



How Volatile Are African Food Prices?

Nicholas Minot

Instability in the price of staple foods is an important source of risk in developing countries. This is particularly true in Africa south of the Sahara because of the low incomes of many African households. Poor urban households allocate a large share of their income to food, so food price volatility affects their purchasing power. Many poor rural households depend on agriculture for their livelihood, so they too are directly influenced by food price volatility.

It is almost universally accepted that food prices in developing countries have become more volatile in recent years (Gerard et al. 2011; G20 2011). It is widely presumed that this pattern applies to Africa, as indicated by stakeholder consultations (OECD 2011). However, few if any empirical studies have examined recent trends and patterns in food price volatility in the region. This brief uses recent data to explore food price volatility over time in international and African markets. It also examines price volatility for different commodities and in different markets within Africa. The findings show that although food price volatility in international markets has increased in the past five years, it is still relatively low. In a group of 11 African countries, food price volatility is high, but it has not increased in recent years. These results challenge the conventional wisdom that food price volatility in Africa has increased in the wake of the global food crisis and suggest that domestic factors may contribute more to African price volatility than do international price fluctuations. Our ability to generalize the results and policy insights from this analysis to the whole continent is constrained by the possibility that the study's sample of countries and markets may not be fully representative, and that the time period after 2007 covered in the study is too short. This suggests that extending the analysis to a larger set of markets and countries is needed to provide more robust results.

Trends over Time in International and African Food Price Volatility

One reason African food prices have been assumed to be more volatile in recent years is the perception that international food

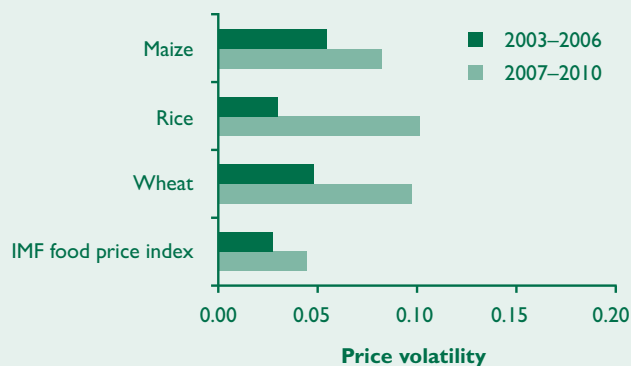
prices have become more volatile. The volatility of international prices affects households and businesses to the extent that it is transmitted to domestic markets. An analysis of price data shows that international grain prices have indeed become more volatile over the short and long term. Monthly prices of maize, rice, and wheat on international markets were significantly more volatile during 2007–2010 than they were during 2003–2006 (Figure 1). Rice price volatility, for example, more than tripled between the two periods.

Similarly, volatility during 2007–2010 rose compared with long-term volatility during 1980–2006. The volatility of international rice and wheat prices, as well as the International Monetary Fund's food price index, roughly doubled. These results contrast with a few recent studies that find only limited evidence of increased volatility of international food prices (Gilbert and

About the Price Data

The analysis uses a database of wholesale and retail food prices compiled from local statistical agencies by the Famine Early Warning System Network (FEWS NET), a project funded by the United States Agency for International Development. For the analysis of changes in volatility over time, the dataset includes prices for 6 staple foods (beans, cooking oil, maize, millet, rice, and sorghum) in 11 countries (Chad, Kenya, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Tanzania, Uganda, and Zambia), resulting in 67 commodity-market combinations. For the analysis of patterns of volatility between, for example, commodities and countries, the dataset includes prices for 10 staple foods (beans, bread, cooking oil, cowpeas, maize, millet, rice, sorghum, teff, and wheat) in 15 countries (Chad, Ethiopia, Guinea, Kenya, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe), resulting in 167 commodity-market combinations.

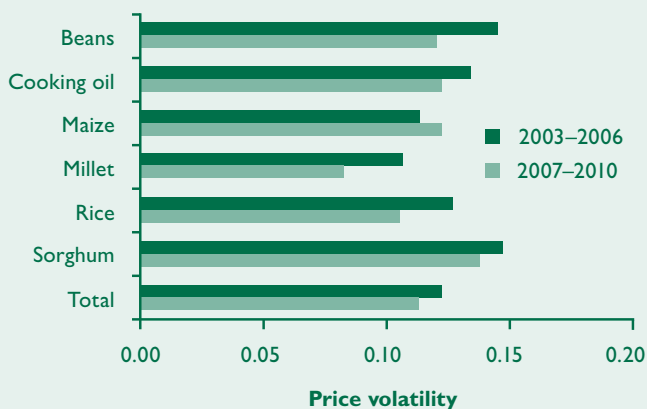
Figure 1—Volatility of international food prices, 2003–2006 and 2007–2010



Source: Analysis based on data from IMF 2011.

Notes: Volatility is defined as the standard deviation of returns to commodity prices, where the return is the difference in the logarithm of prices from one month to the next. Maize is No. 2 yellow, FOB Gulf; rice is 5 percent broken, FOB Bangkok; and wheat is No. 1 hard red winter, FOB Gulf.

Figure 2—Volatility of food prices in selected African countries, 2003–2006 and 2007–2010



Source: Analysis based on data from FEWS NET 2011.

Morgan 2010; OECD and FAO 2011), but they confirm more recent research (Gilbert 2012) and the conventional wisdom regarding international prices. Nonetheless, although international food price volatility has risen, it is still rather low.

In contrast, there is little or no evidence that prices of staple foods in the 11 African countries studied have become more volatile over time. Of the 67 prices tested, two-thirds had no statistically significant change in volatility between 2003–2006 and 2007–2010. Although 7 prices showed statistically significant increases in volatility, 17 showed significant decreases in volatility.

Of the six products tested, only maize showed a statistically significant increase in price volatility in the African countries studied between 2003–2006 and 2007–2010 (Figure 2). Three commodities (beans, millet, and rice) show significantly lower price volatility. The changes in price volatility for cooking oil and sorghum were not statistically significant. Even in 2008, during the peak of the global food price crisis, none of the commodities showed a statistically significant increase in volatility. Calculating volatility at two-, four-, and six-month intervals rather than at monthly intervals does not affect the results.

Patterns of Food Price Volatility within Africa

Although food price volatility in the African countries examined did not appear to rise over time, it is nonetheless quite high. Whereas the volatility of international grain prices is in the range of 0.06 to 0.08 (as measured by the standard deviation of the monthly proportional change in price), the average volatility of the African prices examined is 0.12. In one-quarter of the prices, volatility is more than 0.14.

Somewhat surprisingly, maize price volatility is significantly higher in countries that actively intervene in their maize markets than it is in countries that make little or no effort to manage prices. In Kenya, Malawi, Zambia, and Zimbabwe—which have large state-owned trading enterprises that buy and sell maize and other staples in an attempt to stabilize prices—maize prices are more than 50 percent more volatile than in other countries. It is possible that intervention policies are responses to intrinsically higher maize price volatility in certain countries. Alternatively, government efforts to stabilize prices could be counterproductive because they introduce uncertainty that discourages private traders from engaging in the market.

Among the commodities examined, cowpeas, maize, and beans have the highest levels of price volatility. The commodities with the least volatile prices are cooking oil, bread, wheat, and rice, which are among the most widely traded commodities in the database. In Africa, imports account for 70 percent of the supply of wheat, 49 percent of cooking oil, and 43 percent of rice, whereas only 8 percent of maize is imported (FAO 2010). Thus, given that international commodity prices are not especially volatile, the relative stability of the prices of these traded goods is not particularly surprising. Millet and sorghum also have relatively low price volatility, perhaps because of their drought resistance.

Why Are African Food Prices Assumed to Be More Volatile?

The most surprising result of the study is that little or no evidence exists to show a statistically significant increase in food price volatility in the 11 African countries examined. Some prices became more volatile during 2007–2010, but a larger number became more stable.

One reason that this finding is unexpected is that international food markets have become more volatile in recent years. Given that most African countries are net food importers, it is natural to assume that the volatility in international food markets would be transmitted to domestic African markets. However, several studies have highlighted the low level of price transmission from international markets to African food markets (Quiroz and Soto 1995; Conforti 2004; Minot 2011). For example, Minot (2011) found that only 13 of 62 African food prices showed a statistically significant long-term relationship with international prices. In light of this finding, it is quite plausible that African food prices have not become more volatile in spite of the increased price volatility in international food markets.

However, it is more difficult to reconcile the widespread view that food price volatility has increased in African markets with the lack of empirical support for this trend. Volatility measured at lower frequencies yields the same general trend. It is possible, however, that price volatility has increased at a higher frequency (for example, weekly) that is not captured by this analysis. An analysis of weekly food price data from Africa would test this hypothesis.

Another possibility is that the conventional measure of volatility, the standard deviation of returns, does not match people's intuitive understanding of what volatility is. For example, consumers may perceive a price increase from 200 to 220 to be a larger fluctuation than an increase from 80 to 88, even though they are equivalent in terms of the proportional return and in terms of the standard measure of volatility. In other words, an intuitive understanding of volatility may be based not on proportional changes but on some combination of proportional and absolute changes.

A third possibility is that the apparent increase in volatility is a misconception. Volatility is not an easy concept to observe directly. Comparing the level of prices at two points in time requires just two data points, but comparing the degree of volatility requires a comparison of two sets of data points. The widespread view that African food prices have become more volatile may be just a misconception that has been reinforced by repetition in the media. Although further research is warranted, this seems the most likely explanation.

Policy Implications

What are the implications of these findings for food policy and price stabilization programs? First, at the international level, they suggest that greater attention should be paid to how much price volatility in international markets is transmitted to markets in developing countries. To the extent that the findings for Africa are replicated for other regions, there may be less reason for concern about price volatility in international food markets.

At the regional and national levels, the results imply that greater attention should be given to the level of food prices (particularly high food prices) in Africa rather than price volatility

per se. Food price volatility remains an issue, but it is arguably no greater an issue now than it was before the global food crisis of 2007–2008.

Of course, these findings do not necessarily undermine the rationale for efforts to reduce food price volatility. Food price volatility is higher in Africa than in other regions of the world and much higher than in international food markets. Many of the proposals in the 2011 Group of 20 Action Plan, such as the strengthening of safety net programs and better information about prices and stock levels, would be advisable regardless of the trend in food price volatility.

However, the results suggest that food self-sufficiency is not a promising strategy for reducing food price volatility. As shown here, international food prices are more stable than African food prices, and within Africa, the prices of tradable foods (such as rice, wheat, and cooking oil) are more stable than the prices of commodities for which countries are self-sufficient (beans, cowpeas, sorghum, and millet). Thus, the results support the argument that international trade can play a useful role in stabilizing food prices.

Finally, the results cast doubt on the effectiveness of traditional food price stabilization programs. Four countries in the sample have large state-owned enterprises that attempt to stabilize prices, particularly maize prices, by buying when the price is low and selling when the price is high. Yet maize price volatility is significantly higher in these countries than in African countries with little or no maize price stabilization efforts. These findings are consistent with a number of studies that suggest that unpredictable government intervention in maize markets, and the trade restrictions that often accompany these policies, can inhibit private traders from participating in trade and storage activities, thereby increasing seasonal volatility and exacerbating price spikes associated with supply shortfalls.

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