

Food Price Inflation

Explanation and Policy Implications

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Increases in the prices for major food crops that are traded globally have reached extraordinary levels, sparking riots in some countries and becoming the focus of widespread debate and policy concern. During the current crop year, the price for wheat is nearly 90 percent above its average for the preceding five years, that for corn 60 percent, and that for rice more than 35 percent.¹ At the June summit meeting of the UN's Food and Agricultural Organization in Rome, officials from around the world engaged in discussions of who or what is to blame.

The sharp moves up in food prices have contributed to the acceleration in overall consumer prices and are cited by many officials, along with energy prices, as factors in pushing inflation rates above desired levels. Higher inflation has become a concern among central banks in the industrial and the emerging market economies, and possible tightening of monetary policy is again being discussed.

This report focuses on the behavior of prices of globally traded food crops, reviews the factors that have figured in the debate surrounding their recent increases, and puts the elements of demand and supply that lie behind the price acceleration into context. It takes a medium-term perspective and seeks to understand what has changed over the past several years and brought us to the current situation. There is no reason to assume that only one of the factors now debated gave rise to or can explain recent events. It is far more likely that a combination of factors, interacting over time, did so. Based on this systematic review of the relevant factors, the report draws inferences about the likely course of food prices over the next decade or so. It then looks at the implications of that inference for three major policy areas: monetary policy, agricultural policy, and trade policy. With respect to monetary policy, the U.S. Federal Reserve should no longer use the tactic of monitoring "core" inflation, a measure that excludes the newly significant behavior of food prices. In other economies, the case for pegging the currency to the dollar must be questioned. With respect to agriculture and trade, this report will highlight policies that could be condoned when food is abundant but are likely to be quite costly when food is scarce. Subsidies to farmers to produce certain types of food while keeping certain tracts of land fallow is one such policy. Trade barriers are another.

¹ Marcus Walker, "U.N. Presses Nations on Solutions to Food Shortages," *Wall Street Journal*, June 4, 2008.

The report thus tries to answer several questions: What evidence is there of a change in the long-term trend in global food prices? If a change seems to have occurred, what are the reasons for it? In light of those reasons, what are the prospects for these prices in the future? Last, what are the policy implications of the answers to these questions?

Price Evidence and Measurement Issues

Reported inflation in headline consumer prices has recently reached levels in many countries that are alarming, provoking policy debates about the appropriate course for monetary policy. Although different countries calculate different measures of inflation, the rapid overall rise in prices is generally confirmed by these indexes.

In the United States, the twelve-month change in the headline consumer price index (CPI)—for all urban consumers—was recorded as 4.2 percent in May (see table 1).² In the euro zone, the similar figure for May for the overall harmonized index of consumer prices (HICP) was 3.7 percent, and in the United Kingdom, it was 3.3 percent for the overall CPI. Uncomfortably high rates of inflation are not limited to the industrial countries, but are also being observed in many large emerging-market economies. For example, consumer price inflation in China was 7.7 percent in May and 8.5 percent in April. These rates reflect acceleration in prices from lower rates of inflation in previous years. Over the twelve months ending in May 2007, U.S. overall CPI inflation was measured at 2.7 percent and euro zone overall HICP inflation at 1.9 percent. In China, the twelve-year high came in February, at 8.7 percent.

Table 1: Consumer Price Inflation (percent)			
	Most recent 12-month change	Preceding 12-month change	Most recent month
United States	4.2	2.7	May
Euro zone	3.7	1.9	May
United Kingdom	3.3	2.5	May
Brazil	5.6	3.2	May

² For comparison, the four-quarter change in the United States. PCE deflator for 2008 Q1 was 3.4 percent. The twelve-month change in the chained CPI for all urban consumers was 3.6 percent in May.

Chile	8.9	2.9	May
China	7.7	3.4	May
Indonesia	10.4	6.0	May
<i>Source: Author's compilation.</i>			

An element of this acceleration has been the remarkable recent spurt in global food prices and the accompanying jump in the food component of consumer price indexes in many countries: twelve-month food price inflation rose to about 5 percent in the United States, nearly 6.5 percent in the euro zone, nearly 17 percent in Brazil, and about 20 percent in China. The International Monetary Fund (IMF) attributes the rise in world headline inflation from 3.4 percent in 2006 to 3.9 percent in 2007 to be the result, in part, of an increase in the contribution food prices made to that inflation (from 27 percent to 44.3 percent) as food price inflation itself nearly doubled. Food price inflation rose on average in every region the IMF identified, including advanced economies and especially developing Asia.³

These varying measures all reflect the extraordinary increases that have been recorded in the past year or so for several of the globally traded primary food crops. In the year to May, dollar prices have risen nearly 70 percent for wheat, about 55 percent for corn (maize), over 70 percent for soybeans, and more than 200 percent for rice.⁴ Most extraordinary has been the jump in the price of traded rice during 2008. In mid-April, Thai rice traded for \$950 per ton, up from \$360 per ton at the beginning of the year.⁵

To understand the implications of recent food price behavior for policy, it is necessary to consider whether what is being observed is a transitory spike in typically volatile prices or something more persistent. A longer-term perspective, over a range of food commodities, in light of currency and exchange rate issues and the behavior of the price of food relative to other prices, is required to support any policy insights.

Although food prices have attracted considerable attention with their recent moves up, the shift from generally flat or even declining prices to an upward trajectory

³ IMF, *World Economic Outlook*, April 2008 (Washington, DC: International Monetary Fund, 2008), p. 62.

⁴ Price quotes are from IMF commodity database.

⁵ James Hookway and Lauren Etter, "Asia Clamps Down on Rice Profiteers," *Wall Street Journal*, April 18, 2008.

began several years ago. This report will use 2003 as the transition point. The IMF index of dollar prices of globally traded food rose from 1957 to 2003 at an average annual rate of about 1.6 percent.⁶ From 2003 to the present, average annual inflation of this index has been nearly 15 percent. Of course, the almost five decades from 1957 to 2003 saw several episodes of sharper moves up (and down) in these prices. The current episode shows no sign of abating, however: prices have accelerated even more in the most recent months. The post-2003 period thus appears to be remarkable in the magnitude of the food price inflation and in the persistence of strong price increase.

After the end of the Bretton Woods system of fixed exchange rates, fluctuations in the exchange value of the dollar proved an additional factor in the determination of the global market price for a traded commodity and in the interpretation of a change in the nominal price of such a commodity expressed in any particular currency. The dollar having depreciated significantly since early 2002, particularly over the past six to nine months, the recent moves in dollar food prices no doubt reflect in part the change in the value of the dollar. For example, as the dollar depreciates in relation to the euro, the prices in euro of globally traded goods that are routinely priced in dollars fall, increasing demand from those whose incomes and portfolios are largely in euro. As a consequence, a new, higher dollar price is needed to clear the market.⁷ One quick test to check that the rise of food prices since 2003 is not solely dollar inflation, with no significance beyond the fall in the nominal exchange value of the dollar, is to note that when the change in the IMF index is expressed in euro, food prices have risen over the past five years at an average annual rate of about 8 percent—still an impressively high number.

The large number of alternative currencies in which food prices might be measured, and the range of exchange rate regimes implemented by the various countries, mean that there is no unambiguous way to answer the question of how the nominal price of globally traded food products has behaved. One approach that averages the behavior of food prices in terms of several major currencies is to report the change in terms of the

⁶ The IMF food price index is an index of the prices of selected cereals, vegetable oils and protein meals, meat, seafood, sugar, bananas, and oranges. Data after 1980 use world export weights from 2002 to 2004. Data prior to 1980 were taken from the IFS and rebased to link to the post-1980 data.

⁷ For a discussion of statistical analysis of the relationship between the exchange value of the dollar and commodity prices, see the IMF *World Economic Outlook, April 2008*, appendix 1.2, pp. 46–50.

Special Drawing Right (SDR).⁸ From 1972 to 2003, the IMF index for food prices when expressed in SDR rose at an average annual rate of about 1 percent. From 2003 to the present, that index has risen at an average annual rate of about 11 percent. Although this is not the only possible measure of the acceleration in nominal food prices, it is a measure free of distortion from the fluctuation of the dollar in terms of the other currencies in the SDR basket.⁹

No purely nominal measure can tell us whether food prices have been rising more than the overall average of all prices in any one currency or in an average of currencies. Many countries report core inflation data—inflation excluding some items, often food (or some categories of food) and energy. In the United States, the core CPI has risen at an annual rate of about 2.25 percent since 2003, whereas the food component of the CPI has risen at nearly 3.5 percent per year. Another perspective on how to compare the behavior of global food prices before and after 2003 is to look at the real price of food—the nominal price deflated by a broad price index. This in effect measures the price of food relative to the price of all the goods in the broad index. Table 2 reports two real alternative measures for food prices, showing a swing from slight negative to substantial positive change.¹⁰

Another alternative relative price of food that includes prices for countries other than the United States and drops out the prices of services, which are for the most part not traded, is one that deflates the index of global food prices by the IMF's index of export prices of manufactures of the advanced economies.¹¹ This comparison is a kind of terms of trade measure that reports the terms on which globally traded food can be exchanged

⁸ The SDR is an international reserve asset, calculated by the IMF, used now primarily as a currency unit that comprises specified amounts of the U.S. dollar, the euro, the yen, and the pound sterling. The basket is adjusted every five years.

⁹ Since February 2002, the dollar has depreciated in real terms, that is when adjusted for prices in the United States and in its trading partners. The recent changes in food prices are not the result of all dollar prices moving up more or less the same because of monetary inflation and an offsetting change in the nominal dollar, but of little or no change in the real exchange value of the dollar. Depreciation of the dollar in real terms and real appreciation of the currencies of its trading partners can lead to changes in relative prices of traded goods if the United States and other countries tied to the dollar have a propensity to buy food that differs from that of nondollar countries.

¹⁰ In a related work, Paul Cashin and C. John McDermott found that the industrial commodities index of *The Economist*, when deflated by the U.S. GDP deflator, had a slight negative trend from 1862–1999 (“The Long-Run Behavior of Commodity Prices: Small Trends and Big Variability,” *IMF Working Paper 01-68*, International Monetary Fund, 2001). They document that the volatility of these prices increased after 1971.

¹¹ This index is of the dollar unit value of the exports of manufactured goods by the advanced economies. This relative price is presented in the IMF's *World Economic Outlook*, April 2008, p. 47.

for globally traded manufactures of the major industrial countries. From 1980 through 2003, the measure shows that food prices fell relative to prices of manufactured exports at an annual rate of about 2.7 percent. From 2003 through 2007, the measure reversed direction and rose at an annual average rate of around 3 percent, for a positive swing of more than 5 percentage points.¹²

The question of interest for this report is whether these various prices support the view that the trend behavior of globally traded food prices has changed in recent years. No one measure is ideal or answers all possible questions. But the consistent message from the range of nominal and real measures of global food prices presented is that since 2003 there has been a shift from a moderate positive nominal (negative real) trend to a sharp positive nominal (moderate positive real) trend. To evaluate possible policy implications that might arise from such a change, we must posit a view on whether this new, elevated trend is likely to continue over the next decade or more. This judgment is not a statistical question based on past behavior but rather an insight or conjecture reached from an understanding of *why* prices have moved differently over the past five years. Such a judgment needs to be based on an analysis of the factors that have moved demand and supply in these markets, and hence prices, and the prospects for the future course of those factors.

Table 2: Food Price Inflation (annual average percent)		
	1957 to 2003	2003 to May 2008
Nominal food prices:		
\$ (IMF index)	1.6	14.5
SDR (IMF index)*	0.9	11.1
Relative (real) food prices:		
\$ deflated by U.S. GDP deflator**	-1.9	11.0
\$ deflated by U.S. nonfood CPI**	-2.4	11.3
Food prices relative to prices of manufactured exports of the advanced economies***	-2.7	2.9

¹² Note this calculation does not include the very sharp price increases for food recorded so far in 2008.

Source: Author's compilation.

*1972 to 2003

**1960 to 2003

***1980 to 2003 and 2003 to 2007

What Is Driving Global Demand?

Given that global prices have moved higher for five years, it is reasonable to expect that increasing demand has been a factor. Table 3 shows that global consumption of food crops has increased. We need to investigate whether demand has risen substantially and whether it is likely to continue rising.

Table 3: World Food Consumption (million metric tons)

	2003/04	2004/05	2005/06	2006/07	2007/08
Wheat	589	607	625	616	622
Corn	649	689	706	728	779
Rice	414	409	416	420	426

Source: Data are from USDA database.

Two quite different sources of demand for global food have been raised in the debate to date: consumption by individuals and families and contracts for future food deliveries by global investors. The important food crops traded globally are wheat, maize (corn), rice, soybeans, and some edible oils. The rising global population no doubt imparts some upward trend to global consumption of these foods, but population growth has not accelerated over the past five years. What has been observed is a sustained period of global growth, with recovery from the 2001 recession leading to a period during which real global gross domestic product (GDP) growth has remained in the 4 to 5 percent range since 2004. (Some slowing in that rate is unmistakable this year.) An extended period of global real output growth has enabled standards of living to rise in many countries, a most welcome development. But as living standards rise, more food may be

consumed directly, and more grain is likely to be consumed as diets begin to include more meat and dairy products that in turn require grain inputs.¹³

Examination of global growth since 2003 reveals that emerging and developing countries now account for about two-thirds of the growth in world output (in purchasing-power-parity terms), significantly more than previously.¹⁴ For many decades, emerging and developing countries have recorded real GDP growth faster than that of the advanced economies and the world average. Their share of world GDP was sufficiently small, though, that the increase in output they contributed to the overall global economy in most years was less than that of the more slowly growing, but larger, advanced economies. This changed following the 2001 recession. Since then, the aggregate size of the emerging and developing countries, along with their more rapid growth, has resulted in their contribution to world growth being larger than that of the advanced economies. For example, although the aggregate share of China and India in world GDP in 2007 had reached only about 15 percent, together they accounted for about 30 percent (6 of 20 percentage points) of world GDP growth from 2003 to 2007. Thus global demand is now being shaped significantly by behavior in the emerging and developing countries.

Overall consumption tends to be a smaller, and investment a larger, share of total GDP in emerging and developing countries than in advanced economies. But to compare the patterns of food consumption, we need to look at household consumption patterns. One source of such data is the weight on food in respective consumer price indexes, because those weights are based on household consumption bundles. In the United States, the relative importance of food (excluding alcoholic beverages) in the CPI is a bit below 14 percent.¹⁵ On average in advanced economies, it is around 16 percent. By contrast, in China and emerging Asia, it is about 30 percent. In Latin America, it is over 20 percent.¹⁶ Because the expansion of global GDP is occurring more and more in emerging and

¹³ It takes 2.6 pounds of grain to produce a pound of chicken, 6.5 pounds for pork and 7.0 for beef. Ronald Trostle, "Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices," USDA WRS-0801, May 2008, p. 12.

¹⁴ Based on IMF data that use the estimates of the International Comparison Program undertaken by the World Bank. *World Economic Outlook*, April 2008, pp. 25, 43–6.

¹⁵ This is true for both CPI-U and the chained version, C-CPI-U. Almost half of this is accounted for by food away from home.

¹⁶ Data on CPI weights are from national sources.

developing regions, more of the associated income is being spent on food. Rising demand for food is thus being reinforced by the pattern of global growth.¹⁷

This new pattern of global growth that emerged in 2001 and 2002 is very likely to continue for some time. As long as emerging and developing countries grow more rapidly than advanced economies, their share in global GDP will rise. Both their share and their growth are positively influencing their annual contribution to global GDP growth, leading it and hence global food demand to continue to rise. At some point, two sources of adjustment should dampen this development. Once standards of living become sufficiently elevated, the share of food in household consumption tends to fall, as it has in the advanced economies. Second, once economic development has continued long enough, emerging and developing countries will exhaust their potential to grow rapidly by adopting known technologies and thereby raising labor productivity, and their growth will slow. However, given the differences that persist between living standards and labor productivity in countries such as China and India and those in the United States and the euro zone, these two factors are not likely to be evident for some time.

Other evidence supporting the view that economic success in the developing world is contributing to a rise in global food demand concerns the mix of foods being consumed. According to the U.S. Department of Agriculture data, Chinese per capita urban consumption of milk nearly quadrupled between 1990 and 2006 and its per capita rural consumption of pork, beef, and mutton rose 50 percent. At the same time, per capita rural consumption of rice fell slightly. No doubt similar changes in diet are occurring in other countries where economic growth is raising incomes. It takes about seven pounds of grain to produce a pound of beef. The mix of food being consumed is thus changing in a way that adds to the global demand for grain.

This evidence confirms that global real output growth is an important factor contributing to the increase in demand for internationally traded food crops. The shift in global growth that underlies the rise in demand has emerged over the past five years and

¹⁷ At the same time, the fact that the weights on food in the CPI are higher in emerging and developing countries implies that the inflationary consequences of rising food prices are higher in those countries and that the erosion of real incomes is likely greater as well.

is unlikely to change in the foreseeable future. Accordingly, upward pressure on the relative or real price of global food products is likely to continue for some time.¹⁸

In recent years, trading of contracts on commodities by a variety of institutional investors and others appears to have increased sharply; the traded commodities that have been most visible are crude oil and some metals, but food products have also seen increased attention. Spot trading of the actual commodities is linked to the futures markets through prices and the incentives prices create. Futures contracts, traded on exchanges such as the Chicago Board of Trade, provide an opportunity for expectations of future demand and supply for commodities to be expressed in today's markets. These contracts have long been used by those in the food production and processing industries to hedge against price change, ensure supply for their processing activities, and moderate the consequences of short-term volatility in demand, supply, and price of particular products. Recently, investors who previously largely avoided trading these contracts have developed an interest in them, using them as another source of possible profit, i.e., an asset class from which returns can be earned by buying and selling. In addition, commodity-focused mutual funds and exchange-traded funds have added another opportunity for investors to profit from fluctuations in commodity prices without becoming exposed to the risks of investing in individual commodities. On the Chicago Board of Trade, index-fund investment in corn, soybeans, and wheat has increased 66 percent since January 2006.¹⁹ Data are available for noncommercial traders' share in open positions in futures trading and are an indicator of the extent of speculative trading. For open interest in corn from February 2005 to February 2008, the number of contracts more than doubled and the share of noncommercial traders in long positions increased from 17 percent to 43 percent.²⁰ Much of the buying expressed in the futures trading is not related to a fundamental demand for the product or to an intent to consume or sell the product for consumption. Commodities are seen by investors as providing some

¹⁸ For an opposing view, see *OECD-FAO Agricultural Outlook 2008–2017* (Paris: Organisation for Economic Cooperation and Development, <http://www.oecd.org/dataoecd/54/15/40715381.pdf>), which expects food prices to remain high but to resume a slight negative trend in real terms.

¹⁹ Jeff Wilson, "Wall Street Grain Hoarding Brings Farmers, Consumers Near Ruin," April 29, 2008, <http://www.bloomberg.com/apps/news?pid=20601087&sid=aDZej7GJjpm&refer=home>.

²⁰ *OECD-FAO Agricultural Outlook 2008–2017*, p. 37.

protection against future inflation in the prices of goods and services and against the depreciation of the dollar.

The effect of investor behavior on food prices is complex. Although food products are storable, they are not so indefinitely, and prolonged storage can mean significant loss (hence cost). So the demand from investors expressed on futures markets does not result in permanent removal of the associated food from consumption. However, bidding up prices for futures contracts does change the expectations of both producers and consumers of future spot prices. It creates incentives for buying now in the spot market (to avoid paying more in the future) and for holding back supply (to sell for a higher spot price in the future). As a consequence, demand, supply, and price in the spot market today are linked to the futures prices for the commodity. The result of the greater interest in commodity trading and the elevated level of futures prices could be a tendency for higher inventory holdings, hoarding, and impaired functioning of the spot markets for food commodities for which there is futures trading.

Looking ahead, the shift already evident in global growth, and the resulting increase in the demand for globally traded food, can and likely will contribute to a positive trend for some time in relative food prices. The interest on the part of investors to hold commodity contracts and funds focused on commodities has recently risen significantly and contributed to the upward shift in the level of food prices. Because this trading does not add to the consumption of the products traded, it seems unlikely that it will have a lasting effect on the rate of change in food prices.

Global Supply and Agricultural Stocks

World production of the major crops surged in 2004/2005. Since then, a number of factors have limited production and totals have moved only little on net (see table 4). Overall, the sharp rise in most prices appears not to be the result of a significant decline in supply but rather of an inability of supply increases to match the rise in demand. An important factor influencing the supply of corn for human and animal consumption is the diversion of some corn production and associated arable land to the growing corn for use

in ethanol production in the United States.²¹ There is also diversion of some vegetable oil production (for example, rapeseed, other oil seeds, palm oil) for use in energy products and fertilizer. Other factors having a negative influence on global supply of the major crops are weather events, the higher cost of fertilizer and transportation associated with the rise in the price of crude oil, and potential withdrawal of land from cultivation in response to urban and suburban development.

	2003/04	2004/05	2005/06	2006/07	2007/08
Wheat	554	626	621	596	611
Corn	627	716	699	713	790
Rice	392	401	418	420	428

Source: Data are from USDA database.

World wheat production has risen notably since 2003/2004 and so is up over the past five years, but has not regained its peak 2004/2005 levels. Production declines in the United States, Australia, and the euro zone account for much of the recent stagnation in total production. U.S. production weakness reflects a long-term trend in the reduction of wheat acres planted, from more than 88 million acres in 1981 to about three-quarters of that in 2008.²² Moves on the part of farmers from wheat to corn, including corn for ethanol, explain much of the decline. In Australia, drought contributed to a drop in production of more than 50 percent in 2006/2007 from total output in the previous crop year. Production recovered only slightly in 2007/2008, and future production is not certain. The issues of global climate change and water resources are especially relevant for crop supply going forward and have already had an impact, perhaps a transitory one, in Australia in recent years.

World production of rice has risen steadily since 2003 and rose even more in 2007. Although some of the most dramatic food price increases, and political tensions,

²¹ The role of ethanol in explaining high food prices can be thought of as additional demand or reduction in supply of food and feed corn. It will be treated here as reduction in supply.

²² USDA, cited in Dan Morgan, "Emptying the Breadbasket; For decades, wheat was king on the Great Plains and prices were low everywhere. Those days are over." *Washington Post*, April 29, 2008.

have occurred with respect to the availability of rice, these events were not triggered by any significant decline in global rice production. Indeed, as information about the current crop become available, prices move down from their peak (dropping 28 percent through the end of May) and concerns diminish. The heightened focus on rice is probably explained by its critical role as a staple in the diet of many of the world's poorest people.

Total world production of corn has risen significantly since 2003/2004. U.S. production is rising as acres planted in corn have increased about 40 percent over the past twenty years.²³ However, not all of this corn is used for human or animal consumption. U.S. policies to spur the production of ethanol have resulted in a rapid jump in the share of corn cultivation devoted to energy production. Although the United States accounts for about 40 percent of global corn production and around 66 percent of global exports, about 25 percent of U.S. corn production is now devoted to ethanol production, a much increased share from ten years ago.²⁴ Production of ethanol accounts for almost all of this year's increase in global grain use.²⁵ However, despite the increase in ethanol production and its huge share of the growth in corn output, global food and feed use per capita of food grains has been maintained.²⁶ Further increases in diversion of resources to ethanol production seem likely, though the pace at which they are occurring may moderate.

Available world agricultural land has been stable at about 38 percent of land area since 1990; about 18 percent of cropland is irrigated.²⁷ However, land under cereal production has fallen about 4 percent over that time. There does not seem to be significant scope for world crop production to trend up over time in response to increased land brought into cultivation, though some additional irrigation could be a positive factor. Raising overall yields on cultivated land could make a significant difference going forward. According to the *OECD-FAO Agricultural Outlook 2008–2017*, for world production of wheat, corn, barley, sorghum, and oats, one-third of the total harvested area is within OECD countries and two-thirds is in nonmember developing and emerging

²³ USDA, cited in Steven Mufson, "Siphoning Off Corn to Fuel Our Cars; As farmers feed ethanol plants, a costly link is forged between food and oil," *Washington Post*, April 30, 2008.

²⁴ U.S. and world corn production and export data are from USDA. Ethanol number is from Anthony Faiola, "The New Economics of Hunger; A brutal convergence of events has hit an unprepared global market, and grain prices are sky high. The world's poor suffer most," *Washington Post* April 27, 2008.

²⁵ Chris Flood, "Fed chairman's worries weigh on oil and gold" *Financial Times*, June 4, 2008, p. 22.

²⁶ *OECD-FAO Agricultural Outlook 2008–2017*, p. 40.

²⁷ World Bank database.

countries. The yield per hectare for these crops is 4.5 tons for the OECD countries but only 2.4 tons in the nonmember countries. For the United States, the yield is more than 6.5 tons per hectare.²⁸ Accordingly, the potential for world production to rise through improved yields in non-OECD countries as a result of upgrading techniques, fertilizers, and seeds, would seem to be substantial. In addition, further improvement in yields among the OECD member countries as a result of new research and increased productivity will likely continue at its long-term pace.

The elevated costs of crude oil and natural gas are having, and likely will continue to have, negative impacts on the supply of world crops. Many fertilizers are made from hydrocarbons, and their prices are therefore rising. In addition, fuel costs add to the overall cost structure through higher transportation costs in bringing seed and fertilizer to the farmer and the crop to a market outlet. International shipping costs for traded products are higher, as well. The World Bank estimates that about 15 percent of the increase in food production prices owes directly to higher energy and fertilizer costs.²⁹ These factors may work to favor local production of food crops and to counter the tendency for the basic crops to be produced in a concentrated way in some countries and then traded. In addition, infrastructure bottlenecks inhibit farmers' ability to harvest, store, and market their crops in many of the developing countries.

Historically, individual crops have evidenced a positive supply response to higher prices that can be quite strong. But, to some extent, that response led producers to substitute food crops whose price had risen for others whose relative price had correspondingly declined. The current challenge is increased food prices relative to prices of manufactured goods, not a need to rebalance agricultural production among crops. With limited scope for higher prices to induce more land into agricultural use, the response of supply to price will have to come from improved yield on the available land. Higher prices do allow farmers to afford more costly but better seed, more expensive fertilizer, and so on. Historical experience of the supply response of individual crops to price change, however, is likely to significantly overstate the aggregate response that is possible for all crops to the rise in their average price.

²⁸ *OECD-FAO Agricultural Outlook 2008–2017*, p. 39.

²⁹ "Rising Food Prices: Policy Options and World Bank Response," note distributed at World Bank Development Committee meeting, Washington, DC, April 2008.

The balance of demand and supply since 2003 for the major food crops (wheat, corn, rice, and soybeans) has been such that inventories held around the world of these foods has, on balance, moved down. These stocks are now significantly lower than they were from 1990 to 2002, an interval during which they fluctuated narrowly. In 2003 and again in 2004, aggregate stocks stepped down to reach a lower level around which they have since fluctuated.³⁰

The overall picture of demand and supply since 2003 is thus one in which supply has grown but not matched demand. As a consequence, some of the demand has been met by a drawdown of stocks held in inventory. Nevertheless, prices have been bid up by demand as markets have needed higher prices to match demand to the available supply plus change in inventory. As inventory stocks decrease, so does the available buffer they provide to unexpected strength in demand. As a result, prices have a tendency to move sharply in response to demand surprises. With prices high and rising, all those in the market have an incentive to hold inventories in order to sell later at a higher price (suppliers) or to avoid having to pay more in the future (demanders). Despite these incentives, recorded inventories have moved down, supporting the view that demand has generally been stronger than supply over this period. Of course, some inventories may be held by households or even distributors in ways that escape measurement. Stories this year about rice, for example, suggest that users who feared short supplies purchased large amounts and actually accelerated the appearance of inadequate supply and bid up the price. Over time, as these unseen inventories reach the levels needed to reassure consumers, demand and price both drop. We have seen some of that occurring in the most recent price developments.

Review of the demand and supply factors behind the upward trend in prices since 2003 suggests that rising demand has been the major determinant behind the higher prices, though some supply factors, including diversion of resources for ethanol production, have contributed as well. For many crops, supply has been steady, not falling, as it would need to be if supply-side problems were the primary reason for the rise in prices. The most important demand element—the shift in global growth on the margin to developing and emerging market economies—is likely to persist for some time. The

³⁰ Martin Wolf, “Food Crisis Is a Chance to Reform Global Agriculture,” *Financial Times*, April 29, 2008.

adjustment forces that will ultimately slow potential growth in these regions and lower their higher consumption of food are not likely to appear for many years. Until then, economic development in these countries will give rise to incremental global food demand. Of the supply factors, some, such as drought, may prove transitory. Others, such as managing the global need for more energy, particularly renewable energy, which competes for many of the same resources that produce food, and raising yields in the developing and emerging regions toward the levels achieved in more advanced regions, are difficult to foresee with any precision. However, in many respects, these elements of the problem are open to policy measures that could have important effects on how food prices behave in the future.

Policy Implications

It seems very unlikely that over the next five to ten years global food prices will retrace the increases that occurred since 2003 and return to the level of prices at that time. A resumption of a trend of slow decline in the relative price of traded food also seems unlikely, though it cannot be ruled out. Futures markets generally call for the prices of traded food commodities to stop rising, but to remain elevated near their current levels. However, the review of demand and supply forces above identifies persistent demand and supply elements that should work to raise prices. The most effective element in raising supply and lowering price, an increase in yields in producing countries, is likely to be slow moving. Accordingly, a scenario with global food prices remaining quite volatile but ratcheting up in episodes over time, resulting in an upward trend over the next decade, appears to have sufficient probability that policy officials should incorporate such an outcome into their planning. Just how volatile food prices prove to be, and how strong the upward trend might be, depend in part on how the related problems of climate change, water availability, and energy resources are managed. The challenge for policy is not a statistical one of analyzing past and current data and looking for evidence of a change. It is rather a judgment call, in which analysis of the reasons for recent events are examined in an effort to draw forward-looking implications.

MONETARY POLICY

With respect to monetary policy, a switch from a persistent, if only slight, downward trend in the global relative price of food to an upward trend (or even to an unchanged relative price) calls for a change in central bank tactics. The overall policy objective of price stability remains for central banks as does the fundamental central bank responsibility for whatever inflation outcome occurs over the medium term. If the relative price of food continues to move upward over an extended period, it will impart upward pressure on inflation; this is not a one-time shock that moves the price level but drops quickly out of measured inflation. If central banks are to achieve goals of moderate or low inflation over the medium term, they will need to adjust their tactics to allow for rising food prices.

One tempting but counterproductive tactic for controlling inflation of food prices is price control. Often the intent of the controls is not to be an inflation-fighting tool but a social policy. In some countries, governments use price controls on particular food items, usually local staples, as a subsidy to lower-income households (similar policies are also used for fuel). In other countries, price controls have been put on in an effort to moderate a sudden sharp jump in prices. In the event that the relative price of food does continue to rise for a time, such policies can prove very expensive for the government budget and usually will have to be abandoned. At that point, the jump in the price of the previously protected item is large. The result is a sharp rise in the measured inflation rate and political outcry over the shock to household budgets. As a tactic for addressing the inflationary consequences of a change in the trend of global food prices, such controls are ill advised.

For most central banks, the challenge is to incorporate the outlook for global food prices into the forecast for the domestic economy and the overall inflation rate. Food prices pose particular risks to price stability because of their visibility and importance to households. Inflation expectations are central to stabilizing the trend in overall consumer prices and, should they become unanchored, can be very difficult to bring back down. Households do business in food markets more frequently than in any other sector and update their information about what is happening to food prices continuously. If the relative price of food does rise for an extended period, households will need to see

convincing evidence that it is only a relative change, and that other prices are declining, if they are to maintain stable inflation expectations. Otherwise, the perception of a step-up in inflation is likely to lead to upward pressure on nominal wages. Once a wage-price spiral sets in, the cost to the economy for the central bank to regain control over prices is higher still.

The possibility that the trend behavior of food prices has changed for a time suggests that the practice of the Fed to focus in a tactical sense not on headline inflation but on core inflation (headline inflation excluding food and energy) should be reexamined. The usefulness of core inflation is pragmatic. With food and energy prices volatile, the past saw more “noise” in headline inflation than in core inflation. But the two series shared an underlying basic trend, so judgment about future inflation was better informed by readings on core inflation. If a turning point in global food prices has been reached over the past five years, and if those prices are now going to rise for some time, omitting them from the measure used to adjust policy in the short run could result in an inflationary bias. The problems posed by short-term volatility in food and energy prices will likely remain, and some method must be devised to filter out the noise in headline inflation, but it is no longer wise to disregard this measure. The risk that core inflation may be misleading has risen, and omitting food prices may be precisely the wrong thing to do over the next several years.

The central banks of many emerging and developing countries also face a policy choice about their exchange rate regimes. Over the past few months, the dollar prices for global food crops have risen more than those expressed in several other currencies because of the decline in the exchange value of the dollar. In those countries whose currencies are pegged, even loosely, to the dollar, food prices have risen more than elsewhere. As discussed earlier, when the dollar moves down in nominal terms, the dollar price of a particular commodity adjusts to maintain market equilibrium. The unit of account in which the price is quoted does not have a lasting influence on the price of the good relative to other goods or on the average price in terms of a bundle of currencies, such as the SDR. But when the dollar depreciates in real terms, those currencies tied to the dollar also depreciate in real terms. One consequence is that a unit of one of those currencies buys less of world-traded food commodities than previously. Of course, when

the dollar appreciates in real terms, these currencies gain as well. World goods, including food, become cheaper for them.

Over the past several years, and especially over the past several months, countries with currencies tied to the dollar have experienced higher inflation of import prices, including food, than likely would have occurred with a flexible exchange rate. As a result, they face more difficult challenges in controlling overall domestic inflation. Over the next five to ten years, the dollar may rise or fall in real terms. The experience of the past months, however, strongly suggests that most emerging countries would be advised to allow flexibility of their exchange rates. Unless a particular country has an economy closely tied to that of the United States, such as the Bahamas, there is no reason to expect that the monetary policy stance the Fed chooses will be suitable for that country (such a link is the result of pegging the exchange rate). Furthermore, there are clear costs in terms of inflation and higher food prices when the domestic currency experiences real depreciation along with the dollar. With food prices relatively more important in the consumption bundle of most emerging market economies and likely to rise over the medium term, guarding against even faster increases by allowing the exchange rate to be flexible seems the wiser course. Should the market put a particular currency under downward pressure, the central bank can respond with its own decisions about monetary policy to counter the risk to inflation.

AGRICULTURAL POLICY

Evidence from the past five years shows that we have moved from food surpluses in many regions of the world, surpluses which then became a major element of humanitarian food aid for regions with food shortages, to growing demand for food crops that is outstripping supply and increasing relative prices for food. Most recently, an acute crisis of food availability has emerged that spotlights the issue of food distribution and the impact of the rising prices on the world's poorest people. Over the medium term, however, the focus of policy needs also to include incentives for increases in total supply. It is important that measures taken to address concerns about the distribution of food in the short run do not weaken the market signals to producers to expand supply going forward.

Price controls, discussed earlier in the context of monetary policy, have the negative consequence of lessening the return to producers from expanding supply, hence blunting the incentive the current rise in market prices is creating. In addition, price controls on particular foods are essentially arbitrary. They inevitably will distort the signals on the margin for both consumers and producers to substitute among different foods and between food and nonfood consumption or production. Given the complex linkages across the globe in food production, it is essential that the ability of markets to recognize and act on the best possible trade-offs on both the consumption and production side of the food sector be allowed to work as fully as possible. The linkages of food production to energy supply are particularly complex, with varying rates of substitution possible among crops for use as human food, among some crops as the potential inputs into biofuels, and across different crops as best uses for differing qualities of land. We need to allow the price mechanism to guide these allocations to the greatest extent possible. Both price controls and subsidies distort the information and the incentives consumers and producers face.

Although the food price spike has triggered understandable calls for increased food aid, distribution of surplus food items is likely to diminish over time as the surpluses decrease. This will have the welcome effect of reducing distortions in food markets. For the moment, however, price signals are being muffled. The continued excess production of some crops is *prima facie* evidence that the price system is being distorted at a time when pressure on food resources is growing. Such policies are particularly costly and unwise, and should be revised to allow a reallocation of production resources to a more valued use. Policies that use income supports rather than price controls or subsidies have the advantage of not introducing distortions. Policies that give income supplements to households facing food shortages allow consumers to see the market price for all items as they make their demand decisions. Because of government concerns about how the income will be spent, many countries have used devices such as food coupons rather than monetary disbursement or imposed conditions in addition to family income for receipt of the aid. These alternatives may introduce some distortions, but usually fewer than those associated with policies that control price.

The case for income, rather than price, support for farmers is even stronger now than previously, though it is not clear that in most cases farmers need income support. Policies that influence crop selection or pay farmers to allow some land to remain fallow were justified in the past as having the advantage of reducing the costs associated with surplus crops. With surpluses no longer a major concern, these policies also should be avoided because they distort decisions farmers make and decrease the efficiency of agricultural resources. Given the volatility of crop prices, an argument for helping farmers smooth their income and hedge their risk of sharp price declines can still be made, even in a period of elevated prices. Financial products that resemble insurance are a better alternative for achieving this kind of support to farmers than policies that distort prices and allocation of resources.

The latest U.S. farm bill, recently approved by Congress, is disappointing in that it provides for little substantive reform. The measure instead increases the subsidy for many crops despite record crop prices and high farm incomes. Direct payments to growers reflect past production of crops eligible for subsidies and are paid regardless of market prices.³¹ Although significant payments to farmers are made based on income rather than price, the bill seeks to limit payments in ways that are unlikely to be effective; substantial subsidies are likely to continue to be paid to farm entities that earn high income.

With demand for food likely to continue to rise more rapidly, and with stocks low, policies with the potential to enhance supply over time are needed. Research with respect to increasing crop yields is important. With yields varying widely across countries, global production could improve significantly if current information is shared and best techniques are applied. Availability of water is a critical factor in maintaining and raising agricultural production. Detailed discussion of water policy issues is beyond the scope of this report. It should be recognized, however, that the price of water is important in agricultural allocation decisions. Distortion of the price charged to farmers for water is another source of inefficiency that should be avoided. At the same time, policies to

³¹ Charles Abbott, "U.S. farm bill limits affect few growers: Reformers," Reuters, May 13, 2008, <http://www.reuters.com/articlePrint?articleId=USN1341692120080513>.

improve the quality and security of water resources are likely to be more and more important going forward.

In many countries, poor infrastructure is a factor in limiting agricultural output. Transportation facilities for getting inputs of seed and fertilizer to farmers can be a bottleneck. Similarly, farmers struggle to harvest the crop and transport it to a market. Poor storage facilities for crops result in damage due to rodents or rot. Policies to improve such infrastructure could yield substantial gains in supply over time.

Finally, policies on land use need to be reconsidered in light of the changing balance of supply and demand for food. In some countries, development is reducing the amount of land under cultivation as industrialization spreads and cities grow. In the United States, policies adopted in the past offered farmers payment in return for keeping some fields fallow. Currently, 34.6 million acres are enrolled in this program. Recently, the Agricultural Department announced that it would allow 24 million acres of this land to be opened up for haying and grazing of livestock without penalty to the land owner.³² This move is intended to help lower the cost of feed for raising livestock and is a move in the right direction. Reconsideration of the entire program and the reasons for withholding land from production is warranted.

TRADE POLICY

As prices have risen sharply in recent months, some countries have responded with changes to their trade policy for agricultural products, intending to protect households from rising prices, counter inflation, and provide security of food supplies for the population. In some cases, such as India and Indonesia, import tariffs were lowered or removed. Such steps are a move in the direction of allowing the price mechanism and global markets to function with fewer distortions and as such are welcome. In many other cases, however, the moves have been to raise barriers to exports of food crops. Many rice producers in Asia (China, India, Vietnam, and others) have limited or banned exports of rice. Other countries restricting food exports range from Argentina (wheat) to Russia (wheat and barley). Such actions introduce new distortions, result in gaps between domestic prices and global prices that impair incentives and likely encourage hoarding,

³² “USDA Opens Idled Land In Bid to Ease Feed Costs,” *Wall Street Journal*, May 28, 2008.

and raise at least temporarily the global prices for some traded foods higher than they would have otherwise been. In some cases, these measures were put in place only for specific intervals and have begun to expire. For example, restrictions by Cambodia and Vietnam either have been or soon will be lifted. Although temporary barriers of this kind may not cause lasting damage and may in fact address a short-term crisis, they do so at the expense of importing countries that depend on world markets for food. Moreover, they deprive food producers of access to the world's markets and the gain in relative prices that their output would receive on those markets. They also undercut the confidence of all consumers in the world trade system and its capacity to offer products to all purchasers at nondiscriminatory prices.

Agricultural policy has been a major component of the Doha Round of world trade talks.³³ Progress has been limited, and success of the round is far from certain. Among the contested issues are reductions in agricultural protection by the major industrial countries, along with reduction of manufacturing and services barriers in emerging market and developing countries. The three pillars of the Doha strategy for agricultural reform are market access, export subsidies and competition, and domestic support. The current change in the outlook for the price of traded food crops relative to that of manufacturers is an opportunity for substantial progress in removing distortions in the global agricultural sector that have been entrenched for decades. The switch from a surplus condition for the major traded grains and some other foods to one of rising global price and demand pressures should allow removal of barriers that limit trade, reduction or elimination of subsidies or price supports within the United States, Europe, and elsewhere, and improved global efficiency in production of food at a much lower political cost than was possible previously. Indeed, with high food prices a growing political issue almost everywhere, the continuation of policies that deliberately raise prices to consumers so as to transfer income to well-off farmers is unconscionable. One hopes that it will soon become politically unsustainable.

With energy prices also high and rising, the medium-term outlook for global agricultural trade is not entirely clear. As transportation costs rise, the efficiency of

³³ The Doha Round, under the WTO, brings together trade negotiators from around the world in a series of negotiations with the goal of achieving a set of mutually agreed measures to improve the flow of world trade.

producing and consuming food within local areas increases as well. This may result in a reduction of global trade for some foods. With the prospect of rising relative prices for food crops over the medium term, the importance of allowing global trade to permit the most efficient production of food and the least-cost distribution of food to consumers would seem to be extraordinarily high. Such a liberalization of global agricultural trade likely will also boost incomes in some of the world's poorest countries. Trade negotiators need to redouble their efforts to ensure a successful outcome of the Doha Round and liberalization of agricultural trade.

Summary and Policy Implications

Review of the evidence and the ongoing debate concerning the rise in global food prices has confirmed several points:

- The nominal price of globally traded food, when measured on average and using SDRs rather than the dollar as the unit of account, has accelerated starting in 2003 and has since been rising at double-digit annual rates. The price of globally traded food relative to that of manufactured exports of the advanced economies has also accelerated and through 2007 had reached a trend of about 3 percent per year.
- A major factor underlying the increase in the demand for globally traded food crops has been the shift in the contribution to global growth of the emerging and developing countries. This source of increasing demand for food is likely to continue for some time.
- Increased interest on the part of global investors in holdings of commodity futures contracts and mutual funds focused on commodities has contributed to the rise in the level of food prices recently. Although it may change inventory behavior, because this trading does not reduce the quantity of food available for consumption, it does not seem likely to be an important factor in raising the sustained trend in food prices.
- Agricultural production has been maintained over the past five years, but it has not increased to meet the rise in demand. As a consequence, stocks of the major food crops are down. Corn production devoted to use as ethanol accounts for much of the gains in supply of that crop.

- The most promising source of increased supply going forward to match the rising demand is increased yields in many of the world's agricultural producing countries.

Although the conclusion that global food prices are likely to continue to rise in relative and real terms cannot be unambiguously established, this analysis suggests that policy authorities should incorporate the risk of that outcome in their thinking. Changes in monetary, agriculture, and trade policy would follow accordingly.

Central banks, including the Fed, should manage future inflation risks by putting significant probability on the outcome that food prices continue to rise over the medium term. They should lessen the importance placed on the behavior of core measures of inflation and raise that placed on headline inflation while looking for new ways to distinguish “noise” from “signal” in that measure. Those central banks that still manage the exchange value of their currency, particularly those from large emerging market economies, should move to an exchange rate regime with greater flexibility.

In light of current and prospective upward pressure on the relative price of food, policy officials should move away from measures that control and hence distort prices experienced by consumers and producers. If subsidies are continued, they should not be in the form of price supports. In particular, officials should avoid imposing arbitrary and nonmarket relative prices within the agricultural sector that influence supply decisions by producers. Officials should move away from land-use policies that were designed to manage surpluses. Policies that contribute to raising agricultural yields where those are subpar should be adopted. Efforts to improve the infrastructure in the agricultural sector should be enhanced.

Measures to restrict exports of agricultural products should be used only temporarily and as an emergency response to a critical problem. Over the medium term, such measures should be ended. Policies to liberalize market access for agricultural products should be adopted. Efforts to achieve success for the Doha Round should be strengthened.

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