



Recent trends in world food commodity prices: costs and benefits

Past and future trends in world food prices

Key message

High and volatile food prices are likely to continue. Demand from consumers in rapidly growing economies will increase, population continues to grow, and any further growth in biofuels will place additional demands on the food system. On the supply side, there are challenges due to increasingly scarce natural resources in some regions, as well as declining rates of yield growth for some commodities. Food price volatility may increase because of stronger linkages between agricultural and energy markets, as well as an increased frequency of weather shocks.

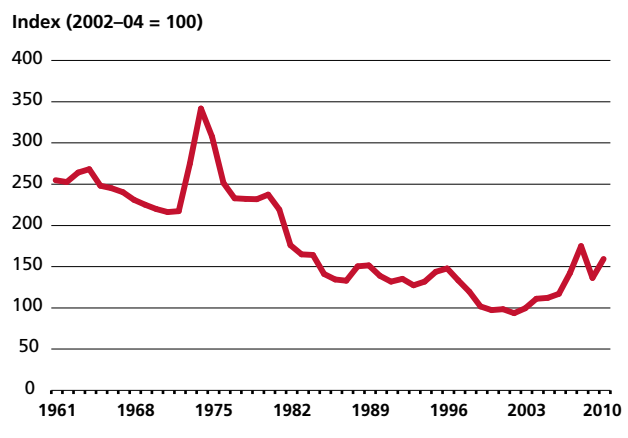
- rising production costs (e.g. irrigation pumps, machinery) and transport costs as a result of higher prices for petroleum and fertilizer;
- slower growth of cereal yields (and production), especially those of rice and wheat, during the past 20 years as a result of low investment over the previous three decades;
- increased demand on commodity futures markets as a result of both speculation and portfolio diversification;
- low levels of stocks, caused in part by some of the factors noted above;
- trade policies, such as export bans and aggressive buying by governments, that encouraged producers to withhold supplies, traders to increase stocks and consumers to engage in panic buying.

Prices of food commodities on world markets, adjusted for inflation, declined substantially from the early 1960s to the early 2000s, when they reached a historic low (Figure 3). They increased slowly from 2003 to 2006 and then surged upwards from 2006 to the middle of 2008 before declining in the second half of that year. The sudden increases took many by surprise, and led to increased concern over the ability of the world food economy to adequately feed billions of people, now and in the future. Although various observers attach differing degrees of importance to assorted factors, there is a relatively strong consensus that multiple factors had a role in the price increases that began in 2003.³ These factors include:

- weather shocks, such as drought in Australia (2005–07), that reduced wheat production and trade;
- policies to promote use of biofuels (tariffs, subsidies and mandated levels of use) that increased demand for maize and vegetable oils;
- depreciation of the United States (US) dollar;
- longer-term economic growth in several large developing countries that (a) put upward pressure on prices for petroleum and fertilizer because of the resource-intensive nature of their economic growth and (b) led to increased demand for meat, and hence animal feed, as diets diversified;

FIGURE 3

Apart from a peak in the early 1970s, the cost of food declined from the early 1960s until 2002, since when it has started an upward trend



Note: FAO Food Price Index, adjusted for inflation, 1961–2010, calculated using international prices for cereals, oilseeds, meats, and dairy and sugar products. The official FAO Food Price Index has been calculated since only 1990; in this figure it has been extended back to 1961 using proxy price information. The index measures movements in international prices, not domestic prices. The United States gross domestic product deflator is used to express the Food Price Index in real rather than nominal terms.
Source: FAO.

When prices declined in the second half of 2008, there was some hope that prices would stabilize, although probably at a higher level than before the surge. But in the middle of 2010 they again began to increase rapidly (Figure 3). This has renewed concerns over high prices, and has also brought price volatility to the fore; it seems that world food commodity prices may endure repeated episodes of ups and downs in the future.

Will higher prices and increased volatility continue in the future? In terms of price levels, many medium to long-term projection models suggest that food commodity prices will remain relatively high over the next decade or so. For example, the *Organisation for Economic Co-operation and Development (OECD)-FAO Agricultural Outlook 2011–2020*⁴ projects that world prices for rice, wheat, maize and oilseeds in the five years from 2015/16 to 2019/20 will be higher in real terms by 40, 27, 48 and 36 percent, respectively, than in the five years from 1998/99 to 2002/03.

Prices are generally expected to rise because continued population and economic growth will put upward pressure on demand, as will the anticipated increased use of biofuels (depending on biofuel policies and the price of oil). On the supply side, if oil prices continue to rise, agricultural

production costs will increase, contributing to higher food prices. Natural resource constraints, especially climate change and the limited availability of productive land and water in some regions, pose substantial challenges to producing food at affordable prices.⁵ On a more positive note, there remains significant potential for raising crop productivity through new technologies and improved extension, as well as for reducing losses in the supply chain. However, these gains will not materialize without increased investment. There may also be potential for further land expansion in Africa, Central Asia, Latin America and Ukraine, but again this will depend on appropriate investment. Furthermore, land expansion may also have negative environmental consequences.

There are also compelling arguments suggesting that, in addition to being higher, food commodity prices will also be more volatile in the future. If the frequency of extreme weather events increases, production shocks will be more frequent, which will tend to make prices more volatile. Furthermore, biofuel policies have created new linkages between the price of oil and the price of food commodities. When oil prices increase, demand for biofuels will increase, thus raising food prices, with the opposite happening when oil prices decrease.⁶ Because world oil prices have historically been more volatile

BOX 1

Some key concepts: price levels, price volatility (variability) and unpredictability of prices

In analysing food prices, it is important to distinguish between several related, but different, concepts. One important distinction is that between average prices over time and variability (volatility¹) of prices over time. It is possible for average prices to change without any change in variability. One simple way this might happen would be if a food-importing country were to impose a constant tariff on imports; the tariff would make food more expensive, but in most circumstances it would have no effect on the variability of domestic prices. Conversely, it is also possible to have a change in price variability with no change in the average level. This might happen, for example, if the weather became more variable but food production remained the same on average.

That being said, price levels and price volatility are related – they are both determined by supply and demand. In addition, high prices tend to be correlated with high volatility. Initially, high prices encourage people to draw down their stocks, which can moderate price changes that would otherwise have been caused by supply and demand shocks. However, once stocks have been drawn down, the system is vulnerable to a further supply or demand shock; the absence of the buffer means that price variation will tend to be greater than if stocks

were available. Despite this relationship, it is still important to distinguish between the two concepts. For one, prices can be high but stable. For another, the costs and benefits of high prices are very different from the costs and benefits of volatile prices, as described in ‘Costs and benefits of high and low food prices’ and ‘Costs and benefits of volatile and unpredictable prices’.

Another crucial distinction is that between variability and unpredictability. Prices exhibit variability for many reasons, but some price changes may be largely predictable. The classic example of predictable changes in food prices is seasonality, whereby prices are lowest during and soon after harvest and highest immediately before harvest. While seasonal changes are not exactly constant from year to year, they are often similar from one year to the next. Weather shocks, on the other hand, are typically unpredictable and may lead to unpredictable changes in prices, especially if stocks are low to begin with. Therefore, some price changes are relatively easy to anticipate and others are much harder to predict. Predictable changes in prices have different costs and benefits than unpredictable changes.

¹ Variability, instability and volatility are used interchangeably in this report.

BOX 2

How to measure price volatility

The simplest way to measure price volatility is the coefficient of variation (CV). This is the standard deviation of prices over a particular time interval divided by the mean price over the same interval. One advantage of this measure is that it has no units. This makes it easy to compare, for example, domestic price volatility measured in different countries. However, the CV can create misleading impressions if there are strong trends in the data, because trend movements will be included in the calculation of volatility. Moreover, there is no universally

accepted method for removing the trend component because different observers will have different ideas about the nature of the underlying trend (e.g. linear, quadratic).

As an alternative to the CV, economists often use the standard deviation of changes in the logarithm of prices.¹ This also has no units, but is less affected by strong trends over time.

¹ C.L. Gilbert and C.W. Morgan. 2010. Review: Food price volatility. *Philosophical Transactions of the Royal Society B*, 365: 3023–3034.

than food prices, world food markets may also be subject to increased volatility. Increased participation (e.g. by pension funds) in financial markets that trade commodity index funds might also lead to increased volatility, although this is a hotly debated issue without a clear consensus.

While it is not possible to know with certainty the extent of future increases in either the level or volatility of prices, the risks of higher prices and greater volatility are sufficiently large to warrant serious efforts to understand what can be done to reduce the likelihood of increased prices or greater volatility, or to manage the consequences when these are unavoidable. In considering the most appropriate options to counter high and/

or volatile prices, however, it is important to remember that the level and volatility of prices are the outcome of various forces that affect supply and demand. Further, this report will stress that the causes and impacts of high and/or volatile prices are complex because they are highly context-specific, i.e. they depend on the commodity being considered, the specific factors (policies, exchange rates, import dependence) that affect price transmission in various circumstances, the demographic characteristics of households and their production and consumption patterns, and many other variables. Thus, a crucial message is that policy interventions should take into account the specific context in which they are meant to be applied.



Costs and benefits of high and low food prices

Key message

In the short term, the benefits of high prices go primarily to farmers with a large marketed surplus, and these farmers are not the poorest of the poor. In addition, the poorest people usually buy more food than they sell. Thus, high food prices tend to worsen poverty, food insecurity and malnutrition. However, high prices represent an opportunity to spur long-term investment in agriculture, which will contribute to sustainable food security in the longer run.

Let us look first at the impacts of high (or low) price levels. The level of food commodity prices has two distinct types of effect. International market prices can affect macroeconomic variables at the national level, such as the balance of

payments, budget deficits and exchange rates, while domestic prices affect the poverty, energy intake and nutrition of individuals. (The linkages between international and domestic prices are discussed in detail under 'Lessons from the world food crisis of 2006–08', pp. 21–31.)

Macroeconomic impacts

The macroeconomic impacts of commodity prices are important because they affect the level of per capita income, which ultimately is a key determinant of living standards for individuals and families.

Generally speaking, high international prices for food commodities benefit countries that export those products, while low prices benefit importing countries. Ignoring for the moment considerations of volatility, this is basically a zero-sum game in the short-to-medium run: exporters benefit at

the expense of importers, and vice versa. In the longer term, however, higher prices could cause some importing countries to invest in their agriculture and reduce imports, or even become exporters. Such investment is crucial for the development of the agriculture sector and sustainable reductions in poverty and food insecurity.

The effects on the balance of payments and the exchange rate will be strongest for countries for which food trade is a substantial share of exports or imports. Countries that export a large proportion of their production benefit the most when prices are high. Countries that import a large share of the food they consume are hurt the most by high prices. However, terms-of-trade effects are also important. For example, a country that exports oil or metals may not need to produce more of those products to offset higher food prices if the price for their exports increases by more than the price of food imports.

In terms of fiscal effects, the impact of higher food prices will be strongest in countries where food subsidies are an important part of the budget. For importers, the cost of higher prices will have a direct fiscal impact if the subsidies not only continue but are increased to offset the higher prices. But even for exporting countries that subsidize domestic consumption, there will be an important impact in opportunity cost terms. In both of these cases, high levels of subsidies can reduce funds available for investment in public goods such as agricultural research, education, health and

roads. Reduced expenditure on these items can reduce long-term economic growth; and this has indeed happened in Latin America.⁷

■ Household-level impacts

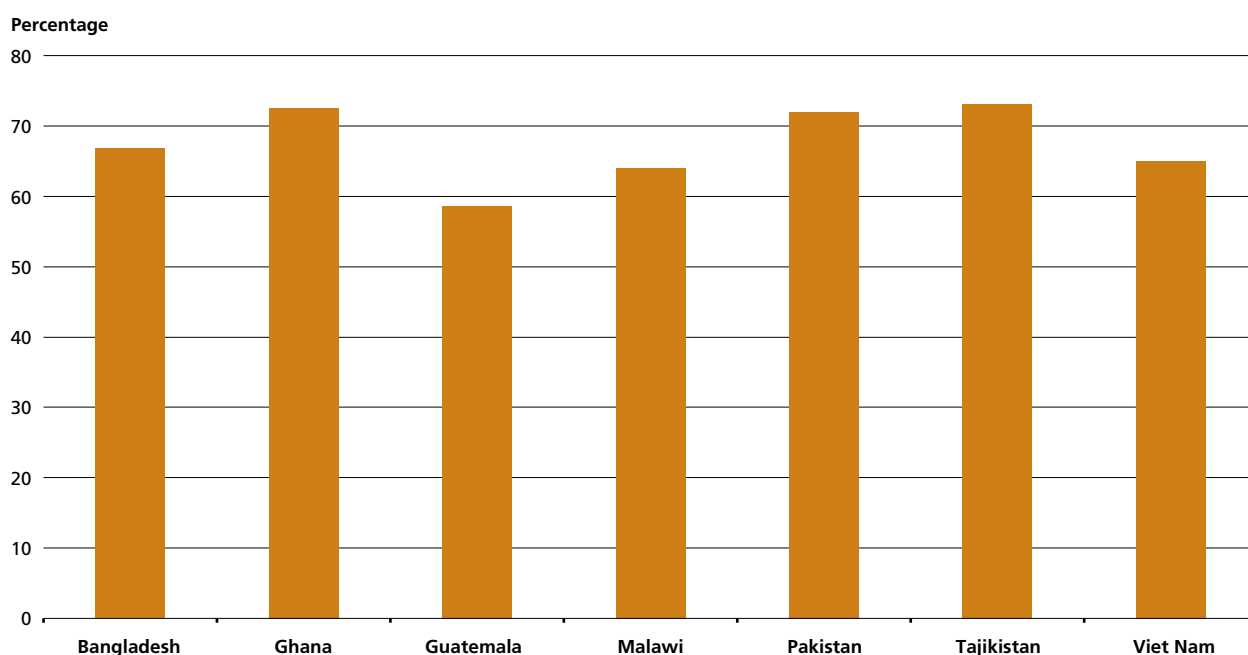
Poor people spend a large majority of their income on food (Figure 4), while many farmers derive much of their income from producing food. This suggests that changes in food prices will have large effects on the welfare of both farmers and poorer consumers.

In order to understand the importance of higher food prices for welfare, poverty and food security, it is important to distinguish between net food sellers and net food buyers. A net food seller is someone for whom the total value of the food they produce exceeds the total value of the food they consume, whereas for a net food buyer the reverse is true. Net food buyers will generally be hurt by higher food prices, while net food sellers will benefit (see Box 3).

The concepts of net food seller and net food buyer are quite distinct from whether the household is rural or urban. Nearly all urban dwellers are net food buyers; perhaps surprisingly, most rural dwellers also are net food buyers. Very-small-scale farmers and agricultural labourers are often net purchasers of food as they do not produce enough food for their families. They thus need to purchase food from the market and are likely to benefit from lower prices (but see

FIGURE 4

Poor people spend much of their income on food



Note: Percentage of household budget spent on food by the lowest expenditure quintile of the population.
Source of raw data: FAO Rural Income Generating Activities project.

BOX 3

Net food sellers and buyers

The concepts of net food seller and net food buyer at the household level are exactly analogous to the concepts of net food exporters and importers at the country level. The status of any particular household is determined by subtracting the value of food consumed (including from its own production) from the value of food produced.¹ This calculation implicitly takes into account marketing costs and seasonality by valuing production at farmgate prices and consumption at retail prices. For example, a household may be a net seller of food during harvest time and a net buyer at other times. Furthermore, on an annual basis a household might actually produce more than it consumes in quantity terms but it could still be a net food buyer if it sells the entire crop at harvest and buys back from the market later, because retail prices are higher than farmgate prices.

It is also true that whether a given household is a net food seller or buyer may depend on the overall level of market prices. Higher prices will discourage consumption, encourage more production and possibly convert some households from net buyers to net sellers. Lower prices could do the opposite. However, it should be noted that these 'second round effects' are typically marginal in their

impact – a household might switch from being a small net buyer to a small net seller but not to a large net seller.² Indeed accounting for this phenomenon has been found to have only minor effects on the poverty impacts of higher prices.³

This methodology of evaluating the impact of price changes on the basis of whether a household is a net food buyer or seller can be used to assess the impact of changes in food prices, but not the impact of simultaneous changes in food and input (e.g. fertilizer) prices. If fertilizer prices increase at the same time that food prices increase, the net impact on farmers will need to be assessed using data on production costs (see 'Do fertilizer price increases cancel out farm price increases?', pp. 29–31 for further discussion of this issue).

¹ N. Minot and F. Goletti. 1998. Rice export liberalization and welfare in Vietnam. *American Journal of Agricultural Economics*, 80(4): 738–749.

² Ibid.

³ A. Zezza, B. Davis, C. Azzarri, K. Covarrubias, L. Tasciotti and G. Anriquez. 2008. *The impact of rising food prices on the poor*. ESA Working Paper 08-07. Rome, FAO (available at <ftp://ftp.fao.org/docrep/fao/011/aj284e/aj284e00.pdf>).

below for a discussion of the possible impact of higher food prices on rural wages, which are typically an important source of income for the landless). These landless or land-poor rural households are often the poorest of the poor, and a disproportionately large proportion of such households are headed by women.

In urban areas, higher food prices may substantially hurt the poor because, typically, little food is produced in such areas and because food typically accounts for a large share of expenditures for the poor. In order to cope with the reduction in disposable income resulting from higher food prices, households will engage in new economic activities, sell assets or borrow in order to mitigate the decline in consumption. They also commonly reduce expenditures on health and education and shift dietary patterns towards cheaper (starchy) foods and away from micronutrient-rich foods such as milk, meat, and fruits and vegetables.⁸ Energy intake will also decline in cases where people are so poor that they simply cannot afford the same amount of calories at the new higher prices.

In rural areas, higher food prices will tend to have smaller negative effects on net food buyers because many households produce a substantial share of what they consume, and hence are only marginal food buyers. On the other hand, farmers who are net food sellers are likely to

benefit from higher prices, which, other things being equal, will tend to increase their income. Since many farmers are poor, higher prices could help to alleviate poverty and improve food security. However, it must also be kept in mind that farmers with more surplus production to sell will benefit more from high prices than farmers who have only a small surplus to sell. Further, in most (but not all) contexts, farmers with more land tend to be better off than farmers with only a little land, so it may be that poorer farmers will not receive the bulk of the benefits from higher food prices. Overall beneficial impacts of higher food prices on poverty are more likely in countries with a relatively equal distribution of land.

Another potentially important effect of food prices on poverty and food security operates through labour markets and wages. Higher food prices stimulate demand for unskilled labour to work on farms, which might result in an increase in rural wages in the long run. This would benefit households that are dependent on wage labour for their income (who are usually very poor). The evidence in this regard is inconclusive, however, and depends on the importance of agriculture in the overall economy and how many years the adjustments in wages take.⁹ The labour-market channel is worthy of more study, as there is scant information available concerning its effects on poverty and food security.

Given these considerations, what does the evidence show about the impact of high prices on poverty? The average income of net food buyers is higher than that of net food sellers in most developing countries, and thus high food prices would transfer income from higher-income people to those with lower income.¹⁰ But this conclusion results from dividing the population into just two groups; studies that use a more detailed disaggregation nearly always show that the poorest 20 percent of the population are net food buyers, with surplus-producing farmers somewhere in the middle of the income distribution. For example, higher food prices increased poverty in seven of nine countries studied, with Peru and Viet Nam being the only exceptions.¹¹ Viet Nam is a substantial rice exporter with relatively equitable land distribution; as a result it has many households that produce a surplus of rice but that are still relatively poor. In Peru, the beneficial impact was very small. In all other countries in the sample (Bolivia, Cambodia, Madagascar, Malawi, Nicaragua, Pakistan and Zambia), higher prices increased poverty, even after taking account of increased labour demand. Another study reached similar conclusions – the poor were hurt by higher prices in all countries studied (Albania, Bangladesh, Ghana, Guatemala, Malawi, Nepal, Nicaragua, Pakistan, Panama, Tajikistan and Viet Nam), with the exception of rural dwellers in Viet Nam.¹² This study did not examine labour-market effects, but did incorporate supply and demand responses, and found that high prices still hurt the poor.

Higher prices also increased poverty in Guatemala, Honduras, Nicaragua and Peru.¹³ A review of a large number of studies pertaining to rice (including Indonesia, the Philippines and Thailand) found that the poorest quintile of the population is nearly always a net purchaser of rice.¹⁴ Taken together, these studies show that the poorest 20 percent of the population are net food sellers only in unusual circumstances.¹⁵

Different types of studies provide further support for the idea that high food prices hurt the poor, and in more ways than just pushing them below the poverty line. Generally speaking, energy intake is less affected than dietary diversity and consumption of protein and micronutrients. As one example, when rice prices increased in Indonesia during the Asian financial crisis in the late 1990s, households reduced purchases of more nutritious foods such as eggs and green leafy vegetables in order to continue to buy rice.¹⁶ This led to a measurable decline in blood haemoglobin levels in young children (and in their mothers), thus increasing the probability of developmental damage. In addition, mothers in poor families responded by reducing their caloric intake in order to feed their children better, leading to an increase in maternal wasting. A negative correlation between rice prices and nutritional status has also been observed in Bangladesh.¹⁷ Height for age scores among children under three years old in El Salvador declined during the 2006–08 food crisis, although the effects were mitigated to some

BOX 4

Forests and food security

Global forest area is around 4 billion hectares, and still represents about 30 percent of the total terrestrial surface of our planet.¹ It is well known that forests provide many key environmental services, such as water management, conservation of biodiversity and serving as a carbon sink to mitigate global warming. In addition, forests play an important role in the food security of one billion of the poorest people on the planet by providing food or cash income through a wide range of products such as wild yams, bush meat, edible insects, fruits, leaves, mushrooms, nuts, honey and medicinal products. Forests also provide many non-food raw materials such as bamboo, rattan, palm fibres and resins that can be used for building shelter or sold at local markets, as well as fodder for livestock.²

The people who depend on forests for their food security are often very vulnerable to higher food prices because they purchase most of their food on markets. Higher food prices for these “hunters and gatherers” mean that they have to collect more out of the forests

either for sale at local markets (in order to obtain sufficient cash to buy the more expensive food), or to exchange via barter. Higher food prices can thus have a direct impact on forest quality, conservation and the survival of key forest species (mainly fauna and medicinal plants).

For these people, farming is not an option, as they do not own or have access to farmland. In view of concerns about climate change and biodiversity losses, clearing more forests is not an attractive alternative either. Thus, sustainable forest management is critical for their food security. Forests will increasingly need to be managed not only for their timber production potential, but also to produce a larger and sustainable supply of edible non-wood forest products, as well as to enhance the many services forests and trees provide to the agriculture sector.

¹ FAO. 2010. *Global Forest Resources Assessment 2010*. Rome.

² For further information, see <http://www.fao.org/forestry/nwfp/en/>.

BOX 5

Why are there now so many concerns about high prices, after years of concern about low prices?

Before the recent world food and financial crises, many observers complained that low world food prices were a problem for poor people in developing countries. More recently, however, after the surge in food prices, most analyses claim that higher food prices increase poverty. How can high prices and low prices both be bad for poverty?¹

One possible way to reconcile these contrasting views on high and low prices would be to distinguish between the long-run and the short-run effects of prices. In the short run, higher prices increase poverty because the poorest 20 percent of the population in most countries are net food buyers. But, if public and private long-term investment increase as a result of higher food prices, this increased investment might raise productivity and contribute to economic growth and poverty alleviation. However, such a beneficial outcome will not arise from a short-term supply response that is due to increased use of labour and raw material inputs such as fertilizer and pesticides.

Another issue to consider is that many of the gains from higher world prices would go to large landowners in upper-middle-income exporting countries – but these farmers are not poor. Thus, even if developing countries gain from higher prices, this does not mean that poverty will be reduced – a more disaggregated analysis that examines the impacts on land values and wages in specific countries is required as well as a careful disaggregation of expenditure patterns by income class.

It is also important to realize that the availability and analysis of household survey data has increased substantially in the past few years and this is responsible for some of the shift in perspective surrounding high and low prices. Furthermore, some of the concern over high and low prices

is more accurately described as concern over price volatility; sharp fluctuations in prices can be bad for both farmers and consumers (see 'Costs and benefits of volatile and unpredictable prices', below).

Some studies appear to support the idea that higher prices have beneficial effects by showing that, for example, agricultural trade liberalization would both reduce poverty and raise world food prices. But a careful reading of some of these studies² shows a more nuanced picture. First, it is increased access to protected markets that reduces poverty, not higher world food prices.³ Second, higher world prices do not necessarily mean higher domestic prices, and it is the latter that affects poverty rates. Thus, a reduction in import barriers would lower domestic prices and raise world prices at the same time (through increased demand for imports). The lower domestic prices would reduce poverty, even though world prices would have increased. In other words, higher world agricultural prices and reduced poverty are two separate outcomes of trade liberalization – high food prices do not reduce poverty.

¹ D. Rodrik. 2008. *Food prices and poverty? Confusion or obfuscation?* (available at http://rodrik.typepad.com/dani_rodriks_weblog/2008/05/food-prices-and.html); J. Swinnen. 2010. *The right price of food: reflections on the political economy of policy analysis and communication*. LICOS Discussion Paper 259. Leuven, Belgium, LICOS Centre for Institutions and Economic Performance, Katholieke Universiteit Leuven.

² See, for example, T.W. Hertel, R. Keeney, M. Ivanic and L.A. Winters. 2006. *Distributional effects of WTO agricultural reforms in rich and poor countries*. World Bank Policy Research Working Paper 4060. Washington, DC, The World Bank.

³ T.W. Hertel and W. Martin. 2008. Response to Dani Rodrik's blog post entitled 'Food prices and poverty? Confusion or obfuscation?' (available at http://rodrik.typepad.com/dani_rodriks_weblog/2008/05/food-prices-and.html).

extent for families with access to remittances from family members overseas.¹⁸ Weight for age did not decrease, suggesting that there was a decrease in consumption of key nutrients but not in energy intake. In some situations, though, even energy intake may decline, in addition to dietary diversity.¹⁹

Furthermore, high food prices seem to have a disproportionate negative impact on female-headed households, for two reasons.²⁰ First, these households tend to have less access to land and other resources, often because of customary laws and social discrimination; as a result, they are less likely to be net sellers of food. Second, these households also tend to be poorer, which means they spend a larger share of their income on food and are more affected by high prices.

In addition to affecting different types of households differently, changes in food prices also affect different household members differently. For example, women's participation in the labour force may increase substantially during economic crises,²¹ such as when males migrate in search of better employment.²² The resultant additional workload places stress on the time they have available to engage in household work and child care.²³ The mortality of infant girls also increases more than that of infant boys during crises.²⁴

While high food prices harm the poor in most cases, this is not an argument for generalized price subsidies. Such subsidies are often politically difficult to remove and can drain government budgets of the funds needed for investment in public goods such as agricultural research, rural roads,

education, health and sanitation. Generalized price subsidies are also generally regressive, in the sense that most of the benefits are captured by the well-to-do, who, despite spending a smaller proportion of their budget on food than do the poor, spend more money on food in total than do the poor.

But if general subsidies are not the answer, what is the best way to help mitigate the adverse effects of high food prices? In the short term, one option is to target food safety nets to the most vulnerable (see 'Coping with price volatility after the fact: targeted safety nets and emergency food reserves', pp. 39–41). Over the longer term, the best way to lower food prices is to invest in agriculture; this will sustainably increase yields, reduce input costs, increase productivity and reduce food losses and waste. These

investments have the potential to make food more affordable for consumers and more profitable for farmers, and are the only way to manage food prices in a way that benefits everyone. In this sense, the cure for high prices may be high prices, provided that the high prices motivate farmers to adopt improved technologies and national governments and international donors to increase the financial resources available for investment in agriculture (see 'Preventing price volatility in the long term: increasing the productivity, sustainability and resilience of agriculture', pp. 42–3). Thus, while high prices make the problem of food insecurity and poverty worse in the short run, they also represent an opportunity for investment and growth that can reduce food insecurity and poverty in the long run.



Costs and benefits of volatile and unpredictable prices

Key message

When prices fluctuate substantially, even if they are tolerable on average, the short-term shocks make both smallholder farmers and poor consumers vulnerable to long-term poverty traps. In addition, smallholder farmers find it difficult to invest when price changes are unpredictable.

In addition to the impacts of high or low food prices discussed above, variability in food prices can also have important effects even if average prices remain constant. This might happen if fluctuations in food production become more common or larger but average production remains the same. This would lead to more frequent and larger price changes, which might be predictable or unpredictable. If the increased variability were largely predictable, this would cause fewer problems than if the changes were unpredictable. However, price changes are generally less predictable than might be imagined. For example, even in the case of seasonality, the classic example of predictable food price changes, the month with the highest and lowest prices may vary substantially from year to year.²⁵ Furthermore, even perfectly predictable changes in prices can cause problems for poor households that are unable to borrow when prices are high and thus are unable to 'smooth' their consumption over time. Thus, in Asia, where seasonal price changes are relatively more predictable than in Africa, there is still widespread concern over the ability of poor households to cope during the lean season immediately before harvest, despite the fact that this lean season is very predictable. Thus, although the focus in the rest of this

section is on price changes that are unpredictable, predictable price changes can also impose significant costs on the poor.

Before discussing some of the negative impacts of price volatility, it may be helpful to point out that, at least in theory and under certain circumstances, volatile prices might actually benefit certain people, even if the price changes are not predictable. For example, rich consumers who can buy in bulk when food prices are low and then store the food for later use are able to buy more food when prices are low and less when prices are high, thus paying, on average, a lower price for food. Another example would be those people who can afford to buy the assets that poorer households sell at very low prices when desperate for funds or faced with natural disasters such as drought.²⁶ In general, however, the costs of unstable and unpredictable prices would seem to far outweigh any benefits such as these, especially for the poor and food-insecure.

Broadly speaking, unpredictable price movements have at least four types of negative impact: poverty traps and reduced farm-level investment at the microeconomic level; macroeconomic impacts; and impacts on political processes (see Table 1). This report focuses on the microeconomic, household-level impacts.²⁷

■ Poverty traps

Increased price unpredictability will mean a greater incidence of high prices, although there will also be a greater incidence of low prices if the average price remains the same. Nevertheless, there are situations in which periods of high prices can cause effects on net food buyers that are

TABLE 1

Impacts of price volatility

Channel	Who/what is affected?	Examples
Poverty traps	Consumers and farmers	Temporary coping mechanisms such as distress asset sales or reduced intake of nutritious foods leading to permanent effects
Reduced private farm-level investment	Farmers	Lower fertilizer use leading to lower productivity
Macroeconomic impacts	Volatile food prices reduce the ability of prices to function as signals that guide resource allocation	Investment not directed to optimal sectors of the economy, reducing economic growth
Political processes	Democratic institutions; long-term economic growth	Food riots that damage investment climate; subsidies that prevent investment in public goods

not reversed by periods of low prices. Similarly, periods of low prices can have adverse effects on farm families that are not reversed by periods of high prices. For example, if staple food prices increase sharply during the first 1 000 days of a child's life, intake of more nutritious foods may be curtailed. This can cause permanent reductions in the child's health and nutritional well-being, which can result in lower productivity during adulthood. Suboptimal nutrition can also result in increased susceptibility to HIV-AIDS.²⁸ In these cases, a subsequent period of low prices will not undo the damage. For net food sellers, periods of low prices will temporarily reduce income, causing similar effects to those experienced by net food buyers during periods of high prices. In these cases, the effects will not be reversed by a subsequent period of high prices.

Temporary reductions in disposable income due to price shocks can also lead families to draw down on their capital. For example, households may engage in distress sales of land or livestock in order to maintain food intake in the face of an economic shock, although this will depend on the situation – in Burkina Faso, for example, during a severe drought households cut back on consumption in preference to selling livestock.²⁹ Alternatively, families may make fewer visits to the doctor, or remove children from school in order to save on school fees. In Burkina Faso school enrolment is negatively affected by shocks such as drought, and a shock to cocoa prices led to a similar decline in Côte d'Ivoire.³⁰ In Nicaragua, sick children in areas affected by Hurricane Mitch in 1998 made fewer visits to the doctor than children in areas not touched by the storm.³¹ These responses may result in a loss of human capital in the affected households.

Such episodes can result in poverty traps, whereby a one-time shock has permanent effects. Poverty traps can be caused by any of a wide range of factors – natural disasters such as hurricanes or droughts, an economic slowdown or adverse price shocks. Regardless of the ultimate cause, any reduction in the purchasing power of the poor can have similar effects.

During Zimbabwe's drought in the mid-1990s, young children living in the poorest households suffered a

substantial reduction in growth rate, and these children remained shorter than would otherwise be expected several years later.³² These effects are particularly worrisome because a large body of literature suggests that stunting is associated with reduced cognitive skills and slower progress in school as a child, as well as reduced earnings as an adult.³³ In Indonesia, lower rainfall in the year of birth significantly reduced attained adult height of women, their number of years of schooling as well as their adult earnings and led to poorer adult health.³⁴ There is evidence of such poverty traps due to drought in Ethiopia and a hurricane in Honduras.³⁵ What all of these studies have in common is that they show how a one-time shock can have permanent effects.

■ Reduced farm-level investment

The second type of negative impact of unpredictable prices relates to farm-level investment decisions in developing country settings where credit markets do not function well and income is highly variable due to fluctuating weather conditions or volatile prices. If farmers cannot obtain credit when they need it, they will be reluctant to make productive investments,³⁶ especially those that tie up capital for extended periods of time. This may happen even when prices are stable, but price volatility will exacerbate this effect. For example, in India, farmers underinvest in bullocks due to volatility in income.³⁷ Other fundamental decisions, such as choice of crop, also may be affected by price volatility; for example, poor farmers in the Punjab region of Pakistan switched from growing Basmati rice, which is relatively profitable, to growing livestock fodder in an effort to avoid price (and yield) risk.³⁸ And even investments in fertilizer use, which offer returns over a relatively short period of time, seem to be negatively affected in some situations; for example, in Ethiopia farmers were reluctant to invest in fertilizer for fear that they would be hit by an economic shock.³⁹

Because poor smallholder farmers are afraid that an adverse price shock might lead them into the type of poverty trap discussed above, they may be reluctant to adopt technologies that provide greater long-run returns. Thus,

they adopt a low-risk, low-return strategy that may be optimal given their aversion to risk (which is due at least partially to their poverty), but slows down the long-term development process. Similarly, because much investment is irreversible or involves sunk costs, investors will tend to reduce investment in an environment of highly unpredictable prices.

■ Price volatility for staple foods in developing countries is particularly harmful

Unstable prices for staple foods are likely to have larger negative effects than unstable prices for other agricultural commodities because staple foods are important for both poor farmers and poor consumers. On the consumer side, staple foods account for a large share of the expenditures of the poor. On the producer side, they are the most widely planted crops in developing countries, especially on smallholdings.

Typical staple foods include rice, wheat, maize, millet, cassava and potatoes, but there may be other crops that are considered staples as well (e.g. onions in India, chilli peppers in Indonesia). The share of these spices in household budgets is much smaller than that of cereals and root crops but price changes can be much larger, resulting in a large impact on disposable income. For most cash crops (e.g. coffee, cocoa), on the other hand, unstable prices have little impact on consumers in developing countries. While perennial crops such as oil palm are food commodities, the budget share of

these commodities is much smaller than that of staple foods. This is not to say that volatility of prices for these crops is unimportant for the welfare of the poor, only that it is probably less important than volatility of prices for staple foods.

Unstable prices for staple foods are also likely to have greater effects in very-low-income countries than in higher-income countries and in poor households than in better-off households along all four of the dimensions in Table 1. There are two key reasons for this. First, in poor countries food accounts for a larger share of consumer spending, farm production and the macroeconomy and hence has more impact on political processes than in rich countries. Second, the poor have fewer assets than the rich, and are thus less able to avoid or cope with price volatility. The corollary is that, as economies grow and develop, stable food prices become less and less important for investment and growth: consumers diversify their diets, producers shift into higher-value crops, and as families move off the farm the macroeconomy becomes more diversified.

But the fact that the costs of unstable prices are greater than the benefits does not necessarily imply that instability should be reduced. Before making this assertion, the costs of unstable and unpredictable prices must be compared with the costs of reducing that instability or of mitigating its impacts. Such a comparison of costs is of paramount importance when analysing the policy options discussed under 'Policy options to address price volatility and high prices', pp. 32–43.