How Much Did Developing Country Domestic Staple Food Prices Increase During the World Food Crisis? How Much Have They Declined?

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Abstract

Using data from a new FAO price database, we found that domestic staple food prices in developing countries typically increased by 48 percent in real terms during the world food crisis. Given that most of the world's poor are net food consumers, such large price increases almost certainly had severe impacts on the effective purchasing power of the poor, which in turn likely affected the number of meals eaten as well as the nutritional quality of food consumed. While domestic prices have declined from their peaks in most countries, the declines have been small thus far and real prices are typically 19 percent higher than they were two years earlier, even after accounting for inflation. Thus, many poor people are faced with higher food prices in the midst of a global economic slowdown.

Key Words: Food prices, food crisis.

JEL: Q13, Q17, Q18.

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Introduction

Staple food prices soared on world markets during the world food crisis of 2006 to 2008 (Figure 1). World maize prices increased 54 percent from August 2006 to February 2007, followed by an increase in world wheat prices of 125 percent from May 2007 to March 2008. World rice prices increased by 203 percent from October 2007 to April 2008, and then maize prices increased by 59 percent from their already elevated levels between December 2007 and June 2008 (all of these price increases are in nominal terms). Thus, prices for all three cereals more than doubled in a span of less than two years. Subsequently, world cereal prices plummeted in the second half of 2008 before recovering slightly or levelling off in the first few months of 2009 (2009 data not shown).[1]

It is well known that domestic cereal prices also increased during this time, and that there were food riots in a number of countries. This paper quantifies the magnitude of those domestic price increases for a large number of developing countries. In terms of food security and poverty, domestic prices are crucial because they are the prices actually paid by consumers and farmers. Changes in domestic prices also determine the magnitude of consumer and farmer response that will eventually affect demand and supply on world markets.

Data

In order to examine what happened to domestic staple food prices in developing countries, the paper uses monthly nominal price data from the new FAO-GIEWS price database (FAO 2009b), as well as monthly data on the consumer price index (CPI) from the International Monetary Fund (2009). Staple foods were chosen because they are particularly important for the poor in terms of expenditures and caloric intake. While aggregate food price inflation is also important, the weights used in constructing such measures do not reflect the expenditure patterns of the poor, which are more oriented towards staple foods.

The ultimate data sources in most cases are official government sources; full details of specific sources for each country are available in FAO (2009). We analyzed domestic price data for six categories of staple foods: (i) rice; (ii) wheat; (iii) maize; (iv) beans and lentils; (v) cassava and potatoes (CP); (vi) sorghum, millet and barley (SMB). Initially wheat was split into wheat and wheat flour, but the results were so similar that we merged the two.

We included only case studies for which monthly data on both nominal prices and the CPI are available for at least 25 months, with the most recent month being December 2008 or later.[2] For more than 70 percent of our case studies, our most recent data cover until March 2009 or later.[3] Subject to the constraint of only one case study for a particular commodity in a particular country (see next paragraph), we included all available data meeting these

[1] The reasons for the increase are complex and beyond the scope of this working paper. For more information on the causes of the world food crisis, see FAO (2008), FAO (2009a) and Headey and Fan (2008), among others.
[2] We chose 25 months instead of 24 months so that we could compare the most recent price with the price in the same month two years earlier. See the discussion in the Results section.
[3] The number of case studies for each given end date is as follows: December 2008 (10), January 2009 (9), February 2009 (16), March 2009 (35), April 2009 (15), May 2009 (46), and June 2009 (1).

constraints. This leads to a total of 127 case studies of staple foods distributed across 46 countries. A case study is defined as a specific commodity in a specific country, e.g. rice and wheat in Bangladesh constitute two separate case studies. There were 40 case studies for rice, 29 for maize, 20 for wheat, 17 for beans and lentils, 11 for the CP group, and 10 for the SMB group.

Within a given country for a given staple food, nominal price data are often available for multiple locations, multiple qualities, multiple levels of the marketing chain (i.e. wholesale and retail), or some combination thereof.[4] In order to avoid skewing our sample, we decided to include only one case study from each of the six commodity groups in any given country (e.g. we would *not* include both wheat and wheat flour from the same country, or rice wholesale and retail). The only exceptions were in the CP and SMB groups, where we included two case studies from the same commodity group in four countries because there were so few data available from those commodity groups.[5] In most countries, data are not available for all of the commodity groups, so the number of case studies is less than six in every country (Cameroon is the only exception). The average number of case studies per country is about three.

When data are available for multiple locations, multiple qualities or multiple marketing levels for a given staple food in a given country, a set of ordered selection criteria are needed in order to choose which data series to analyze. Our first criterion was to use, whenever possible, retail price data (84 case studies), the justification being that these are the prices paid by consumers. However, if no retail price data were available for a particular case study, we used wholesale prices (43 case studies), which are usually linked quite closely to retail prices. In the case of wheat, if there were data for both wheat and wheat flour, we used data on wheat flour. In the case of maize, we used data on tortillas if available, but if not, we used data on maize flour. If data for neither of those two commodities were available, we used data on maize grain.

Our next criterion was based on quality. We chose the lowest quality available, on the grounds that lower qualities are more important for the poor. That being said, prices of different qualities generally seemed to move broadly together within the same country.

Our third criterion was to use national average prices when available. When national average prices were unavailable, we used an unweighted average of price in all the markets in the given country for which data were available. There were 36 case studies for which national average data were available, and an additional 38 case studies for which we calculated an average based on three or more locations. For the other 53 case studies, we used data from one or two locations in the country (in nearly all cases it was one location only).

While our analysis would be slightly more up to date if we did not use CPI data (because CPI data are typically available with a greater lag than are nominal price data), we felt that in this particular analysis, which synthesizes data across a large number of countries with very different inflation rates, it was important to control for inflation. In other cases, however, use of nominal price data will be more appropriate.[6]

[4] Farm price data are not included in the FAO basic food price database.
[5] The four countries (and associated commodities) are Cameroon (cassava and potatoes), and Burkina Faso, Niger and Senegal (sorghum and millet).
[6] Another alternative is to extrapolate the CPI one or two months ahead so that the analysis can be more up to date. This alternative will be explored in subsequent analyses.

Ideally, we would like to divide the nominal price by a CPI that excludes the commodity in question, because such a procedure would give the true relative price increase of a given commodity. We do not have such data, however, so we divide by the aggregate CPI. Since all of our case studies show real price increases, use of the aggregate CPI in constructing the real price understates the true magnitude of the price increase relative to other commodities.[7]

Methodology

The timing of staple food price increases varies across countries and across commodities within a country. Thus, it is not very informative to pick specific dates and use these same dates across all case studies. Instead, we calculated year on year price increases for each month in each case study, starting with July 2006 (when world maize prices began their surge) at the earliest. For example, we calculated the real price increase from July 2005 to July 2006, August 2005 to August 2006, and so on until the most recent date for each case study. For each case study, we then calculated the maximum percentage year on year real price increase across all dates and termed it %ΔPMAX1. We performed the same calculation using successive three month windows, e.g. the price increase from July-August-September 2005 to the same three months in 2006, followed by August-September-October 2005 to the same three months in 2006, and so on. The maximum of these percentage real price increases is termed %ΔPMAX3. Note that %ΔPMAX1 must always be greater than or equal to %ΔPMAX3, and that both of these variables are different than the maximum real price, which we term PMAX.

We compare these various measures of real price increases across countries and commodities using the median instead of the mean. The median is used because the mean might be skewed by very large price increases in particular case studies. In addition to quantifying the magnitude of the price increases, we also analyze the month and year when these maximum year on year price increases occurred, as well as the month and year in which PMAX occurred.

To assess the extent to which prices have declined from their peaks, we calculate, in real terms, the percentage decline between the most recent price (PEND) and PMAX. PEND is not necessarily the lowest price that was reached after PMAX, but we use PEND to provide an update on the current situation as best as we are able to monitor it.

Finally, to assess the current level of domestic staple food prices, we compare PEND (the price in the most recent month) with the price in the same month (to control for seasonality) two years earlier. As in the rest of the paper, this calculation is done in real terms, with the comparisons across countries and commodities done using the median.

While it is likely that the price surge on world markets affected domestic prices in most countries, our analysis does not address the question of whether the domestic price increases in the case studies were caused by price movements on world markets. Thus, we are analyzing the behavior of domestic prices during and after the world food crisis, not the effects of world market prices on domestic prices. For example, price surges in some countries could have been caused by drought or floods unrelated to world markets.

[7] As a concrete example, if the share of a commodity in the total CPI is 10 percent, the nominal price increase of that commodity is 30 percent, and the increase in the CPI during the same period is 10 percent, then our calculated real price change is 18 percent, compared to the true value of 22 percent.

Results

Maximum year on year percentage price increases

The median value for %ΔPMAX1 across all 127 case studies was 48 percent (Table 1), with an average of 59 percent.[8] This is a very large shock to the purchasing power of poor people because expenditures on a single staple food often account for 20 to 40 percent of total expenditures for the poorest fifth of the population. Of course, some of these poor people are farmers who benefit from increases in staple food prices, but much research has shown that the poorest of the poor are net food consumers (Ivanic and Martin 2008, Zezza et al 2008) and are hurt by high food prices. The median value for %ΔPMAX3 is by necessity lower than that for %ΔPMAX1, but the difference is not very large, indicating that the large price surges lasted more than one month.

The domestic price surges were widespread across different commodity groups (Figure 2), with wheat, beans and lentils and maize experiencing the largest increases overall. Although the increase for the sorghum, millet and barley group was less than for the other groups, it was still quite substantial at 32 percent. Befitting the global nature of the crisis, the price increases were also widespread geographically. The median value for Latin America and the Caribbean was highest at 56 percent, but the price increases were also large in Asia and the Pacific (48 percent) and Africa (46 percent).

Nearly two-thirds (65 percent) of the peak values of the percentage year on year increase in price occurred in 2008, with 25 percent occurring in 2006 or 2007 and the remaining 10 percent occurring in 2009. This is very similar to the distribution of the peak price level (measured in real local currency terms), except that the peak price was reached in 2009 for 17 percent of the cases.

Can we explain the cross-country variation in domestic price increases?

We attempted to explain the cross country variation in %ΔPMAX1 through the use of several explanatory variables. First, we used real exchange rate appreciation vis-à-vis the US dollar from 2005 to 2007. We used 2007 as the end year instead of 2008 on the assumption that real exchange rate changes take some time to work their way through to domestic prices. In addition, the US dollar appreciated strongly towards the end of 2008. Countries where the real exchange rate appreciated strongly would be expected to have smaller increases in real domestic prices because the magnitude of the world price shock is smaller in such cases.

Second, we used the ratio of domestic prices to world prices in the first quarter of 2006 as a measure of policy stance. Countries where domestic prices were high before the crisis might be expected to have smaller percentage increases in prices. Because we only have data on world prices for rice, wheat and maize, use of this variable meant that we could include only case studies from those three commodities in the regression analysis.

[8] If we were to weight different case studies using relative population size and the relative importance of each staple food in expenditures, a weighted average would most likely be much lower than the median value reported here. This is because rice and wheat price increases in China and India were well below the global median. This conclusion would be further strengthened if Indonesia, the world's third largest developing country, were included in the dataset, because its rice prices were stable during the world food crisis.

Third, we used the percentage deviation of production in 2007 from a fourth and fifth order polynomial trend fitted to data from 1988 to 2007 (twenty years of data). These two percentage deviations were not used simultaneously in the same regression, but as alternatives (i.e. as sensitivity analysis). We used a relatively high order polynomial in an attempt to take account of the vastly different trends in different countries. Linear or quadratic trends would most likely have much poorer fits to the data in a number of cases. Countries where production was above trend in 2007 might be expected to have a relatively smaller increase in domestic prices.

Fourth, we used one of two measures of openness to trade. One measure was net imports as a share of consumption, or, for net exporters, net exports as a share of production (the net trade position). This measure varies, by construction, from -1 to +1. Countries that are net importers of the commodity in question might be more susceptible to domestic price increases. Our second measure of openness to trade was the absolute value of the net trade position, which varies from 0 to 1. The rationale for this measure is that any country more open to trade, whether importer or exporter, will be more vulnerable to domestic price increases. Only one of these two measures was used in any given specification.

Finally, we also used dummy variables for region (Asia, Africa, Latin America) and for commodity (rice, wheat, maize).

We constructed different specifications by using all different possible combinations of independent variables. Our regression results are not shown here because the fit of the regressions was poor in all specifications. None of the variables were ever significant at the 5% level, and they were often of the wrong sign. One approach for future work would be to include other variables. For example, we did not include any measures of trade policies actually pursued during the crisis. Inclusion of such a variable could potentially be helpful to improving the results. On the other hand, it may be more useful to pursue a detailed case study approach, where the timing and details of policies and weather shocks are explored in depth for specific countries or for specific commodities in a regional setting (e.g. maize in southern Africa).

How much have prices declined?

Real prices have declined in all case studies except for six. While prices have thus declined nearly everywhere, the magnitude of the real price declines from the peak has been relatively small so far, with a median price decline of just 15 percent. More than half of all cases (57 percent) have experienced price declines of less than 20 percent from the peak, although about one-fourth of case studies have experienced price declines of more than 30 percent in real terms (Figure 3).

Given the small price declines thus far, it is not surprising that real prices are currently higher than they were two years earlier. The median value of the percentage increase, comparing the most recent price with the price in the same month two years earlier, is 19 percent. The median is relatively similar across the three regions, but is quite different across commodities (Figure 4). The median price increase is highest for rice at 26 percent, compared to just 8 percent higher for maize. The larger price increase for rice is probably due to the fact that the ratio of world market prices in May 2009 compared to May 2007 is much higher for rice than for wheat and maize, regardless of whether rice prices are measured in Bangkok or Viet Nam (the conclusion is stronger if Bangkok prices are used).

Summary

Using data from a new FAO price database, we found that domestic staple food prices in developing countries typically increased by 48 percent in real terms during the world food crisis. Given that most of the world's poor are net food consumers, such large price increases almost certainly had severe impacts on the effective purchasing power of the poor, which in turn likely affected the number of meals eaten as well as the nutritional quality of food consumed. While domestic prices have declined from their peaks in most countries, the declines have been small thus far and real prices are typically 19 percent higher than they were two years earlier, even after accounting for inflation. Thus, many poor people are faced with higher food prices in the midst of a global economic slowdown.

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Table 1. Quartiles of maximum year on year percentage price increases

	%ΔPMAX1	%ΔPMAX3
Minimum	10	3
Quartile 1	34	26
Median	48	41
Quartile 3	73	66
Maximum	176	157

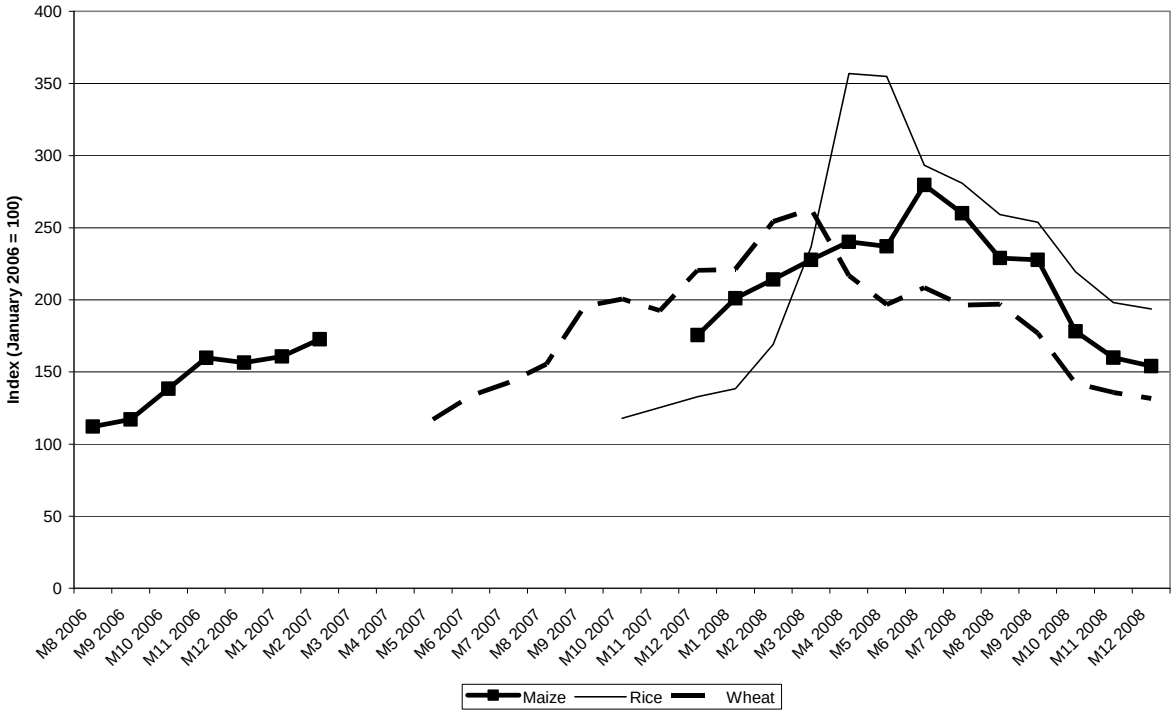

Figure 1. World cereal price surges and declines, July 2006 to December 2008

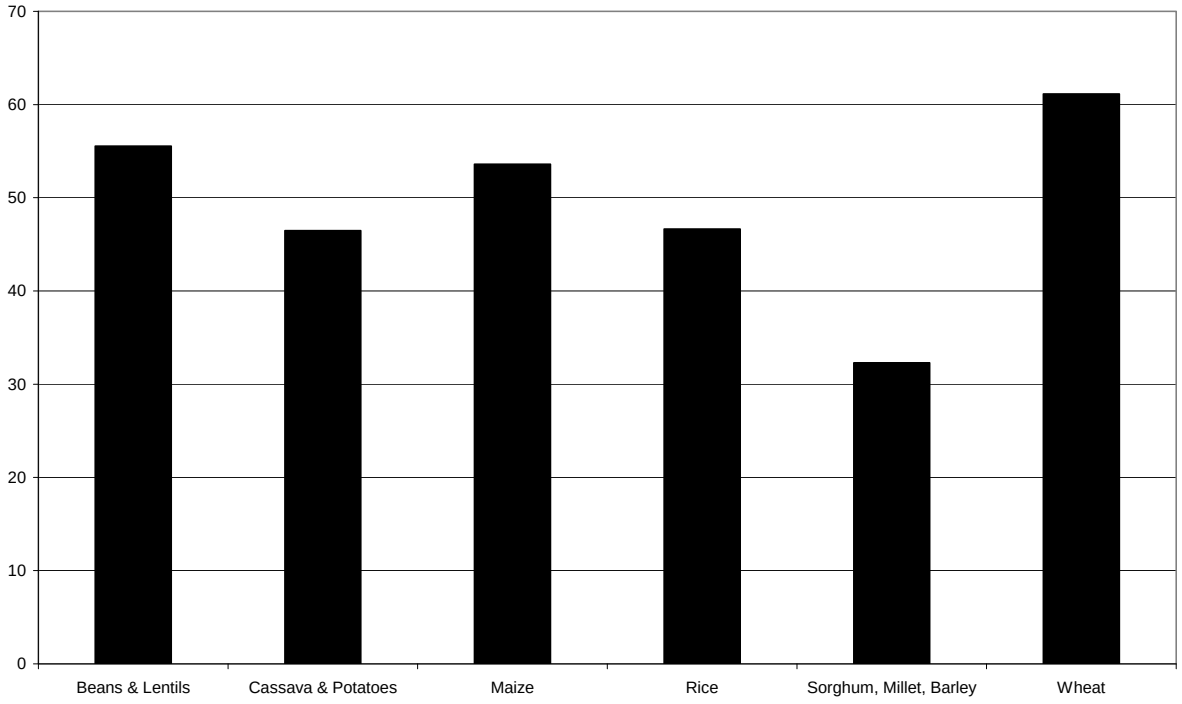

Figure 2. Median value of maximum year on year percentage real price increase by commodity group

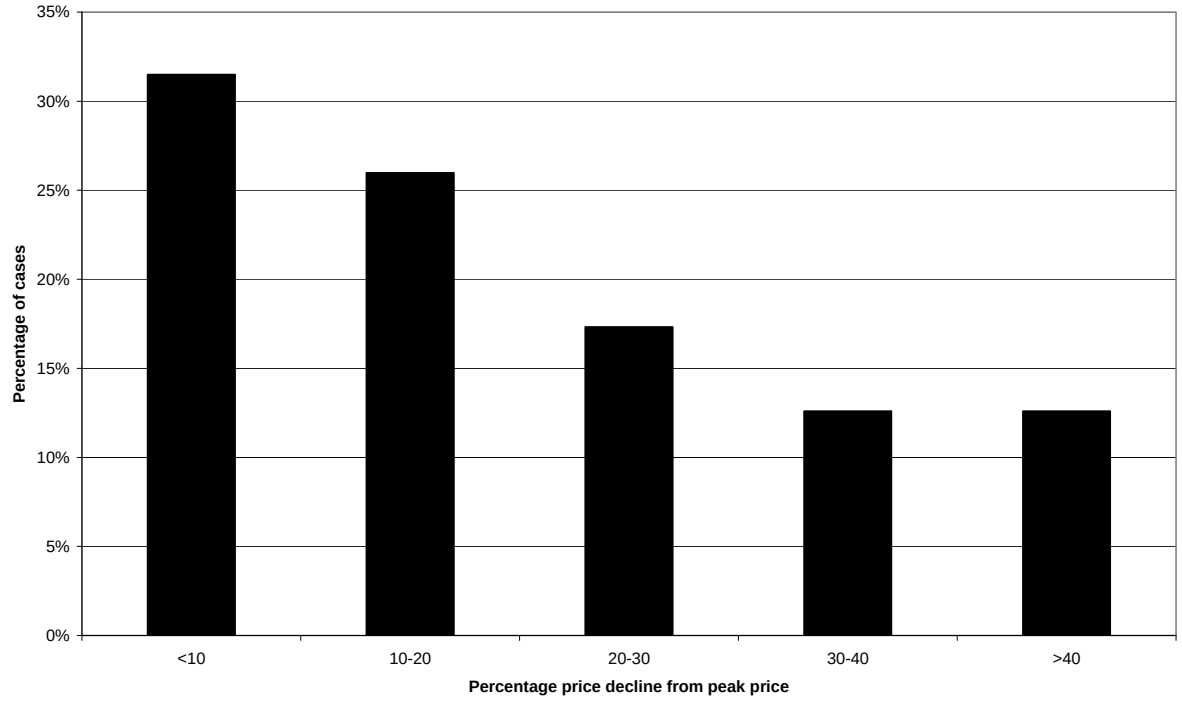

Figure 3. Distribution of percentage real price declines from peak price to most recent price

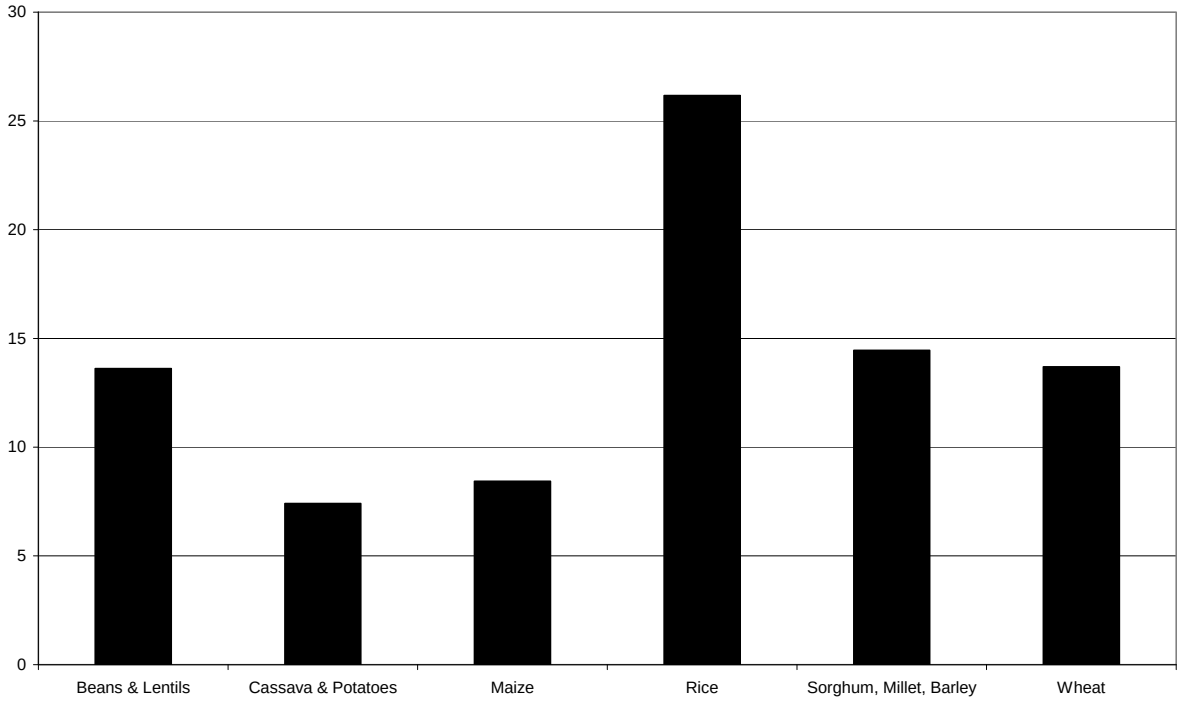

Figure 4. Median percentage increase in real price, most recent month compared with the same month two years earlier

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