating existing but inefficient antipoverty measures is politically difficult***

Removing subsidies is difficult and can be met with strong opposition and violent protest. Nevertheless, given the fiscal burden that such subsidies impose—especially on oil importers—governments have little choice but to reform. While many different approaches have been followed, those that have worked have tended to use a strategy that replaces the subsidy with a better-targeted benefit, preceded by an effective publicity campaign that emphasizes the poorly targeted nature of the existing subsidy (Kojima and Bacon 2006).

Several countries have used some variation of this approach. Chile made a one-time payment of \$28 to low-income households to

## Box 3.8 Conditional cash transfers are most effective in getting money to the poor

Targeted cash transfers are the cornerstone of safety net programs in most of the countries with safety nets. They help protect poor households by providing them with the resources they need to maintain a minimum level of consumption. These are the most flexible programs and can be adapted to particular circumstances. It is not surprising that targeted cash transfers are used in countries of varying income level, from Albania to Mexico to Zambia.

Even poor countries can afford to allocate resources for safety net programs. The fiscal costs of a well-targeted safety net for the poorest need not be unduly high. For a large share of developing countries, spending on overall safety nets has been on the order of 1–2 percent of GDP in recent years. However, the costs of the responses differ according to the scope, generosity, and degree of targeting: ranging from a mere 0.04 percent of GDP in Chile (for a well-targeted response) to more than 1 percent of GDP in Ethiopia (for lifting the value added tax on food grains, raising the wage on the cash-for-work program, and distributing wheat to the urban poor at a subsidized price). A careful fiscal-planning exercise will be needed in each country. Such a plan should seek to protect critical growth-enhancing spending and prune low-priority expenditures, and be embedded in a medium-term fiscal sustainability strategy so that the longer-term fiscal sustainability of the program is ensured. For the poorest countries, international assistance will be essential.

The quality and care with which programs are designed and implemented, including the selection, provision, and monitoring of benefits, have a large impact on program efficiency and effectiveness. No program is a guaranteed success, and few are guaranteed failures. The role of good systems and

adroit managers in getting the most from a program cannot be overemphasized.

Conditional cash transfer programs have a good reputation and are an effective mechanism for directing assistance toward the poor. Large-scale conditional cash transfer programs were developed in Mexico (*Progresa, Oportunidades*) and in Brazil (*Bolsa familia*) and later spread to other countries in Latin America and the Caribbean and to the rest of the world. Those programs are well targeted to poor families through a combination of geographic prioritization and household assessment mechanisms and are particularly efficient in providing transfer to the poor. Administrative costs are relatively low, averaging about 5 percent of total program costs after start-up, compared with food-based programs, whose administrative costs average 36 percent of total program costs. However, because they are more difficult to set up than unconditional programs and might exclude the neediest where services are scarce, cash transfer programs can be part of an emergency response, for example to high food prices, where they are already established.

Care must be taken to ensure that the policy response to temporary crises is temporary. Although a permanent increase in fiscal space may be justified in countries that have underinvested in adequate safety net systems, in countries that already had broadly adequate safety nets a temporary expansion of benefits may be best. Permanent changes in the benefit levels or scope of the transfer program can be avoided by targeting additional benefits at those already qualified for a program; making payments in a lump sum or explicitly time-limited fashion.

Source: Grosh, del Ninno, and Tesliuc 2008.

compensate for higher fuel prices and provided extra cash compensation to 1.4 million households consuming less than 150 kilowatt-hours of electricity a month. Indonesia used an effective public relations campaign, coupled with a cash compensation scheme and general trust in the government, to more than double gasoline

and diesel prices and nearly triple kerosene prices in 2005 with no substantial opposition. Ghana combined prior analysis of who benefited from fuel subsidies with a campaign publishing the measures that would be used to compensate for removing subsidies in a successful effort to remove subsidies (box 3.9).



### Box 3.9 Removing fuel subsidies in Ghana

Ghana could not continue fuel subsidies as world oil prices rose in 2004, and the government launched a poverty and social impact assessment to study the situation. Guided by a steering committee of stakeholders from ministries, academia, and the national oil company, the assessment was completed in less than a year. By the time the government announced the 50 percent price increases in February 2005, it could use the assessment findings to make its case for liberalizing fuel prices to the public—including the fact that the price subsidies mostly benefited the better-off.

The minister of finance launched the public relations campaign with a broadcast explaining the need for the price increases and announcing measures to

mitigate their impact. A series of interviews with government officials and trade union representatives followed. The Energy Ministry used newspaper advertisements with charts to show that Ghana's fuel prices were the lowest in West Africa, after Nigeria's.

The mitigation measures, which were transparent and easily monitored by society, included an immediate elimination of fees at government-run primary and junior secondary schools and a program to improve public transport. Although the trade unions remained opposed to the price increases, the public generally accepted them, and no large-scale demonstrations occurred.

*Source:* Bacon and Kojima 2006.

### The international response to high commodity prices

The effectiveness of the policy response to the recent rise in food and fuel prices will, in the main, depend on the ability of individual governments to put in place well-targeted programs to ameliorate hardship and to provide the infrastructure, services, and appropriate incentives required to raise food production and encourage adjustments to high food and fuel prices. For the poorest countries, some form of additional assistance will be required, while for other countries international coordination may be required to help restore confidence in global food markets and provide emergency assistance for poor consumers.

#### *The loss of real income from higher food prices is too great to compensate all consumers*

As discussed earlier, the rise in food and fuel prices substantially reduced the purchasing power of the poor throughout the developing

world. During such episodes, short-term assistance is urgently needed to avoid hardship. However, effective targeting of assistance is critical. The cost of compensating all consumers for the rise in food prices alone since January 2007 is impossibly large—perhaps more than \$270 billion annually. Moreover, insulating consumers from the effects of price increases (and taxing producers to finance this assistance) delays the necessary adjustments in demand and supply that will eventually bring prices down.

Even if a program could be devised that concentrated aid only on the poor, it would cost some \$38 billion annually, or about 14 percent of all official development aid in 2007. Focusing international assistance on the poorest countries makes sense, in part because higher proportions of their populations are extremely poor and because their own fiscal resources are particularly weak. The total cost of reversing the poverty impact of higher food prices in IDA-eligible countries would be a more manageable \$2.4 billion.

## Box 3.10 The international response to rising food prices

The UN secretary-general established a Task Force on the Global Food Security Crisis aimed at promoting a unified response to the global food price challenge. An initial meeting was held in June 2008, attended by 181 countries, and 60 nongovernmental and civil society organizations.

The summit concluded with a declaration calling on the international community to increase assistance for developing countries, in particular the least developed countries and those that are most negatively affected by high food prices. The immediate response was to call for increased humanitarian assistance to those hardest hit by the rise in food prices

through food aid and balance of payments support to countries. The medium-term response has been to assist countries to put in place revised policies and measures to help farmers, particularly small-scale producers, to increase production and integrate into local, regional, and international markets along with measures to moderate the fluctuations in food grain prices through increased stockholding capacity and better use of risk management practices. Longer-term responses have focused on how to increase the resiliency of food production systems to challenges posed by climate change.

### *The international community has reacted swiftly to the rise in food prices*

The international community has been quick to recognize the serious risks that higher food prices posed for the poor. The United Nations has established a Task Force on the Global Food Security Crisis to formulate a unified response to the food crisis (box 3.10).

Donors ramped up existing programs and launched new initiatives to speed the provision of food aid to the poor. Examples include the Food and Agricultural Organization has launched the Initiative on Soaring Food Prices, which assists small-holders in critically affected countries (beginning with Burkina Faso, Haiti, Mauritania, and Senegal) to obtain seeds, fertilizers, and animal feedstock; the International Fund for Agricultural Development (IFAD) is making up to \$200 million from existing loans and grants available to improve poor farmers' access to seeds and fertilizer; bilateral donors (for example, the U.S. Agency for International Development and the U.K. Department for International Development) are focusing existing programs on countries most affected by the food crisis; the European Union has committed €1.0 billion in funds from European farm subsidies that

have not been used (because high prices have reduced the compensatory amounts payable to farmers) to farmers in developing countries, mostly in Africa; and the World Food Programme has pledged \$214 million to provide assistance to vulnerable groups.

For its part, the World Bank has created a \$1.2 billion rapid financing facility, the Global Food Crisis Response Program (GFRP), to address immediate needs arising from the food crisis. The facility includes \$200 million in grants targeted at vulnerable poor countries, with priority given to the most fragile states.

The GFRP strives to create a balance between short-run food stabilization and measures to ensure that countries are able to cope better in the medium term. Countries can select measures most relevant to their individual situations from program components that address price policies, social protection and nutrition, and immediate supply response provisions for getting seeds and fertilizers to farmers.

The World Bank is also establishing a multilateral trust fund, with an initial contribution from Saudi Arabia, to help the poor respond to high energy and food prices. This fund will operate in parallel with the GFRP and will

provide priority assistance to countries whose economies are most severely affected by the increase in the price of imported fuel, that have already embraced or are pursuing energies policies that are more fiscally sustainable, and that propose cost-effective social safety net programs.

***Improvements are required in the architecture for humanitarian aid to strengthen the response to the food crisis***

The dramatic increase in food prices has underlined the importance of improving the efficiency of programs to deliver emergency food aid. Bilateral food aid programs are largely based on the disposal of surplus commodities. This approach has played an important role in garnering political support for the provision of food aid. However, 60–86 percent of the aid is tied, either directly to commodities provided by the donor country or through constraints on the use of cash donations (FAO 2006). As a consequence, the cost of this aid can be 30–50 percent higher than nontied sources (OECD 2005). Moreover, tied food aid of this type slows the delivery of food aid, and reduces supplier incentives in local food markets.<sup>43</sup>

Progress is being made in improving the administration of food aid programs. Some donors have lifted requirements that food aid be procured domestically and have shifted from providing commodities to providing cash, making it possible to purchase some food locally. Resources have shifted toward the provision of emergency aid, implying an improvement in the targeting of food aid (FAO 2006). Additional efforts to provide cash aid and allow the food to be purchased where and from whom made most economic sense would reduce costs and help make food aid a more efficient instrument in reducing poverty.

Improvements in food aid management are required at the international level as well. The main multilateral provider of food assistance is the UN's World Food Programme, which delivers more than half of the humanitarian food aid in the world. Higher food prices have

made it very expensive for the WFP to purchase food on international markets, threatening its capacity to deliver emergency humanitarian aid in a timely manner.

A strengthening of the financing arrangements for the WFP could markedly improve the efficiency of its operations, allowing for an expansion in food aid and a reduction in costs.<sup>44</sup> Financing of the WFP depends on voluntary contributions from donor countries that are largely tied to assistance for specific countries or programs on a year-to-year basis.<sup>45</sup> As a result, WFP programs can be designed and implemented only after financing is committed. Contributions are often based on surplus disposal, with provision that the food be transported on the carriers of the donating nation.

These arrangements are major constraints on the WFP's ability to respond flexibly and efficiently to the need for assistance. The time required to obtain donor commitments makes it difficult to respond to unexpected shocks. The timing of commitments also can mean that food purchases must be made when prices are at seasonal highs rather than following harvest when prices are at seasonal lows. Several donors provide commodities rather than cash, significantly increasing the cost of food compared to local purchases. Providing an annual dollar budget equivalent to the value of current commitments would dramatically improve the efficiency of WFP operations. Given the volatility of food prices, this budget might be supplemented by a line of credit upon which it could draw in years when either prices or needs are unusually high.

***Steps to assist the replenishment of international grain stocks would help***

The role that low stocks have played in the rise of food prices has raised the issue of whether or not an international food stockpile should be created to help prevent a repetition of the past year's high prices, in part by ensuring that supply would be available to the market and by dissuading speculative behavior. While an appealing notion, it is not clear that such a stockpile would be effective—or

needed. To have a significant dampening effect on the market, such a stockpile would have to be large and would be very expensive to create and maintain. Rough calculations suggest that a stockpile equivalent to 10 percent of global production would cost about \$66 billion to create and some \$8–10 billion annually to maintain.<sup>46</sup> Moreover, the creation of the stockpile would add significantly to global food demand and price pressures during the period in which it was being created. Nor is it clear that a global stockpile would actually increase world stocks. The public stock increase may well be matched by a reduction in private stocks, thus transferring the costs of keeping a stock to the public sector without necessarily improving the stability of the market.

A more effective strategy might be to improve information flows about stocks and create mechanisms by which they can be managed. Currently most stocks are held by a limited number of major producers and importers. It may be possible to create an international agreement that provides for the sharing of some of these costs—perhaps along the lines of the International Energy Agency agreement governing oil reserves. As in that agreement, the rules for accumulating and distributing grain stocks would need to be clearly defined to prevent their being used for surplus disposal or price support and to ensure they are used for humanitarian purposes.

***More multilateral discipline in trade policies would help mitigate the rise in food prices***

A range of multilateral and trade policies (export restrictions, biofuel subsidies, tariffs, mandates, and global protection of agriculture more generally) have contributed to the rise in food prices. Moreover they have reduced confidence in the international food trading system and interfered with consumer and producer incentives, reducing supply and increasing demand. As a result, the price hike has been larger and longer lasting than it would have been otherwise.

A strengthening of existing international rules governing the imposition of export re-

strictions may be desirable. Currently, unlike countervailing duties, the conditions that must be met before export restrictions are introduced are ill defined, and although there is a requirement that the World Trade Organization be notified of their implementation, it is not enforced.<sup>47</sup> Even the enhanced rules proposed under the Doha Round should probably be strengthened.<sup>48</sup> Helpful measures might include including stricter (even pre-) notification requirements, limits on the allowed duration of restrictions, and possibly a definition of the conditions under which such restrictions might be admissible.

Policy makers should also consider phasing out biofuel subsidies and production mandates, especially where these are coupled with tariffs that restrict imports from lower-cost producers. This step would both reduce pressure on food prices and help low-cost and environmentally cleaner developing-country biofuel producers that are currently shut out of major markets by these rules.<sup>49</sup> There are indications that a number of developed countries are beginning to reexamine their biofuel policies, but it remains a contentious issue.

More fundamentally, decades of trade-distorting policies (such as tariffs, quantitative restrictions, and subsidies) are partly responsible for the current spike in food prices, having encouraged inefficient agricultural production in rich countries and discouraged efficient production in developing countries (Chaufour 2008). The kind of agricultural trade barrier reductions contemplated in the Doha Round might lead to higher agricultural prices in the short term, but in the long run, they should help establish a more transparent, rules-based, and predictable food trading system that would stimulate trade and raise incomes around the world. An ambitious program could reduce global poverty by as much as 8 percent (World Bank 2004).<sup>50</sup>

Moreover, removal of the rules that allow such trade restrictions would help ensure that, as prices come down, countries cannot introduce new subsidies and restrictions in an effort

to prevent domestic producers' prices from declining as sharply as they would otherwise.

## Conclusions

The rise in primary commodity prices since 2003 was much larger and more sustained than those of earlier periods. This boom generated dramatic transfers of income within and among countries and has imposed severe burdens on some consumers. However, it has also created opportunities for producers and these, if managed properly, can provide significant growth opportunities. The boom has also exposed weaknesses in domestic and international policies that have contributed to and prolonged the period of high prices and reduced confidence in international markets.

For commodity producers, commodity dependence need not hurt long-term growth. Although commodity-dependent economies have, on average, grown more slowly than more-diversified economies, for most economies dependence on commodities is the result of slow growth, not the cause. To achieve the growth potential inherent in commodity riches, countries need to implement policies that minimize the potential disruptive impacts of volatile export revenues, exchange rate appreciation that can erode the competitiveness of manufacturing, and incentives for rent seeking and corruption. It would appear that producing countries have responded to higher prices in a more prudent manner during this boom than in the past. Fiscal policy has been less procyclical than in the past, countries have made greater efforts to save windfall profits, and rate appreciation has been muted. As a result, they are less likely to endure the major setbacks that characterized the 1980s as prices declined. An exception to this generally welcome response has been the performance of countries with newfound commodity wealth and some newly independent resource-rich countries that may have repeated some of the mistakes of the past.

Consumers have faced daunting challenges from the commodity price boom. The rise in

food prices has presented the greater challenge because the poor in developing countries spend as much as half of their incomes on food, while fuel is a smaller share of their expenditures. The rise in food prices has increased poverty and boosted the cost of many countries' poorly targeted and inefficient subsidy programs, which by limiting the impact of food and fuel prices impede the necessary adjustment to high prices.

The expansion of existing programs and the adoption of emergency measures are understandable, given the magnitude of the oil and food price increases, the potentially dire implications for the poor, and the limited time. However, the high cost of this response underlines the importance of putting in place well-targeted and efficient safety net programs, so that next time countries can address the needs of the poor without incurring undue fiscal costs. This episode has also shone light on the need for international coordination to encourage countries to avoid counterproductive policies and to marshal aid resources to help the poor.

Policies to deal with the rising food and fuel prices have often exacerbated the problem by slowing necessary adjustments. Such policy responses have included price controls and export bans that have impaired incentives to reduce consumption and invest in the additional capacity that would help bring prices down, while weakening confidence in the international trading system.

The dramatic increase in food prices has underlined the importance of improving the efficiency of programs to deliver emergency food aid and transition these programs from largely surplus disposal programs to effective humanitarian assistance programs with fewer constraints on their use. A range of multilateral and trade policies (export restrictions, biofuels subsidies, tariffs, mandates, and global protection of agriculture more generally) have contributed to the rise in food prices and need to be reconsidered. The Doha Round, while not likely to lower food prices in the near term, would provide longer-term discipline to agricultural policies and raise incomes around the world.

## Technical Annex: Sensitivity Analysis

The poverty effects of higher food prices discussed in chapter 3 are based on a number of assumptions. This annex reports the sensitivity of the results (change in the number of poor and the change in the income gap ratio) under different assumptions regarding the nature of the price shock and the proportion of increased food expenditures that accrue to agricultural households.

The results presented in the main text deflate the increase in food prices by the non-food deflator. More traditionally in high-income countries, where food represents a small share of total spending, real food prices are deflated by the overall consumer price index. If the whole consumer price index had been used to deflate the increase in food prices, the overall shock would have been much smaller and hence the estimated poverty effects would have been milder. Under this scenario, labeled “real price change” in table 3A.1, the total number of poor would be around half as large as in the central scenario.

Another important assumption driving the estimated poverty effects is the allocation of the revenues from higher food prices to different households. In the central scenario, producer prices are increased by the same proportion as consumer prices. To the extent that *all* of the increase in retail food prices is attributable to an increase in farmgate prices, then the proportional increase in farmgate prices should have been larger than that experienced by retail prices.<sup>51</sup> The other issue is how the price change affects the incomes of different households. In the kind of short-term simulation being conducted here, wages and employment are normally held constant. Therefore, only the incomes of self-employed agricultural workers or landowners, who sell the final product, should increase, not those of agricultural wage laborers. Unfortunately, the GIDD database does not distinguish between different income sources. Therefore the data in the GIDD is complemented with information from the Rural Income Generating Activities (RIGA) project. RIGA is an FAO–World Bank funded project that uses data from 21 (household) Living Standards Measurement

**Table 3A.1 Sensitivity analysis**

Region	Real price change		Relative price change	
	All agricultural incomes affected	Self-employment agricultural incomes affected	Central Scenario: All agricultural incomes affected	Self-employment agricultural incomes affected
<b>Change in number of poor (million)</b>				
East Asia and the Pacific	52.1	59.9	103.7	114.7
Europe and Central Asia	0.0	0.0	0.1	0.1
Latin America and the Caribbean	0.4	0.8	0.7	1.3
Middle East and North Africa	1.9	3.0	4.6	7.2
South Asia	10.8	14.3	16.8	24.4
Sub-Saharan Africa	2.0	2.2	5.7	5.9
Developing world	67.2	80.3	131.6	153.5
<b>Change in income gap ratio (percent)</b>				
East Asia and the Pacific	0.36	0.43	0.78	0.93
Europe and Central Asia	0.00	0.00	0.00	0.00
Latin America and the Caribbean	0.00	0.01	0.01	0.01
Middle East and North Africa	0.03	0.06	0.09	0.15
South Asia	0.17	0.24	0.28	0.43
Sub-Saharan Africa	0.10	0.11	0.30	0.32
Developing world	0.16	0.21	0.33	0.41

Source: World Bank.

Surveys (LSMS) to identify the various income generating activities of rural households.<sup>52</sup> The information on total agricultural incomes and self-employment agricultural incomes reported in RIGA is used to estimate the econometric relationship between this and per-capita household income and consumption, which was then used to impute agricultural income shares in all the households included in the GIDD (De Hoyos and Medvedev 2008).<sup>53</sup>

If the short-term price increase benefits only self-employed landowners, the increase of self-employment agricultural incomes should be larger than the increase in retail prices. At the limit, if agricultural wages and employment are held constant, then all of the additional income would accrue to landowners and none to farm workers.

Mathematically,

$$P_1^c * Q_1 = \Pi_1 * SE + W_1 * E + \text{other costs},$$

where  $P_1^c$ ,  $Q_1$  are the retail price and quantity consumed of good 1, respectively.  $\Pi_1$ ,  $W_1$  are remunerations of self-employed workers (including the return to land to self-employed landowners) and wage earners, respectively. Rearranging:

$$P_1^c = \Pi_1 \frac{SE}{Q} + W_1 \frac{E^{AG}}{Q} + \frac{\text{other costs}}{Q},$$

where  $SE/Q$  is profits share in total output. We denote these as alpha and those of other costs as beta, giving us:

$$P_1^c = \Pi_1 \alpha + W_1 (1 - \alpha - \beta) + \beta \frac{\text{other cost}}{Q}.$$

Taking the total derivative while holding wages and other costs constant gives us:

$$\frac{d}{dt} P^c = \alpha \frac{d}{dt} \Pi$$

or

$$\frac{d}{dt} \Pi = \frac{1}{\alpha} \frac{d}{dt} P^c.$$

Numerically, if the landowner's share in the value of output initially is 50 percent, then the percent increase in his revenues will be twice that of the increase in the retail price (assuming all the changes in retail price are translated into increases in profits).

In the central scenario, *all* agricultural incomes are raised by the same amount as retail prices. This is tantamount to assuming that wages, self-employed profits, and other costs all rise by the same proportion as the increase in consumer food prices.

It is also equivalent to assuming that all of the increase in farm incomes accrue to landowners but that all the farm workers work for poor landowners.

An alternative assumption is to assume that only landowner incomes and other incomes rise in the same proportion as consumer prices. This essentially assumes that none of the agricultural workers work for proper landowners. Under this assumption, the head-count poverty rate increases by substantially more— 153 million (see results in table 3A.1 under the label “self-employed agricultural incomes affected”).

The lower panel of table 3A.1 reports the change in the income gap ratio (Foster, Greer, and Thorbecke 1984)—the average difference between the per capita income of poor households and the poverty line stated as a percent of the poverty line—for the various scenarios. The differences in the income gap ratio between different scenarios confirm that larger poverty impacts are found when the change in relative prices is used as the shock and when only self-employment agricultural household incomes are assumed to respond to change in relative prices.

## Notes

1. The idea that dependence on natural resources may impede development dates back at least to the decline of Spain, a period when it was benefiting from substantial gold inflows from the New World in the 17th century (Landes 1999). The idea was forcefully restated by development theorists in the decades following World War II (such as Prebisch 1950 and Singer 1950) and continues to attract attention.

2. Sachs and Warner (1995, 2001) are perhaps the most influential. See also Gylfason, Herbertsson, and Zoega (1999); Leite and Weidmann (1999); Auty (1998); and Bravo Ortega and De Gregorio (2005). Gylfason (2001) finds that resource dependence is associated with lower education levels, implying that economies dependent on primary commodities have limited incentives to invest in human capital. Lederman and Maloney (2007) find that the Sachs and Warner results are not robust to data modifications and changes in estimation techniques.

3. Bevan, Collier, and Gunning (1991) provide case-study evidence of excessive expenditures, debt accumulation, and low-quality investments during commodity price booms in Sub-Saharan Africa. Cuddington (1989) finds that many developing countries overspent during and after the 1970s boom.

4. Manzano and Rigobon (2006), for example, find that the post-boom slowdown in Latin America in the 1980s was almost entirely explained by the debt overhang accumulated during the boom period.

5. The average data presented in this section tend to obscure the great diversity of country experiences, because both the rate of increase in government expenditures and in exports (relative to GDP) vary enormously. The difference between changes in the ratio of exports to GDP and changes in the ratio of government expenditures to GDP may be viewed as a rough summary indicator of the fiscal response to primary commodity booms. In both the 1980s and the 2000s, this difference varied by as much as 60 percent of GDP between countries.

6. Historically, the very different circumstances facing individual countries were reflected in diverse fiscal responses to commodity booms. For Sub-Saharan Africa, see Deaton and Miller (1995); for a more geographically diverse collection of countries, see Collier and Gunning (1994).

7. This analysis includes developing countries where primary commodities accounted for more than 70 percent of merchandise exports. Boom periods are defined as sequential increases in merchandise export revenues that average more than 10 percent a year. Thus “booms” do not represent trough-to-peak changes in prices but simply periods of rapid growth in export revenues in countries dependent on primary commodities. We report simple averages of the percentage point change in the ratios of exports and government expenditures to GDP.

8. Because of the small number of countries in the sample for fuel exporters during the 1980s (owing to the lack of government expenditure data for many countries), these results must be treated with caution. The basic results for nonfuel primary commodity exporters remain robust to the exclusion of the two

largest outliers in the sample (São Tomé and Príncipe, whose government expenditures declined by 45 percentage points, and Paraguay, whose export revenues rose by 37 percentage points of GDP).

9. For any given price forecast, countries with 70 or 80 years of reserves at current production levels have a higher permanent income from the oil price rise than countries with only 10 or 20 years of reserves at current production. Thus, assuming countries wish to smooth the revenue flow over an extended period of time, countries with large reserves relative to production should spend a larger share of the current revenues than countries with smaller reserves.

10. The countries of concern here are mostly oil exporters. Based on available data, only one country (Zambia) relies on minerals for more than 70 percent of export revenues. (Botswana’s dependence on diamonds would be another example, except that a large share of diamond exports are counted as processed goods in trade statistics.)

11. The calculation of the life span of reserves is subject to considerable uncertainty, given that geologists are continually increasing estimates of reserves, and changes in technology and in prices raise the share of proven reserves that can be exploited profitably (see chapter 2).

12. This calculation does not take into account the share of the increase in export revenues captured by the government. Most of the high-reserves countries control their oil resources through a state company, but even so the government may not see the full proceeds from the increase in price.

13. A brief discussion of this type of reduction in the context of the Dutch disease is given in Sachs and Warner (1995). See also the references they cite and Torvik (2001).

14. Comparisons with the experience of the 1980s are difficult to draw because of missing data for oil-exporting countries. Moreover, after initially appreciating, the currencies of many non-oil primary commodity exporters depreciated sharply in real terms in the 1980s in reaction to the debt crisis, so that foreign exchange was limited, despite the rise in export earnings.

15. On corruption, see Lane and Tornell (1999), Baland and Francois (2000), Torvik (2002), and Wick and Bulte (2006). On resource wealth and civil wars, see Collier and Hoeffler (2004). On inefficient distribution of rents, see Acemoglu and Robinson (2001).

16. Mehlum, Moene, and Torvik (2006) provide evidence that natural resource abundance has a negative impact on growth only in countries with poor institutions. Murshed (2004) finds that oil and mineral wealth slows growth through impairing institutional development.



17. Oil and mineral wealth can be more heavily taxed than agricultural wealth (see above) and thus generates more opportunities for corruption.

18. The relationship between government revenues and expenditures has been found to be weaker in countries with national revenue funds than in countries without such funds (Davis and others 2001; Crain and Devlin 2003). Analysis of 15 oil-dependent economies over 30 years indicates that national revenue funds are associated with reduced volatility of broad money and prices, but the relationship with real exchange volatility is weak (Shabsigh and Ilahi 2007).

19. In countries with strong political institutions (as measured by the existence of effective checks and balances in decision making), government consumption is unrelated to changes in oil revenues (that is, it is not procyclical), but in countries with weak institutions, government consumption is strongly related to oil revenues (Humphreys and Standbu 2004).

20. Such deals are, by no means a new phenomenon. Firms from high-income countries have entered into such contracts for several decades.

21. Factors such as delivery specifications, contract liquidity, particular industry structures in various countries, and transportation differences make defining standardized contracts more difficult.

22. "Indian Fuel Prices, Too Hot to Touch," *Economist*, November 29, 2007.

23. Estimating the impact of rising metals prices is even more difficult, because metals tend to enter into the consumption basket of households only indirectly in the form of manufactured goods.

24. The GIDD data set consists of 73 recent household surveys for low- and middle-income countries complemented with more aggregate information on income distributions for 25 high-income and 22 developing countries, together representing 90 percent of the world's population.

25. According to household surveys in Africa, the relationship between food shares and per capita household incomes is concave, that is, for very low levels of income, food shares accelerate as the households become richer. The household surveys indicate that in extremely poor households, consumption items such as wood or kerosene are incompressible.

26. The cost is estimated as the change in the *poverty deficit* (Atkinson 1987), that is, the variation in financial resources required to eliminate poverty under a perfect targeting scenario.

27. This share assumes the same poverty line for rural and urban areas. Ravallion, Chen, and Sangrula (2007) use a higher poverty line for urban areas and show that the rural share of poverty is 75 percent.

28. Real price increases are calculated as the total increase in the ratio of the food and nonfood consumer

price index (CPI) over the period January 2005–December 2007. This differs from the common practice in high-income countries where the numerator is the level of the overall CPI including food prices. The definition adopted here provides a better measure of the relative increase in food prices because food is a very large share of the overall CPI in most developing countries. Were the more usual measure to be employed, the real price increases would be seriously underestimated.

29. For details on this and other reported simulations, see De Hoyos and Medvedev (2008).

30. Despite a very different methodology and a much smaller sample set, Ivanic and Martin (2008) arrive at a similar figure—105 million.

31. In part, this reflects the influence of higher oil prices on nonfood prices—the numeraire used for calculating real food price increases. Unfortunately, too few countries had information on the actual impact of high fuel prices on the consumer price index to use a nonfood non-oil index to deflate the increase in food prices.

32. An analysis of Argentina suggests that a 10 percent increase in prices will increase output by 3.6, 7.1, and 17.8 percent after 5, 10, and 20 years respectively (Cavallo 1988), a result that is consistent with Binswanger's (1989) estimate that long-run effects may take between 10 and 20 years to play out.

33. The pass-through was defined as the ratio of absolute changes since December 2003 in the retail price of fuel and the local currency price of the relevant fuel import product.

34. Many countries subsidize kerosene, which is used for lighting and cooking fuel by the poor, and unlike gasoline and diesel, whose retail prices rose by more than the international price in 2007, the median increase in domestic kerosene prices was only 85 percent of the international price increase (Mati 2008).

35. "Indian Fuel Prices, Too Hot to Touch." *Economist*, November 29, 2007.

36. For example, diesel is kept artificially cheap by preventing state oil companies from raising prices; in return these companies issue oil bonds that the government guarantees.

37. Export bans are not new (the United States imposed one on soybeans in the 1970s and the European Union banned wheat exports in 1995), but their use has become more common.

38. India's ban was later replaced by a minimum export price, which was then replaced by another complete ban on exports. Other factors also contributed to the increase in international rice prices, including the thinness of the international rice market and a simultaneous decision by consuming countries to increase

demand to build stockpiles. Increased government-to-government rice sales, which are not subject to the ban, have reduced its effectiveness.

39. Reacting to its inability to secure imports of rice in early 2007, the Philippines recently passed policies aimed at achieving rice self-sufficiency.

40. Although the supply of a single crop may respond quickly to an increase in prices, supply is normally achieved through crop switching.

41. Binswanger (1989) estimates the long-term price elasticity of supply to be approximately 0.2.

42. Self-targeted programs are designed to minimize the incentives the nonpoor may have to participate, typically achieved through a mix of rationing benefits (such as limiting food quantities), imposing physical requirements (such as manual work for food), and limiting the subsidies to inferior commodities.

43. For example, delivery of emergency food aid provided under U.S. Title II takes five months, on average (CARE 2006).

44. This discussion is based on "Strengthening the World Food Program's Role in Humanitarian Food Assistance," a note prepared by World Bank staff.

45. Fully 93 percent of commitments are tied to specific operations. A few countries (Canada, the Netherlands, Russia, and the United States) have begun making limited three-year pledges.

46. Financing costs (based on a 6 percent interest rate) would be around \$4 billion, while storage costs would be around \$1.4 billion, based on U.S. storage costs of \$0.29 a bushel or \$10.70 a metric ton incurred during 2004–07 for wheat in the Bill Emerson Humanitarian Trust (pers. comm., Fred Blott, USDA, August 11, 2008). Assuming that 3–5 percent of the stockpile spoiled each year (consistent with losses in high-income countries), the annual cost would be an additional \$3–5 billion.

47. Under existing rules, export restrictions are allowed to prevent or relieve critical shortages of foodstuffs or other essential products. The last notification, by Hungary, dates to 1997.

48. The Doha rules, for example, proposed that notification be made within 90 days from the entry into force of the measure and that it explain the reasons for their introduction. The rules also would limit the duration of export restrictions to 12 months unless importing members agree to an 18-month period.

49. This need not eliminate the impact of biofuels production on food prices, because at some level all biofuel production inevitably competes with food for agricultural land, water, and other resources

50. A pro-poor agreement in which rich countries cut tariff peaks to 10 percent in agriculture and 5 percent in manufacturing, combined with cuts of 15 and

10 percent in developing countries, respectively, could yield gains in developing countries of \$315 billion over 10 years along with gains of \$170 billion for rich countries (World Bank 2004).

51. The difference would stem from transport, merchandising, and other costs.

52. For more details on the LSMS household surveys see <http://www.worldbank.org/LSMS/>. For a complete description of the RIGA project, including publication of the first results, see Carletto and others (2007).

53. Notice that given the data restrictions, all rural households are assumed to have positive agricultural and self-employment agricultural income shares, and therefore a good part of the distribution story behind higher food prices is lost.

## References

- Acemoglu, Daron, and James A. Robinson. 2001. "Inefficient Redistribution." *American Political Science Review* 95: 649.
- Aghion, P., G. M. Angeletos, A. Banerjee, and K. Manolov. 2005. "Volatility and Growth: Credit Constraints and Productivity-Enhancing Investments." NBER Working Paper 1139. National Bureau of Economic Research, Cambridge, MA.
- Aizenman, Joshua, and Nancy Marion. 1996. "Volatility and the Investment Response." NBER Working Paper 5841. National Bureau of Economic Research, Cambridge, MA.
- Aksoy, Ataman, and Aylin Isik-Dikmelik. 2008. "Are Low Food Prices Pro-Poor? Net Food Buyers and Sellers in Low-Income Countries." Policy Research Working Paper 4642. World Bank, Washington, DC.
- Asfaha, Samuel. 2007. "National Revenue Funds: Their Efficacy for Fiscal Stability and Intergenerational Equity." Personal RePEc Archive Paper 7656. Research Papers in Economics, Munich.
- Atkinson, A. B. 1987. "On the Measurement of Poverty." *Econometrica* 55 (4): 749–64.
- Auty, Richard M. 1998. *Resource Abundance and Economic Development*. Helsinki: UNU World Institute for Development Economics Research.
- Baland, Jean-Marie, and Patrick Francois. 2000. "Rent-Seeking and Resource Booms." *Journal of Development Economics* 61: 527–42.
- Bacon, Robert, and Masami Kojima. 2006. "Coping with Higher Oil Prices." ESMAP Report 323/06. World Bank, Washington, DC.
- Barrett, Christopher B., and Emelly Mutambatsere. 2008. "Marketing Boards." In *The New Palgrave Dictionary of Economics*, ed. Lawrence E. Blume

- and Steven N. Durlauf, 2d ed. London: Palgrave Macmillan.
- Bevan, David, Paul Collier, and Jan Willem Gunning. 1991. "Temporary Trade Shocks in Developing Countries: Consequences and Policy Responses." In *The Economics of Commodity Markets*, ed. David Greenaway and W. Morgan, pp. 64–93. Cheltenham: Edward Elgar.
- Binswanger, Hans. 1989. "The Policy Response of Agriculture." *Proceedings of the World Bank Annual Conference on Development Economics*. Washington, DC: World Bank.
- Bleaney, Michael. 1996. "Macroeconomic Stability, Investment and Growth in Developing Countries." *Journal of Development Economics* 48: 461–77.
- Bravo Ortega, Claudio, and Jose de Gregorio. 2005. "The Relative Richness of the Poor? Natural Resources, Human Capital, and Economic Growth." Policy Research Working Paper 3484. World Bank, Washington, DC.
- Bussolo, M., R. De Hoyos, and D. Medvedev. 2008a. "Economic Growth and Income Distribution: Linking Macroeconomic Models with Household Survey Data at the Global Level." World Bank, Washington, DC.
- . Forthcoming. "Global Income Distribution and Poverty in the Absence of Agricultural Distortions." In *Agricultural Price Distortions, Inequality and Poverty*, ed. K. Anderson, J. Cockburn, and W. A. Martin.
- Byerlee, Derek, Robert Myers, and Thomas Jayne. 2006. "Managing Food Price Risks and Instability in an Environment of Market Liberalization." Agriculture and Rural Development Department, World Bank, Washington, DC.
- CARE. 2006. "White Paper on Food Aid Policy." www.care.org.
- Carletto, G., K. Covarrubias, B. Davis, M. Krausova, K. Stamoulis, P. Winters, and A. Zezza. 2007. "Rural Income Generating Activities in Developing Countries: Re-Assessing the Evidence." *Journal of Agricultural and Development Economics* 4 (1).
- Cashin, Paul, Luis Cespedes, and Ratna Sahay. 2002. "Keynes, Cocoa and Copper: In Search of Commodity Currencies." IMF Working Paper 02/223. International Monetary Fund, Washington, DC.
- Caspary, Georg. 2008. "China Eyes Latin American Commodities." Yale Global, January 18. yale-global.yale.edu.
- Cavallo, Domingo. 1988. "Agriculture and Economic Growth: The Experience of Argentina 1913–84." Paper presented at the 20th Conference of Agricultural Economists, Buenos Aires, Argentina.
- Chauffour, Jean-Pierre. 2008. "Global Food Price Crisis: Trade Policy Origins and Options." Trade Note 34, World Bank, Washington, DC.
- Chen, S., and M. Ravallion. 2008. "The Developing World Is Poorer than We Thought, But No Less Successful in the Fight against Poverty." World Bank Policy Research Working Paper 4703, Washington, DC.
- Christiaensen, L., and L. Demery. 2007. *Down to Earth: Agriculture and Poverty Reduction in Africa*. Directions in Development series. Washington, DC: World Bank.
- Clements, Benedict, Jung Hong-Sang, and Sanjeev Gupta. 2003. "Real and Distributive Effects of Petroleum Price Liberalization: The Case of Indonesia." IMF Working Paper No. 03/204, International Monetary Fund, Washington, DC.
- Coady, David, Moataz El-Said, Robert Gillingham, Kangni Kpodar, Paulo Medas, and David Newhouse. 2006. "The Magnitude and Distribution of Fuel Subsidies: Evidence from Bolivia, Ghana, Jordan, Mali, and Sri Lanka." IMF Working Paper WP/06/247. International Monetary Fund, Washington, DC.
- Coady, David, and David Newhouse. 2005. "Ghana: Evaluation of the Distributional Impacts of Petroleum Price Reforms." Technical Assistance Report. Unpublished, International Monetary Fund, Washington, DC.
- Collier, Paul. 2007. "Managing Commodity Booms: Lessons of International Experience." Centre for the Study of African Economies, Oxford University, Oxford, U.K.
- Collier, Paul, and Anke Hoeffler. 2004. "Greed and Grievance in Civil Wars." *Oxford Economic Papers* 56: 563–95.
- Collier, Paul, and Benedikt Goderis. 2007. "Commodity Prices, Growth and the Natural Resource Curse: Reconciling a Conundrum." Centre for the Study of African Economies Working Paper Series/2007-15. Oxford University, Oxford, U.K.
- Collier, Paul, and Jan Willem Gunning. 1994. *Trade Shocks: Consequences and Policy Responses in Developing Countries*. San Francisco: International Center for Economic Growth.
- Crain, Mark, and Julia Devlin. 2003. "Non-Renewable Resource Funds: A Red Herring for Fiscal Stability?" Paper presented at the annual meeting of the American Political Science Association, August 27, Philadelphia, PA.
- Cuddington, John. 1989. "Commodity Export Booms in Developing Countries." *World Bank Research Observer* 4 (2):143–65.
- Dana, J. 2008. Personal communication, World Bank.

- Dana, J., C. J. Gilbert, and E. Shim. 2006. "Hedging Grain Price Risk in the SADC: Case Studies of Malawi and Zambia." *Food Policy* 31: 357–71.
- Datt, Gaurav, and Martin Ravallion. 1998. "Farm Productivity and Rural Poverty in India." *Journal of Development Studies* 34 (4): 58–62.
- Davis, Jeffrey M., Rolando Ossowski, James Daniel, and Steven Barnett. 2001. "Stabilization and Savings Funds for Nonrenewable Resources: Experience and Policy Implications." Occasional Paper 205. International Monetary Fund, Washington, DC.
- Deaton, Angus, and Ron Miller. 1995. "International Commodity Prices, Macroeconomic Performance, and Politics in Sub-Saharan Africa." Princeton Studies in International Finance 79. Princeton University, Princeton, NJ.
- De Hoyos, R. and R. Lessem. 2008. "Food Shares in Consumption: New Evidence Using Engel Curves for Developing Countries." World Bank, Washington, DC.
- De Hoyos, R., and D. Medvedev. 2008. "Poverty Effects of Higher Food Prices: A Global Perspective." Background paper for *Global Economic Prospects 2009*. Washington, DC: World Bank.
- Delgado, Christopher L., Jane Hopkins, and Valerie A. Kelly. 1998. "Agricultural Growth Linkages in Sub-Saharan Africa." Research Report 107. International Food Policy Research Institute, Washington, DC.
- Dessus, S., S. Herrera, and R. De Hoyos. 2008. "The Impact of Food Inflation on Urban Poverty and Its Monetary Cost: Some Back-of-the-Envelope Calculations." Forthcoming, *Agricultural Economics*.
- Downs, Erica. 2007. "The Fact and Fiction of Sino-African Energy Relations." *China Security* 3 (3): 42–68.
- Eifert, Benn, Alan Gelb, and Nils Borje Tallroth. 2002. "The Political Economy of Fiscal Policy and Economic Management in Oil-exporting Countries." Policy Research Working Paper 2899. World Bank, Washington, DC.
- ESMAP. 2005. "The Impact of Higher Oil Prices on Low Income Countries and on the Poor." United Nations Development Programme/World Bank Energy Sector Management Assistance Programme, Report 299, March.
- . 2006. "Coping with Higher Oil Prices, ESMAP Report 323/06, Washington DC.
- FAO (Food and Agriculture Organization). 2006. *The State of Food and Agriculture 2006*. Rome: FAO.
- Fasano, Ugo. 2000. "Review of the Experience with Oil Stabilization and Savings Funds in Selected Countries." Working Paper 00/12, International Monetary Fund, Washington, DC.
- Fatas, Antonio, and Ilian Mihov. 2005. "Policy Volatility, Institutions and Economic Growth." INSEAD. Fontainebleau, France.
- Foster, J., J. Greer, and E. Thorbecke. 1984. "A Class of Decomposable Poverty Measures." *Econometrica* 52: 761–66.
- Gaiha, R. 1993. "Design of Poverty Alleviation Strategy in Rural Areas." FAO Economic and Social Development Paper 115. FAO, Rome.
- Gelb, Alan. 1988. *Oil Windfalls: Blessing or Curse?* New York: Oxford University Press.
- Gilbert, Christopher L. 2007. "International Commodity Agreements." *Handbook on Trade and Policy*. Edward Elgar Publishing.
- Griffith-Jones, Stephanie, and Jose Antonio Ocampo. 2008. "Sovereign Wealth Funds: A Developing Country Perspective." Paper prepared for the workshop on sovereign wealth funds organized by the Andean Development Corporation, February 18, London.
- Grosh, Margaret, Carlo del Ninno, and Emil Daniel Tesliuc. 2008. "Guidance for Responses from the Human Development Sectors to Rising Food and Fuel Prices." Human Development Network, World Bank, Washington, DC.
- Gylfason, Thorvaldur. 2001. "Natural Resources, Education and Economic Development." *European Economic Review* 45 (4–6): 847–59.
- Gylfason, Thorvaldur, Tryggvi Thor Herbertsson, and Gylfi Zoega. 1999. "A Mixed Blessing: Natural Resources and Economic Growth." *Macroeconomic Dynamics* 3: 204–25.
- Herrera, Santiago, Tala Khartabil, Gaobo Pang, and Stefano Paternostro. 2005. "Preliminary Estimates of the Financing, Growth, and Poverty Implications of the Oil Shock on Developing Nations." World Bank, Washington, DC.
- Herrera, Santiago, and Gaobo Pang. 2006. "Update of the Financing, Growth, and Poverty Implications of the Recent Oil Price Shock on Developing Countries." World Bank, Washington, DC.
- Humphreys, Macartan, and Martin E. Standbu. 2004. "The Political Economy of Natural Resource Funds." In *Escaping the Resource Curse*, ed. Humphreys, Sachs, and Stiglitz. New York: Columbia University.
- IEA. 2002. *World Energy Outlook*. Paris: International Energy Agency.
- IMF (International Monetary Fund). 2007. "The Role of Fiscal Institutions in Managing the Oil

- Revenue Boom.” Fiscal Affairs Department, IMF, Washington, D.C.
- . 2008a. “Food and Fuel Prices: Recent Developments, Macroeconomic Impacts, and Policy Responses.” IMF, Washington, DC (June).
- . 2008b. *World Economic Outlook*. Washington, DC: IMF.
- Ivanic, Maros, and Will Martin. 2008. “Implications of Higher Global Food Prices for Poverty in Low-Income Countries.” Policy Research Working Paper 4594. World Bank, Washington, DC.
- Kaufmann, D., A. Kraay, and M. Mastruzzi. 2007. *Governance Matters VI: Aggregate and Individual Governance Indicators for 1996–2006*. World Bank Policy Research Working Paper 4280, Washington, DC.
- Kojima, Masami, and Robert Bacon. 2006. “Phasing Out Subsidies: Recent Experiences with Fuel in Developing Countries.” World Bank, Washington, DC.
- Koren, Miklos, and Silvana Tenreyro. 2003. “Diversification and Development.” Working Paper 3-3. Federal Reserve Bank of Boston.
- Kpodar, Kangni. 2006. “Distributional Effects of Oil Price Changes: Evidence from Mali.” Working Paper 06/91, International Monetary Fund, Washington, DC.
- Landes, David. 1999. *The Wealth and Poverty of Nations: Why Some Are Rich and Some So Poor*. New York: W. W. Norton and Company.
- Lane, Philip, and Aaron Tornell. 1999. “The Voracity Effect.” *American Economic Review* 89: 22–46.
- Larson, Donald F., Panos Varangis, and Nanae Yabuki. 1998. “Commodity Risk Management and Development.” Policy Research Working Paper 1963. World Bank, Washington, DC.
- Lederman, Daniel, and William Maloney. 2007. “Trade Structure and Growth.” In *Natural Resources: Neither Curse nor Destiny*, ed. Daniel Lederman and William Maloney. Washington, DC: World Bank.
- Leite, Carlos A., and Jens Weidmann. 1999. “Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth.” IMF Working Paper 99/85. IMF, Washington, DC.
- Lyman, Princeton. 2005. “China’s Rising Role in Africa.” Council on Foreign Relations, New York. [www.cfr.org/publication/8436](http://www.cfr.org/publication/8436).
- Manzano, Ozmel, and Roberto Rigobon. 2007. “Resource Curse or Debt Overhang?” In *Natural Resources: Neither Curse nor Destiny*, ed. Daniel Lederman and William F. Maloney. Washington, DC: World Bank.
- Mati, Amine. 2008. “Managing Surging Oil Prices in the Developing World.” *IMF Survey Magazine: Policy* March 20, 2008.
- McDonald, Scott, and Melt van Schoor. 2005. “A Computable General Equilibrium (CGE) Analysis of the Impact of an Oil Price Increase in South Africa.” PROVIDE Working Paper No. 1, The Western Cape Department of Agriculture, Elsenburg.
- Mehlum, Halvor, Karl Moene, and Ragnar Torvik. 2006. “Institutions and the Resource Curse.” *Economic Journal* 116: 1–20.
- Murshed, S. Mansoob. 2004. “When Does Natural Resource Abundance Lead to a Resource Curse?” Environmental Economics Program Discussion Paper 04/01. International Institute for Environment and Development, London.
- Ocampo, Jose Antonio. 2003. “Developing Countries’ Anti-Cyclical Policies in a Globalized World.” In *Development Economics and Structuralist Macroeconomics: Essays in Honour of Lance Taylor*, ed. Amitava Dutt and Jaime Ros. Aldershot, UK: Edward Elgar.
- OECD (Organisation for Economic Co-operation and Development). 2005. “The Development Effectiveness of Food Aid: Does Tying Matter?” OECD, Paris.
- Prebisch, Raul. 1950. *The Economic Development of Latin America and its Principal Problems*. New York: United Nations.
- Ramey, Garey, and Valerie Ramey. 1995. “Cross-Country Evidence on the Link between Volatility and Growth.” *American Economic Review* 85: 1138–51.
- Ravallion, Martin, Shaohua Chen, and Prem Sangraula. 2007. “New Evidence on the Urbanization of Global Poverty.” Policy Research Working Paper 4199. World Bank, Washington, DC.
- Revenga, A., Q. Wodon, and H. Zaman. 2008. “Policy Responses to Rising Food Prices.” World Bank, Washington, DC.
- Sachs, Jeffrey, and Andrew Warner. 1995. “Natural Resource Abundance and Economic Growth.” NBER Working Paper 5398, National Bureau of Economic Research, Cambridge, MA.
- . 2001. “Natural Resources and Economic Development: The Curse of Natural Resources.” *European Economic Review* 45: 827–38.
- Seshan, Ganesh, and Dina Umali-Deininger. 2007. “Agriculture and Import Liberalization and Household Welfare in Sri Lanka.” Mimeographed.
- Shabsigh, Ghiath, and Nadeem Ilahi. 2007. “Looking beyond the Fiscal: Do Oil Funds Bring Macroeconomic Stability?” Working Paper 07/96. International Monetary Fund. Washington, DC.

- Singer, H. 1950. "The Distribution of Gains between Investing and Borrowing Countries." *American Economic Review* 40: 473–85.
- Steenblick, Ronald. 2007. "Biofuels—At What Cost? Government Support for Ethanol and Biodiesel in Selected OECD Countries." Global Subsidies Initiative, International Institute for Sustainable Development, Geneva.
- Torvik, Ragnar. 2001. "Learning by Doing and the Dutch Disease." *European Economic Review* 45: 285–306.
- . 2002. "Natural Resources, Rent Seeking, and Welfare." *Journal of Development Economics* 67 (2): 455–70.
- Turnovsky, Stephen J., and Pradip Chattopadhyay. 1998. "Volatility and Growth in Developing Countries: Some Numerical Results and Empirical Evidence." University of Washington, Seattle.
- UNCTAD (UN Conference on Trade and Development). 2006. "Boosting Africa's Growth through Re-injecting Surplus Oil Revenue: An Alternative to the Traditional Advice to Save and Stabilize." UNCTAD/DITC/COM/2006/10. UNCTAD, New York.
- . 2007. *World Investment Report: Transnational Corporations, Extractive Industries, and Development*. New York: United Nations Conference for Trade and Development.
- UNDP. 2007. "Overcoming Vulnerability to Rising Oil Prices: Options for Asia and the Pacific." United Nations Development Programme, Regional Center in Bangkok.
- USDA. 2007. "Serbia Grain and Feed Update." Foreign Agricultural Service GAIN Report No. RB7009, USDA.
- Van der Ploeg, Frederick, and Steven Poelhekke. 2007. "Volatility, Financial Development, and the Natural Resource Curse." Working Paper 2007/36. European University Institute, Florence, Italy.
- Wick, Katharina, and Erwin Bulte. 2006. "Contesting Resources: Rent Seeking, Conflict, and the Natural Resource Curse." *Public Choice* 128 (3–4): 457–76.
- World Bank. 2003. "Iran: Medium Term Framework for Transition, Converting Oil Wealth to Development." Economic Report No. 25848-IRN. World Bank, Washington, DC.
- . 2004. *Global Economic Prospects 2004*. Washington, DC: World Bank.
- . 2005a. "Egypt: Toward a More Effective Social Policy: Subsidies and Social Safety Net." Report 33550-EG. Social and Economic Development Group, Middle East and North Africa Region, World Bank, Washington, DC.
- . 2005b. *Extractive Industries and Sustainable Development, An Evaluation of World Bank Group Experience*. Washington, DC: World Bank.
- . 2007. *World Development Report 2008, Agriculture for Development*. Washington, DC: World Bank.
- . 2008a. "Rising Food and Fuel Prices: Addressing the Risks to Human Capital." Human Development Network, World Bank, Washington, DC.
- . 2008b. "Multiple Shocks, Poverty and Country Vulnerability." Presentation for the October 2008 Annual Meetings, Washington, DC.