Food Price Spikes, Price Insulation and Poverty

by

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Abstract

The analysis in this paper first considers the impact on world food prices of the changes in protection for staple foods during the 2008 world food price crisis—changes that were generally designed to partially insulate domestic markets from changes in international prices. We find that this insulation substantially increased world prices for key food crops such as rice, wheat, maize and oilseeds. The net effect was to reduce domestic prices in only a few developing countries, while domestic prices in many other countries were increased despite their attempts to insulate against the price rises. We estimate that the overall reduction in import protection or increase in export restraints in developing countries reduced the extent to which global poverty would otherwise have risen. However, the actual poverty-reducing impact of insulation is much less than its apparent impact, and there are now domestic policy instruments that almost certainly could reduce the impact of higher food prices on the poor more efficiently than variations in trade restrictions.

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Many countries have responded to price spikes such as those of mid- 2008, early 2011 and mid-2012 by adjusting their agricultural trade barriers in an attempt to insulate their domestic markets from higher international food prices. Martin and Anderson (2012) show that such interventions exacerbate the initial increase in international prices, and that this policy response is completely ineffective when both exporting and importing country groups insulate to the same extent, even though it may appear to each individual country to have been successful. In reality, those two country groups are likely to intervene to different extents, so the impact of the initial exogenous increase in international prices plus the additional influence of altered trade restrictions may generate non-obvious redistributions between countries.

One possibility is that countries where the poor are most adversely affected by higher food prices stabilize their domestic prices more than countries where the poor are less vulnerable to food price shocks. In that case, most poor people might be protected from the adverse impacts of the initial shock to food prices. A related possibility is that, if countries where producers and consumers are better able to deal with such shocks transmit a larger portion of the increase in international food prices, the adverse global poverty impacts of the original shock will be less (Timmer 2010).

A more pessimistic possibility is that many of the countries which insulate from shocks to international food prices are countries for which the impacts on domestic poverty of higher food prices are relatively minor, or even favorable. Rich countries, for example, are well-placed to absorb price shocks because of the small shares of food in the expenditures of their consumers, their producers’ access to risk management tools such as futures and options markets, and their relatively well-developed social safety nets. Even so, some high-income countries have used highly-insulating policy instruments such as variable import levies. Another example of this possibility is where large, poor, food-importing countries—for which insulation is more expensive because it turns their terms of trade against them—might insulate less than would a small but otherwise similar country, and hence may not avoid adverse poverty outcomes.

It is clear from these examples that alterations in trade restrictions could increase or reduce the global poverty impact of higher prices. Only by looking at data on the changes in agricultural distortions during periods of rapid increases in international prices, and estimating the impacts of consequent food price changes on poverty in different countries, is it possible to ascertain which of these possibilities is more likely.

Knowing whether poverty rises or falls in response to changes in trade restrictions is insufficient for sound policy formulation though. The most cost-effective policy instrument for dealing with the poverty impacts of price rises is likely to be a domestic one—such as a well-targeted social safety net—that deals directly with the problem of poverty vulnerability. If such a policy is infeasible, considerable work is likely to be needed to identify feasible policy options that are more effective than border trade measures.

This paper begins by looking at data on the consumption patterns and income sources of low-income households in a sample of developing countries in order to assess which commodities are likely to be important in analyzing the poverty impacts of changes in commodity prices. We then turn to data on agricultural price distortions, and in particular on relative movements in domestic and international prices, to assess the extent to which countries insulated their domestic market from the initial changes in international food prices during 2006-08. With these data we use models to compare the actual changes in domestic prices with those that would have occurred in the absence of price-insulating policies. These price scenarios are then used to assess the impacts of food price changes on poverty both with and in the absence of price-insulating policy behavior. They allow us to make a much broader assessment of the impacts of price-insulating behavior on poverty than has previously been available. The final section examines alternative policy measures at unilateral, regional and multilateral levels which—together with complementary domestic measures—might more efficiently reduce the impact of future price spikes on poverty.

What price changes are important for the poor?

The direct short-run impact of food price changes on the well-being of a particular household depends on the proportional change in the real price of a particular food times the household's net purchases of that food (Deaton 1989). Since food typically makes up a large share of the spending of poor people, we would generally expect food price changes to have a large impact on the living costs of the poor. However, the vast majority of poor people are rural (three-quarters, according to Ravallion, Chen and Sangraula, 2007), and most poor people earn their living from agriculture. Hence food expenditure shares alone are insufficient for determining the impact of food price changes on poverty: account also needs to be taken of the shares of household income obtained from the sale of food, and hence the net expenditures on food by the household.

The first two columns of Table 1 report the shares of particular types of food in aggregate food expenditure and in total expenditure by the poor for the 30 developing countries[1] for which detailed data are available on household expenditures and income sources. The right-hand

[1] Albania 2005, Armenia 2004, Bangladesh 2005, Belize 2009, Cote d'Ivoire 2002, China 2002, Ecuador 2006, Guatemala 2006, Indonesia 2007, India 2004, Cambodia 2003, Sri Lanka 2007, Moldova 2009, Mongolia 2002, Malawi 2004, Nepal 2002, Nigeria 2003, Nicaragua 2005, Niger 2007, Pakistan 2005, Rwanda 2005, Tajikistan 2007, Timor Leste 2001, Tanzania 2008, Uganda 2009, Vietnam 2010, Yemen 2006 and Zambia 2010

columns of Table 1 net out household production that is sold, and so are the most relevant for present purposes. Six countries' shares are shown, together with the weighted average for all 30 countries. The bottom row reveals that food accounts for 40 percent of the poor's net expenditure once the marketed surplus is subtracted. Evidently, net buyers of food dominate net sellers among the poor in this group of countries, and in one of the countries shown (Vietnam) are the poor, as a group, net sellers of the listed foods, although there are other cases where the poor are net sellers of particular foods.

Table 1 also reveals that rice, wheat and oilseeds are the three dominant traded food products affecting the net food expenditure of the poor. Together with maize (the most heavily traded of the coarse grains) they account for about two-fifths of the net expenditure of the poor on food. They are also substitutes in production and consumption for other coarse grains and root crops, and are important inputs into livestock production and so indirectly affect international prices of meat, fish and milk products. Hence in what follows we concentrate on what happens in markets for rice, wheat, maize and oilseeds/edible oils.

Table 1: Food expenditures of people living on less than $1.25 per day, weighted average across 30 developing countries, 2002–2010[a]

	Average gross share in expenditure of the poor			Average net share in expenditure of the poor, % of total						
	% of food	% of total	All 30 countries	India	China	Bangladesh	Pakistan	Vietnam	Uganda	Tanzania
Rice (+ processed)	21.2	7.4	8.4	14.9	5.6	4.2	1.8	-8.1	0.1	2.1
Wheat (+ processed)	11.0	3.8	4.1	5.2	3.4	0.6	10.7	1.3	0.1	1.5
Maize and other grains	-4.7	-1.6	0.7	1.7	-5.6	-0.1	0.2	-4.6	1.2	6.0
Root crops	1.3	0.4	0.5	1.8	0.4	1.1	1.5	-4.5	1.5	0.4
Oilseeds and edible oils	7.7	2.7	4.2	5.2	0.1	2.5	4.5	1.0	1.3	2.6
Plantains and other fruits	2.6	0.9	0.7	0.8	1.3	1.0	1.0	-1.1	-0.7	-0.3
Other vegetables	10.3	3.6	5.6	9.2	0.1	3.4	4.5	0.2	2.9	4.7
Sugar	4.0	1.4	2.2	2.4	0.0	0.3	4.4	-0.9	2.3	3.1
Milk and dairy products	7.9	2.7	4.3	6.6	0.0	-0.4	7.4	1.2	0.6	-0.1
Meats	10.8	3.8	0.5	1.8	9.4	-0.4	1.4	-2.4	1.9	-1.3
Fish and fish products	7.0	2.4	1.8	1.5	3.5	4.9	0.3	-2.4	2.1	3.3
Other processed food	20.9	7.3	7.2	5.6	7.3	9.5	3.0	9.3	3.1	11.0
Total	100.0	34.8	40.2	56.8	25.5	26.6	40.6	-11.0	16.4	33.0

[a] Weighted averages across 30 developing countries using the populations as weights. The $1.25 per day income level includes own-food consumption. Net share in expenditure refers to consumption of food less sales of food as a share of total expenditure, including own-food consumption. For the list of developing countries and their survey dates, see footnote 1 of the text.
Sources: Authors' calculations.

Price insulation for key food commodities

The first step in our analysis is to consider the changes in prices of each of these four key food items in each of the sample countries for which we have information on income sources and expenditure patterns. For this, we follow Anderson and Nelgen (2012a, b) in considering price changes between 2006 and 2008 for each item. These are shown in Table 2, together with changes in nominal nonfood prices as measured by the non-food component of the consumer price index for each country.

Table 2: Changes in domestic food and nonfood prices, in nominal local currency terms, 2006–8, %

	Rice	Wheat	Maize	Edible oils	Nonfood
Albania	—	72.3	63.8	26.0	6.4
Armenia	—	84.5	—	—	13.8
Bangladesh	25.2	36.9	31.4	0.5	18.8
Belize	10.5	—	11.7	7.5	8.8
Cambodia	45.6	—	98.0	58.1	26.7
China	35.4	37.5	41.8	-17.9	11
Cote d'Ivoire	78.8	—	39.7	46.3	8.4
Ecuador	76.4	124.5	139.8	18.5	10.9
Guatemala	75.6	—	29.6	—	19
India	48.9	26.6	14.1	36.8	15.1
Indonesia	20.8	—	57.1	54.5	17.4
Malawi	40.4	26.3	42.6	19.7	17.4
Moldova	—	72.8	53.6	43.3	26.7
Mongolia	—	111.3	—	—	40.3
Nepal	10.7	28.0	21.6	0.1	18.3
Nicaragua	34.1	—	41.7	7.7	33.1
Niger	26.8	28.1	28.4	27.4	11.3
Nigeria	0.6	39.6	10.2	11.7	17.6
Pakistan	-2.6	-9.3	-8.2	-2.3	29.4
Panama	45.5	—	57.5	—	13.2
Peru	118.1	100.5	54.4	37.2	7.7
Rwanda	-52.7	22.3	30.5	40.1	18.3
Sri Lanka	120.9	—	74.7	47.0	10.1
Tajikistan	-47.9	65.8	—	—	18.3
Tanzania	31.8	—	42.1	—	18.1
Uganda	36.2	—	53.5	—	18.9
Viet Nam	83.1	—	—	—	32.6
Yemen	—	61.3	50.2	—	17.7
Zambia	42.7	17.8	27.7	329.3	24.4

Sources: Authors' calculations based on the World Bank's Distortions to Agricultural Incentives database at www.worldbank.org/agdistortions, the FAO's producer price data, CPI for all consumption and non-foods, and its GIEWS survey data at www.fao.org.

The changes in the domestic prices of these four key food items between 2006 and 2008, relative to the nonfood price index, provide the first input into measuring the change in poverty resulting from the changes in real domestic food prices over this period. Our objective is to compare this poverty impact with what the poverty impact would have been had countries *not* insulated their markets from changes in international food prices over this period. To initiate this process, we examine the changes in domestic and border prices for those key food items in 102 countries that together account for more than 90 percent of the world market for each of rice, wheat, maize and edible oils.

Description of key food price changes, 2006–08

For the present analysis, data are required on changes in domestic and world prices for a set of countries that cover a very large fraction of world consumption, plus estimates of changes in protection in the set of countries for which we have detailed data on production and consumption of each food at the household level. The Distortions to Agricultural Incentives (DAI) database (Anderson 2009 and www.worldbank.org/agdistortions) provides annual estimates of agricultural price distortions in the 82 countries that are most important in influencing world prices. Because the DAI database does not include data for some of the smaller developing countries for which we have household data, we supplement the DAI data with estimates from other sources, particularly the FAO's domestic price and trade series.

To assess changes in protection at the country level, we consider changes in international, domestic and country-specific border prices of four key food items relative to the most relevant international price for each particular country. Our estimates of the global price changes come from the World Bank's Global Economic Monitor (GEM) database. Because for most commodities the GEM reports a set of prices for specific varieties (e.g. US Hard Red Winter wheat etc.) we calculate and use unweighted averages of all available prices.

For domestic prices, we turn to the available DAI and FAO databases which usually contain a single price estimate for most agricultural commodities and countries. For edible oils, where a producer price index was not available, we calculated a weighted price index including several important oil seeds (soybeans, sunflower, groundnuts, rapeseed) in addition to palm oil.

In a very few cases where FAO producer price data were not available, we used the FAO GIEWS database to identify the changes in domestic prices using the most relevant price series available.

Rice

Rice prices increased substantially between 2006 and 2008. Table 3 reports that the changes for three international indicator prices averaged close to 120 percent in nominal US dollars. National border price changes (shown in Figure 1 in US dollars) were generally smaller, with the median price increasing by 78 percent. Most of the border price changes that we observe range between 53 and 102 percent. The reasons they differ from the international reference price changes may include: contractual arrangements that delay adjustments in the prices of traded goods; differences between the types of rice traded; and freight costs that make the export prices that are quoted internationally more volatile than most border prices.

Changes in domestic prices of rice were more subdued than changes in the border prices. This is also shown in Figure 1. The median price rise was only 44 percent, with half of the price increases in the 30 to 64 percent range. Because domestic prices generally rose less than international prices, we also observe a reduction in protection,[2] with a median change of -18 percent (measured as the change in (1+t), where t is the rate of the trade tax equivalent). Most countries' protection rates fell between 0 and 30 percent.

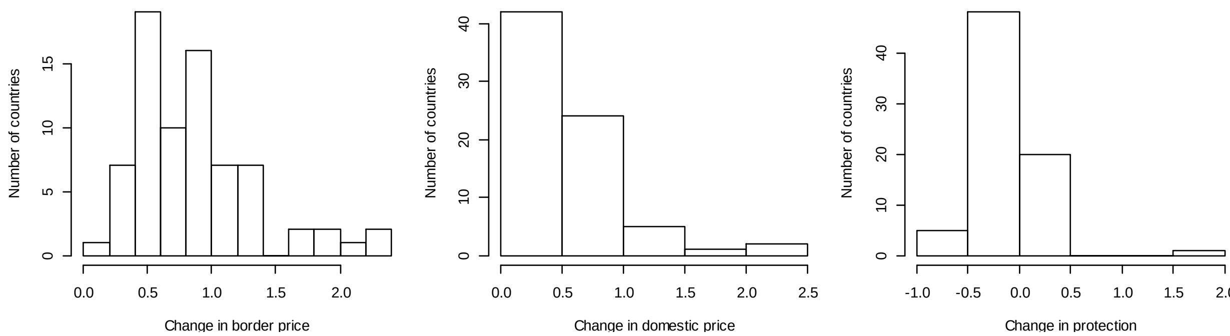
[2] Protection is defined as the ratio of the domestic price to the border price of a like product. If there are no other price-distorting policies than border measures, as assumed here, this is both the farmers' nominal assistance coefficient and an indicator of the distortion to the domestic consumer price. For some countries this indicator may be negative, usually because it is an exporting country with an export restriction, although in rare cases it indicates import subsidization.

Table 3: Changes in international indicator rice prices between 2006 and 2008

	Price 2006, US$/t	Price 2008, US$/t	Change, percent
Rice, Thai, A1.Special	220	482	120
Rice, Thailand, 5% broken	305	650	113
Rice, Vietnamese, 5% broken	260	567	118
Average, unweighted	262	566	117

Source: World Bank Global Economic Monitor database

Figure 1: Rice: Distribution of proportional changes in border and domestic prices, and protection 2006–2008



Source: Authors' calculations

Wheat

According to the World Bank's Global Economic Monitor database, the price of wheat traded internationally increased substantially between 2006 and 2008, with US soft red winter wheat rising by 71 percent and Canadian Western Red Spring wheat rising by 110 percent. Using the data from the FAO database, however, we observe much greater variation in border price changes between countries (Figure 2). Some countries experienced negligible price changes while other countries experienced price increases of over 200 percent. For the majority of countries, the wheat border price rise was between 80 and 120 percent.

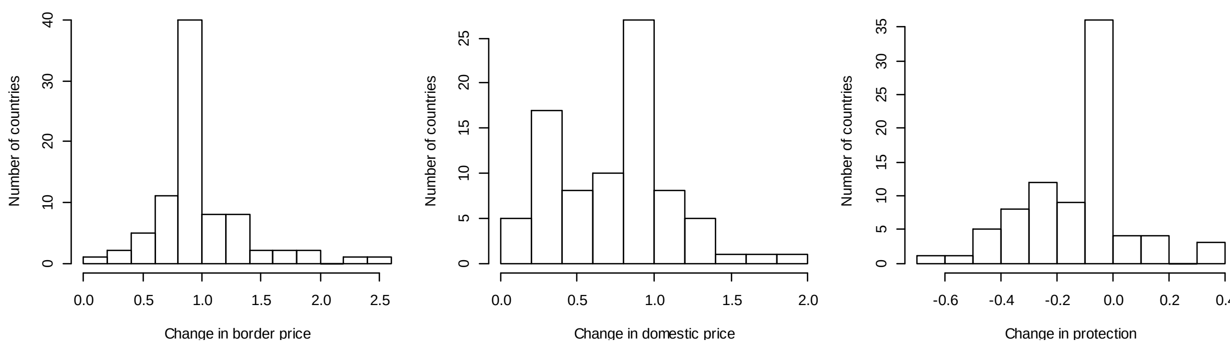
Domestic wheat prices rose much less than the large increases in border prices for most countries. The median domestic price change was 70 percent, and most countries experienced a price increase between 35 and 100 percent (Figure 2). Because domestic prices changed at very different rates from the border prices, there is a sharp reduction in protection (Figure 2). The observed median change in the protection index is only -0.1 percent, but most of the countries' protection fell between zero and 25 percent.

Table 4: Changes in international wheat prices between 2006 and 2008

	Price 2006, USD/t	Price 2008, USD/t	Change, percent
Wheat, Canada WRS	217	455	109.7
Wheat, US, HRW	192	326	69.8
Wheat, US, SRW	159	272	70.8
Average, unweighted	189	351	83.4

Source: World Bank Global Economic Monitor database

Figure 2: Wheat: Distribution of proportional changes in border and domestic prices, and in protection 2006–8



Source: Authors' calculations

Maize

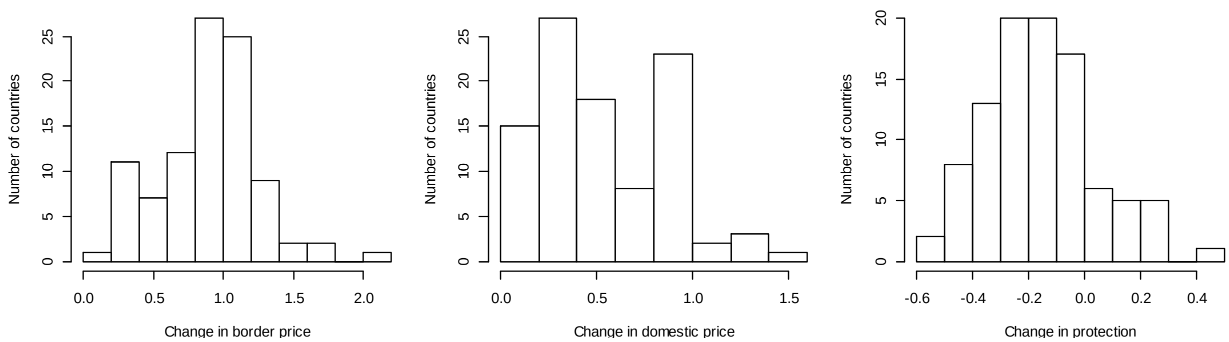
The international price of maize rose by 83 percent between 2006 and 2008 (Table 5). The median change in border prices was 94 percent, with half the observations between 60 and 110 percent (Figure 3). Domestic prices changed much less with a median price change of 49 percent and most countries experiencing increases in domestic prices between 30 and 85 percent. Corresponding to these differences in domestic and international price changes we observe a reduction in protection with a median fall of 17 percent and the majority of the cuts between 10 and 30 percent.

Table 5: Changes in international maize prices between 2006 and 2008

	Price 2006, USD/t	Price 2008, USD/t	Change, percent
Maize	122	223	83.1

Source: World Bank Global Economic Monitor database

Figure 3: Maize: Distribution of border and domestic prices, and protection changes 2006–2008



Source: Authors' calculations

Edible oils

Oilseeds and edible oils are much more complex to monitor than cereals because of the diverse set of commodities involved. To obtain at least a broad guide on developments in this market, we examine three key oil products—palm oil, palm kernel oil, and soybean oil—to obtain the average changes in international prices shown in Table 6. In order to measure the changes in domestic and border prices for edible oils, we consider a consumption-weighted price index for palm oil and major oil seeds (soybeans, cottonseed, soybeans, and groundnuts). We report a distribution of so-defined border prices in Figure 4 and find that the median border price change was 85 percent and that the majority of border price changes were between 55 and 110 percent.

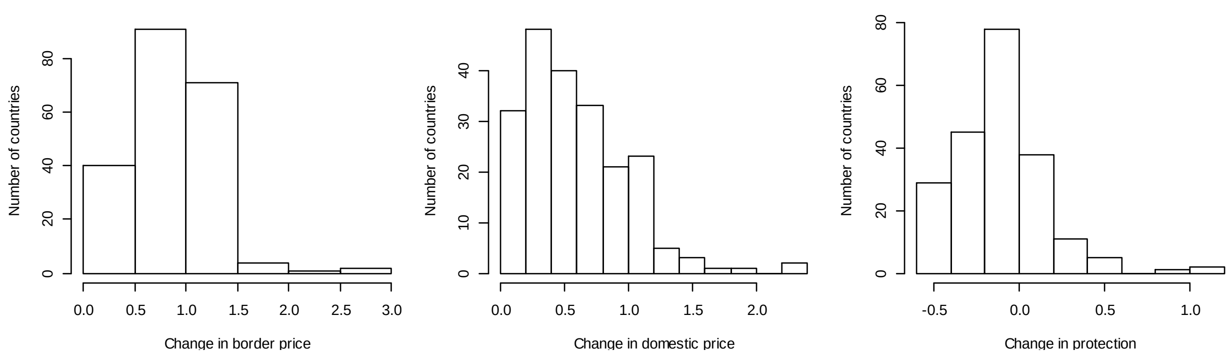
As with other commodities, domestic prices changed much less (also Figure 4) with a median price change of 54 percent and most of price changes between 30 and 80 percent. The median fall in protection was 12 percent, with half of the falls between 2 and 30 percent.

Table 6: Changes in international edible oil prices between 2006 and 2008

	Price 2006, USD/t	Price 2008, USD/t	Change, percent
Palm oil	478	949	98.3
Palm kernel oil	581	1130	94.4
Soybean oil	599	1258	110.2
Average, unweighted	553	1112	101.0

Source: World Bank Global Economic Monitor database

Figure 4: Edible Oils: Distribution of border and domestic prices, and protection changes 2006–2008



Source: Authors' calculations

Changes in protection in our sample countries

For the developing countries for which household data are available, the 2006-8 changes in protection to key crop products are detailed in Table 7. The table also includes at the bottom, for comparison, five large developing countries for which suitable household data are unavailable. The table reveals that protection in most developing countries fell during the observed period. The few cases where there are increases in protection are mostly African countries, and are likely to have been caused by these countries' food markets being detached from international markets.

Note also from Table 7 that changes in protection among the five large developing countries for which we do not have household data are broadly similar to the changes in protection in our sample countries, apart from China, where protection fell only for rice, and Egypt and Russia, where protection increased for wheat and oils.

Table 7: Observed change in protection (p_d/p_b), 2006–08, percent

	Rice	Wheat	Maize	Oils
Albania	—	-21.5	-16.5	-39.2
Armenia	—	5.2	—	—
Bangladesh	-20.4	-31.6	-27.5	0.5
Belize	-40.7	—	-37.3	-30.1
Cambodia	-26.9	—	0.8	-17.6
China	-37.4	-23.5	-36.1	-52.2
Cote d'Ivoire	-7.0	—	-13.4	-17.2
Ecuador	85.4	-2.9	23.5	10.1
Guatemala	-8.0	—	-33.7	—
India	-53.0	-10.5	-10.7	-19.8
Indonesia	-18.4	—	-25.2	-29.9
Malawi	3.5	-29.6	145.6	-3.1
Moldova	—	-27.0	-21.4	0.4
Mongolia	—	6.2	—	—
Nepal	-60.5	-33.2	-10.7	-0.2
Nicaragua	-23.7	—	-26.4	-26.5
Niger	-7.7	-6.8	-14.5	-7.7
Nigeria	-31.2	-52.6	-19.3	-10.7
Pakistan	-49.3	-65.7	-49.8	-33.8
Panama	-8.7	—	-22.9	—
Peru	16.6	-8.3	-22.5	-4.6
Rwanda	-55.7	-31.6	161.1	-6.3
Sri Lanka	122.2	—	14.7	5.1
Tajikistan	-61.7	-48.7	—	—
Tanzania	3.8	—	183.6	—
Uganda	5.1	—	14.9	—
Viet Nam	-15.9	—	—	—
Yemen	—	-39.9	-24.0	—
Zambia	-21.5	-32.2	67.7	0.0
US	-0.1	0	0	-15.1
EU	4.4	0	-14.4	-5.1
Brazil	-21.6	-0.1	0.9	1.9
Egypt	-8.8	34.4	-23.2	31.0
Philippines	-41.9	—	-30.6	-8.9
Russia	-18.1	6.7	-17.5	17.6

Source: Authors' calculations

Results

In this section we first compute the impact of changes in trade restrictions around the world on international prices of our four key food items. We then examine how much domestic prices changed relative to (a) actual international price changes during 2006–08 and (b) what the latter would have been had all countries abstained from insulating. This is followed by an analysis of the impact of changes in trade restrictions by different groups of countries on prices in other countries, exposing the extent to which some large insulating countries shift the burden of adjustment to others. Attention then turns to estimating the impacts of insulation on poverty in our sample countries and, by extrapolation, in the world as a whole.

Impacts of changing trade restrictions on international prices

To obtain an indication of the impact of the observed protection changes on domestic prices, we need first to estimate the impact of those changes in trade restrictions on international prices. That involves taking account of the changes in protection in countries that collectively account for a very large share of world production/consumption. Following Martin and Anderson (2012), we do this using the simplest possible model—a model which assumes (a) that each product is homogeneous, (b) that we can focus on just consumption because of limited supply response opportunities, and (c) that demand elasticities for each product are equal across countries. As a cross-check, we repeat the estimation assuming the supply response elasticity is unity (and the demand elasticity is -0.2).

For small changes in protection policy, we can, as shown in Martin and Anderson (2012) express the relationship between change in the power of protective tariffs or export taxes/subsidies, $\hat{T}_i$ and percentage changes in the world price $\hat{p}_w$ as:

$$\hat{p}_w = \frac{\sum_i (H_i\gamma_i - S_i\eta_i)\,.\hat{T}_i}{\sum_i (S_i\eta_i - H_i\gamma_i)},$$

where H_i is the share of country i's output in global production at world prices, S_i is its share of global consumption, γ_i is the supply elasticity and η_i is the demand elasticity. For potentially large changes in world prices and in protection, it is helpful to work in log changes, which are equal in magnitude (but opposite in sign) for a protection increase and protection cut that reverses the initial increase. This yields an equation for the change in the log of the world prices as a function of changes in countries' rates of protection:

$$\Delta ln\, p_w = \frac{\sum_i (H_i\gamma_i - S_i\eta_i)\, \Delta \ln T_i}{\sum_i (S_i\eta_i - H_i\gamma_i)}$$

Once we know the change in the world price resulting from any change in countries' protection policies, and the change in policies in country i, we can estimate the impact on prices in country i as:

$$\Delta ln\, p_i = \Delta ln\, p_w + \Delta \ln T_i$$

We are particularly interested in the percentage change in the domestic price in each country when all countries refrain from insulation. This is obtained by estimating the change in the world price resulting from all countries reversing their insulating policies, plus the change in country i's own interventions from reversing the observed change in its own protection. If we set the initial price level at unity, the usual proportional change in *p* from its initial level can be recovered by recalling that, from an initial price level of unity, $\Delta ln\, p = ln(1+\hat{p})$.

Estimates of the impacts of price-insulating behavior on international prices are reported in the first two columns of Table 8, from which it is clear that using different demand and supply elasticity assumptions makes little difference to the estimates as long as these are uniform across countries. This result is not unexpected given that net trade is a small share of production and consumption of these food items in most countries making each countries' share of world output and consumption very similar. The results suggest that the aggregate effect of all countries' price-insulating behavior during 2006–08 was to raise prices in the international marketplace of rice by 54 percent, of wheat by 14.6 percent, of maize by 15 percent, and of oilseeds by 32.1 percent.[3]

Using the simple consumption-only model, the increases in world prices are given by minus the weighted average of changes in countries' rates of protection, obtained using as weights the values of consumption at international prices. If, for instance, all countries reduce the power of the protection rate (1+t) applying in their market by 10 percent, the world price will rise by 10 percent. This measure allows for a very simple interpretation: a country that changes its protection by less than the weighted average change in trade taxation will experience a change in domestic prices that is larger than it would have experienced absent insulation by all countries.

The extent of the contribution by each country to the changes in international rice and wheat prices can be seen by the size of each country's shaded rectangle in Figure 5. In this diagram, the countries whose protection (measured by 1+t) fell by more than the increase in world prices were effective in sheltering themselves from part of the increase in world prices. Those countries where protection fell by less than the increase in international prices experienced an increase in domestic prices greater than would have occurred in the absence of insulation. Countries whose protection rate did not change experienced the full proportional increase in world prices—an increase that results from both the original shock and the compounding effect of price insulation. In the two unusual case where a country apparently *increases* its protection

[3] These are higher from the comparable estimates for the three cereals in Martin and Anderson (2012), because a larger sample of countries is used here and the price changes are calculated exactly as opposed to simple linear approximations.

during a price spike (as with maize in Ethiopia and Tanzania), the outcome is probably due to isolation rather than insulation, with domestic prices being determined by local supply and demand and rising because of short domestic supplies that just happened to coincide with a period of high international prices.

For rice, it appears that China, India and the Philippines reduced their protection enough to have smaller domestic price increases than they would have experienced without insulation by any country. China and India contributed much more to the overall increase in world prices than did the Philippines because of their much greater share in world markets— because of both their size and the extent to which they each insulated against the increase in world prices. Other countries, such as Indonesia and Bangladesh insulated themselves to some degree from the increase in world prices—and hence increased the magnitude of the rise in world prices—but not by enough to offset the price-increasing implications of all countries' collective action. For these countries, the domestic price increased more than it would have done in the absence of all countries' insulation.

For wheat, the countries that insulated sufficiently that their domestic price rose by less than it would have in the absence of insulation include China, Pakistan, Japan and Iran. While India insulated, it appears not to have done so enough to reduce the increase in domestic prices below the increase that would have occurred in the absence of insulation. For other countries, it appears that the increase in domestic prices was greater than it would have been in the absence of insulation.

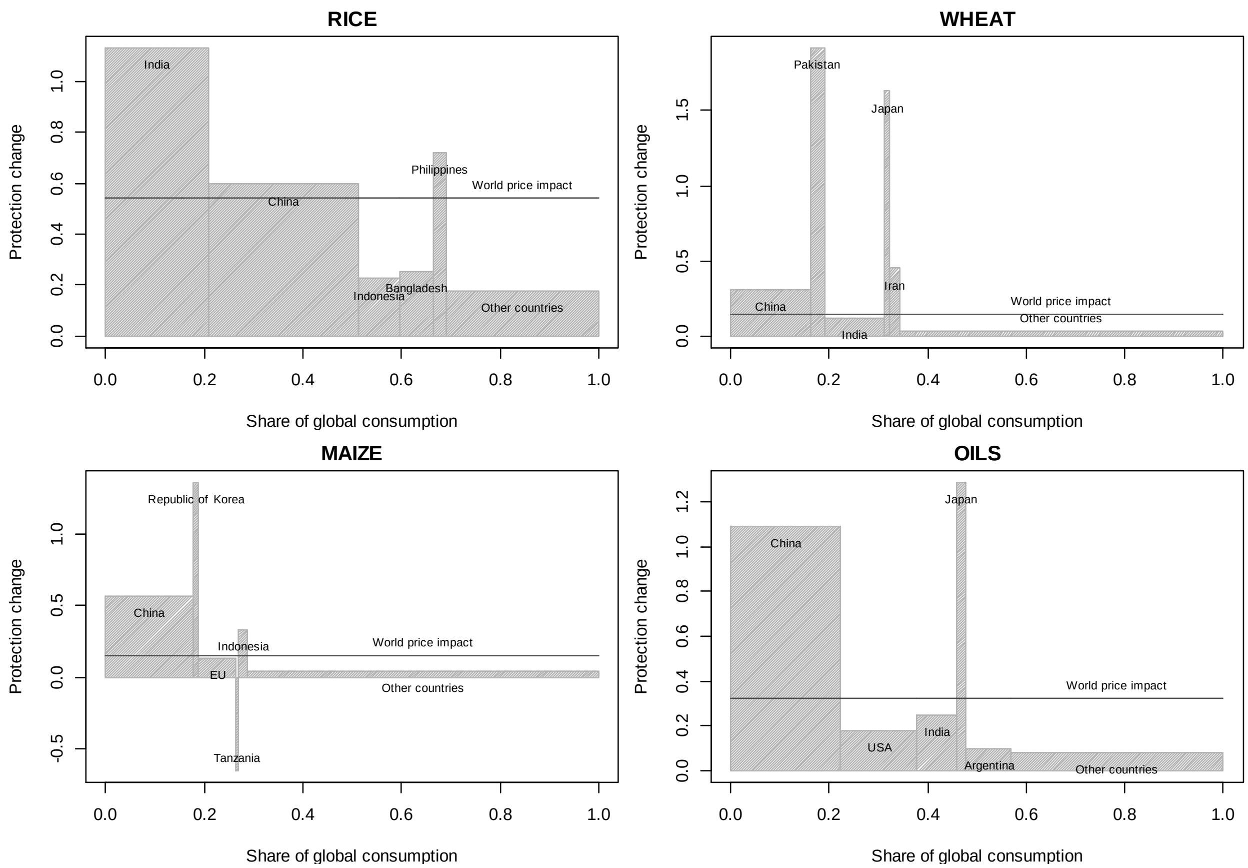
For maize, China, the Republic of Korea and Indonesia insulated enough to reduce the rise in their domestic prices relative to the no-insulation scenario, while for edible oils it is China and Japan that insulated enough to reduce the volatility of their domestic prices. For other countries, price volatility was greater than it would have been in the absence of intervention.

Table 8: Impacts of price domestic market insulation on international prices, 2006-08, %

	Assuming no supply response, %	Assuming es=1, ed=-0.2, %	Share of world consumption covered, %	Share of world production covered, %	Number of countries included
Rice	54.0	52.6	91.8	93.9	82
Wheat	14.6	13.9	92.8	97.1	86
Maize	15.0	14.5	93.8	97.2	103
Oilseeds	32.1	27.8	95.1	97.0	97

Source: Authors' estimates

Figure 5: Contribution of countries' insulation to global price changes



Source: Authors' calculations. Protection change is the proportional change in (1+t) estimated using, in order, the World Bank Distortions to Agricultural Incentives Database, FAOSTAT and FAO GIEWS databases. Shares at international prices derived from FAO Commodity Balance Sheet data.

Domestic prices with and without insulation

We can now estimate the change in domestic prices that would have occurred in each country had it and all other countries not altered the restriction on their international trade in these key food items. These domestic price changes, reported in Table 9, therefore take into account two separate price impacts: first, the impact of not changing protection, which typically means removing a reduction in protection and hence increases domestic prices relative to the world prices; and second, the abstention from insulation by the whole world, which lowers international prices. Hence a country which would double its protection (that is, doubling its domestic price relative to the international price) could experience zero domestic price impact if at the same time international prices halved.

In practice, the price impacts across different countries and commodities vary considerably, depending on the actual level of insulation and its relative size compared to the hypothetical change in the international price. For example, the price of rice would rise in China in the absence of insulation because undoing its 37.4-percent reduction in protection would raise its domestic prices by 59.6 percent and even though the world prices would at the same time fall by 35.1 percent with the removal of protection, the overall impact on domestic price of rice in China would be a net increase of 3.7 percent. On the other hand, the price of rice would fall in Tanzania where protection rose slightly between 2006 and 2008 and therefore in the absence of any protection in the world Tanzania would experience a reduction in domestic prices equal to the reduction in the world price of rice (35.1 percent) amplified by the reduction in its own protection which would lower domestic price of rice by additional 3.7 percent for a total reduction by 37.4 percent.

Table 9: Impact on domestic prices had all countries abstained from insulation, 2006–08 (percent)

	Rice	Wheat	Maize	Oils
Albania	—	11.1	4.2	24.6
Armenia	—	-17.0	—	—
Bangladesh	-18.5	27.5	19.9	-24.6
Belize	9.4	—	38.6	8.3
Cambodia	-11.2	—	-13.7	-8.1
China	3.6	14.1	36.1	58.4
Cote d'Ivoire	-30.2	—	0.5	-8.6
Ecuador	-65.0	-10.1	-29.6	-31.2
Guatemala	-29.4	—	31.3	—
India	38.3	-2.4	-2.6	-5.6
Indonesia	-20.5	—	16.2	8.0
Malawi	-37.3	24.0	-64.6	-21.9
Moldova	—	19.5	10.7	-24.6
Mongolia	—	-17.8	—	—
Nepal	64.3	30.6	-2.6	-24.1
Nicaragua	-14.9	—	18.2	3.0
Niger	-29.7	-6.4	1.7	-18.0
Nigeria	-5.6	84.0	7.8	-15.2
Pakistan	28.0	154.4	73.4	14.3
Panama	-28.9	—	12.9	—
Peru	-44.3	-4.8	12.2	-20.6
Rwanda	46.5	27.5	-66.7	-19.2
Sri Lanka	-70.8	—	-24.2	-28.0
Tajikistan	69.3	70.1	—	—
Tanzania	-37.4	—	-69.3	—
Uganda	-38.2	—	-24.3	—
Viet Nam	-22.8	—	—	—
Yemen	—	45.1	14.4	—
Zambia	-17.3	28.6	-48.1	-24.3
Brazil	-17.2%	-12.7%	-13.8%	-25.7%
EU	-25.2%	-10.2%	2.6%	-16.7%
Egypt	-28.8%	-35.1%	13.2%	-42.2%
Philippines	11.7%	—	25.3%	-16.9%
Russia	-20.7%	-18.2%	5.4%	-35.6%
USA	-35.0%	-12.7%	-13.0%	-10.8%

Source: Authors' calculations

Distribution of price changes due to different country groups' actions

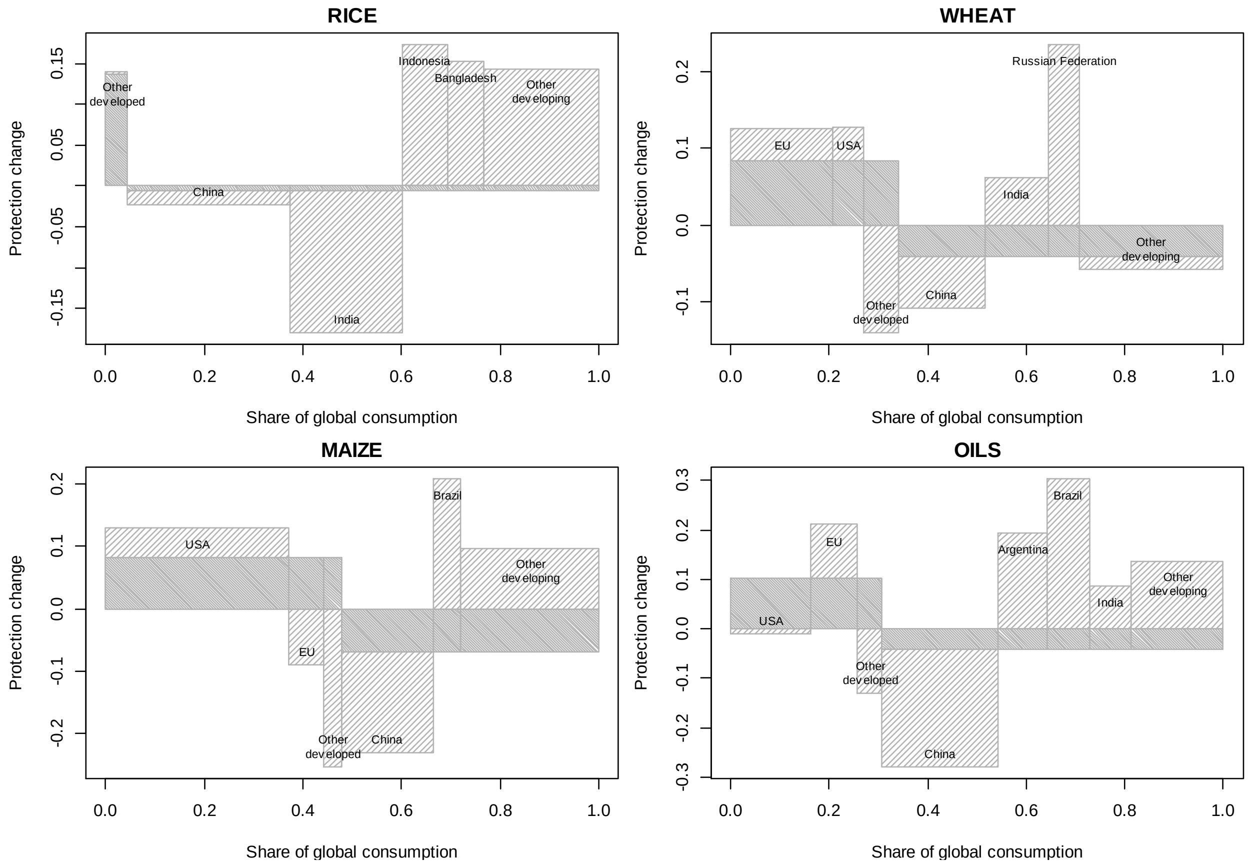
With different countries applying different changes in protection during 2006–2008, only some countries achieved the desired degree of insulation of domestic prices while others experienced higher prices than they would if no country had insulated. In other words, the countries that insulated the most vigorously "exported" price increases to the countries that insulated less. Because these "imports" and "exports" of price increases have important consequences for poverty, it is important to understand how different groups of countries, and especially the poorest ones, handled their own insulation and whether their decisions contributed to or reduced global poverty.

To facilitate such an analysis, Figure 6 shows the distribution of price changes due to countries' actions from two perspectives: developed versus developing countries (densely shaded boxes), and within each of those country groups(lightly shaded).

Consider first the impacts of the actions of developed and developing countries acting as two aggregate groups. The densely shaded set of bars in each subfigure shows the magnitude of the price change transmitted between developed and developing countries. That magnitude is determined by the consumption share of each group (the x-axis) and the size of excess insulation (over the international price change). As can be seen, in each case the actions of the developing countries lower the extent of their own price rise at the expense of the developed countries. Only in the case of rice did the impact of the developing countries' actions not lower their own price rise much. This is because rice consumption in developed countries is a tiny share of world consumption and hence little of the rice price increase could be "exported" from those countries.

Second, consider the level of coordination among developing countries' own actions, by focusing on the lightly shaded bars which show how much of the international price change was distributed within the group by group member actions. In the case of rice, for example, India and China insulated their markets much more than other developing countries, shifting large price increases onto the shoulders of other developing countries. A similar situation can be observed for the remaining crops, where China alone was successful in lowering the extent of its own domestic price rise but, in doing so, put upward pressure on prices in other countries.

Figure 6: The distribution of price changes due to the observed insulation between developed and developing countries (densely shaded) and among major developing and developed countries (lightly shaded boxes)



Source: Authors' calculations

Poverty impacts

Using our sample of 30 developing countries, we can now evaluate the poverty impacts of the hypothetical price changes associated with removing the observed levels of price insulation in the period 2006–08. To calculate poverty impacts, we follow the methodology of Ivanic, Martin, Zaman (2012) who measure changes in poverty as a change in the number of people living on less than US$1.25 a day. Following their approach, we also only consider the short-run impact of the changes in food prices on households' agricultural sales and food expenditures. That is, we ignore any quantity adjustments (increases in production or changes in consumption), and we also ignore any impacts of food price changes on wage rates.

Table 10: Changes in poverty that would result from abstaining from insulation, 2006–08 (percent)

	Abstaining from observed insulation		Abstaining from hypothetical uniform insulation in developing countries	
	Change in poverty headcount (%)	Change in number of poor (thousand)	Change in poverty headcount (%)	Change in number of poor (thousand)
Albania	0.2	7	0.1	2
Armenia	-0.1	-3	0.1	4
Bangladesh	-0.2	-354	0.2	336
Belize	0.0	0	0.0	0
Cambodia	1.7	241	-0.1	-20
China	-0.4	-5,720	-0.1	-691
Cote d'Ivoire	-1.2	-242	0.1	29
Ecuador	-0.6	-83	0.0	5
Guatemala	0.2	33	0.2	31
India	3.4	41,665	0.4	5,426
Indonesia	0.1	241	0.1	194
Malawi	-1.5	-227	0.2	34
Moldova	0.3	12	0.2	5
Mongolia	-0.7	-20	0.3	8
Nepal	0.9	262	0.1	18
Nicaragua	-0.5	-27	0.1	6
Niger	-0.9	-139	0.2	39
Nigeria	0.3	435	0.1	216
Pakistan	12.2	21,538	0.6	1,109
Panama	-0.3	-11	0.1	3
Peru	-0.4	-120	0.1	25
Rwanda	-0.2	-21	0.1	16
Sri Lanka	-2.2	-454	0.2	34
Tajikistan	3.7	259	0.4	28
Tanzania	-2.0	-923	0.4	190
Timor-Leste	0.0	0	0.0	0
Uganda	-0.1	-36	0.1	31
Viet Nam	2.7	2,402	-0.1	-111
Yemen	3.3	821	0.5	114
Zambia	0.8	110	-0.1	-8

Source: Authors' calculations

We compare the base simulation, in which we consider the actual observed levels of insulation, with another simulation in which we assume that all developing countries insulated by the same degree, namely that equal to the average observed developing-country insulation. This counterfactual simulation allows us to see whether the decisions of individual countries helped the poor or made the situation worse for them. Both sets of results are shown in Table 10 in terms of percentage point changes in the initial poverty rates as well as the estimated absolute changes in poverty.

Table 11: Sample coverage of $1.25 per day poor people by region and income levels

		Region					
		EAP	ECA	LAC	MNA	SAR	SSA
Low- income	Poor population, mil	3.3	0.8	6.2	—	72.7	264.6
	Sample coverage, mil	3.3	0.5	none		72.7	69.8
	Weight	1.0	1.7	—		1.0	3.8
Lower-middle income	Poor population, mil	81.8	0.8	6.8	8.0	444.3	148.3
	Sample coverage, mil	59.6	0.1	2.7	4.3	444.3	124.5
	Weight	1.4	10.7	2.5	1.8	1.0	1.2
Upper-middle income	Poor population, mil	175.8	1.4	22.6	3.7	—	19.1
	Sample coverage, mil	175.5	none	2.4	none		0.0
	Weight	1.0	—	9.6	—		

Table 12: Extrapolated global poverty estimates (in millions)

	Mean estimate	Standard deviation
Abstaining from observed insulation	57.5	18.6
Abstaining from hypothetical uniform insulation in developing countries	8.8	9.8

Based on the coverage of our sample of global poverty by region and income level, we assign weights to the individual countries included in our sample and extrapolate sample poverty changes into poverty estimates at the global, regional (WB regions) and income-group level (low, lower middle and upper middle income countries) . To perform this extrapolation, we assign weights to the countries in the sample to make them represent all missing countries for the particular income and region group. With the inclusion of China and India, our sample covers extensively most of the regions and income groups with poverty and especially the “pockets of poverty” among lower-middle income countries of South Asia (SAR), upper middle-income countries of East Asia (EAP) where our sample coverage is nearly perfect as documented by Table 11. The assigned weights for individual countries and the characteristics of the missing countries also allow us to evaluate the relationship between the sample statistics and population statistics.

In order to understand how the statistical properties of our sample relate to the population (developing countries') statistics, we perform a Monte Carlo simulation of 10,000 runs in which we simulate normally distributed poverty changes in a set of 109 developing countries with weights equal to their poor population shares. In each run, we calculate weighted mean poverty changes for the whole population and a sample of 30 countries representing our sample, and the difference between the two. Finally, we calculate the ratio of the variance of differences between the sample and population means, and the mean variance of the sample, which we find to be equal to 1.47%. This ratio means that the mean that we obtain from our sample estimates the population mean with standard deviation equal to 12.1 percent of the sample standard deviation.

The poverty results suggest that the observed level of price insulation helped lower global poverty. Had developing countries abstained from it, global poverty would have been higher by about 57.5 million extra people who would have fallen into poverty as a result. The standard deviation of this estimate is 18.6 million, which means that the estimate is positive with significance level less than 0.5 percent.

Had all developing countries insulated identically at the average level, even that uniform insulation would have saved an extra 8.8 million people falling below the $1.25 a day poverty line. Even though this estimate is not significant from zero (significance level more than 10 percent), it suggests that the insulation by developing countries probably help prevent an increase in poverty. Based on these results we may conclude that the differential actions of individual developing countries were the key factor for alleviating the poverty impact through insulation.

Two other useful measures are presented in Table 13 and Table 14. They are partial indicators, not taking into account the effects of insulation on international prices. The first is the impact of observed changes in domestic prices on poverty. This measure suggests that the increases in the prices of our four products would, using the approaches of this paper, result in an increase of 75.8 million people living below the $1.25 per day poverty line. The second measure, which we term the apparent poverty reduction from price insulation, is the effect of altering trade restrictions on poverty assuming that the international price is unchanged by countries' interventions. This measure is 146.3 million people estimate with significance level less than 0.1percent. It seems likely that policy makers—particularly in small countries—would focus on this measure because it does not require a model of policy choice in a world of many countries, and does not require knowledge of the policy responses taken by other countries. Unfortunately, as is clear from Table 14, it is a very upward-biased estimate of the effectiveness of price insulation: the numbers in are much closer to the true situation.

Table 13: Partial changes in poverty due to changes in domestic prices and in domestic protection in 2006–08, percent (ignoring world price impacts)

	Observed changes in domestic prices		Abstaining from insulation	
	Change in poverty headcount (%)	Change in number of poor (thousand)	Change in poverty headcount (%)	Change in number of poor (thousand)
Albania	0.6	18	0.4	12
Armenia	0.6	18	-0.1	-3
Bangladesh	-0.1	-194	-0.1	-189
Belize	0.0	0	0.9	3
Cambodia	-1.7	-238	-0.6	-81
China	0.3	3,967	0.6	8,413
Cote d'Ivoire	4.7	951	0.7	147
Ecuador	0.6	84	-0.3	-49
Guatemala	0.4	52	0.5	72
India	4.7	58,722	9.0	111,418
Indonesia	0.5	1,173	0.5	1,094
Malawi	0.2	31	-1.5	-235
Moldova	1.2	43	0.1	2
Mongolia	4.4	123	-1.0	-27
Nepal	0.0	-12	1.7	517
Nicaragua	0.2	9	0.4	23
Niger	1.0	159	0.4	63
Nigeria	-0.3	-497	1.1	1,740
Pakistan	-2.6	-4,600	12.1	21,326
Panama	0.2	8	0.0	1
Peru	2.5	725	-0.1	-34
Rwanda	0.0	4	0.1	16
Sri Lanka	4.6	968	-1.9	-390
Tajikistan	0.6	43	5.8	404
Tanzania	0.9	401	-1.7	-776
Timor-Leste	0.0	0	0.0	0
Uganda	0.2	77	0.0	10
Viet Nam	-0.1	-60	-0.3	-236
Yemen	2.7	682	3.2	785
Zambia	2.3	306	0.7	89

Source: Authors' calculations

Table 14: Extrapolated global poverty estimates (in millions)

	Mean estimate	Standard deviation
Observed changes in domestic prices	75.8	15.8
Abstaining from insulation	146.3	25.5

Some Policy Implications

Standard principles of economic policy suggest that the most effective approach in dealing with the poverty consequences of price volatility is via instruments targeted most directly at the problem. This suggests a social safety net aimed directly at alleviating poverty is likely to be better than an indirect policy that operates through market prices facing all consumers, and even more so than one at a country's border since that also affects producer incentives. If, however, pure safety net policies are not feasible to the extent required, it may be necessary to consider alternative policies.

As has recently been shown by Gouel and Jean (2012), policy makers in small countries where high food prices have adverse welfare impacts have an incentive to use trade policies that insulate their domestic markets from large changes in international prices. At the global level, such insulating policies are beggar-thy-neighbor because measures—such as export restrictions—that lower domestic prices in a group of collectively-large countries raise international prices. However, Gouel and Jean (2012) find that targeted subsidies to domestic storage combined with trade policies yield better outcomes for each individual country than either policy alone—and would clearly be better for the world as a whole than insulating trade policies alone.

The apparent success of some countries in reducing the extent of increase in domestic prices might lead one to encourage or assist other developing countries to achieve the same high degree of price insulation. This would, however, run head-first into the collective action problem: for commodities such as rice, where the market share of developed countries is small, equally successful insulation by all developing countries would be the same as no insulation at all.

What types of reforms are needed and at what level (national, regional or global)? If price stabilization were only attainable through price insulation, if all countries had the same responses to price volatility, and if all countries were small, then the collective action problem would need to be addressed at the regional or global level. Each country would, unilaterally, have an incentive to insulate to the same degree. Using rational storage policies as suggested by Gouel and Jean (2012) offers some possibility of diminishing the extent of beggar-thy-neighbor impacts than use of insulating trade policies alone.

Gouel and Jean (2012) suggest that a combination of insulating trade policies and subsidies to storage in times of domestic surplus provides a potential basis for policy recommendations that would improve on current outcomes. However, this is very different from the policies observed in the 2008 crisis: global rice stocks—and stocks in most major developing countries—increased during 2007-08, despite extraordinarily high prices.

The result that the largest developing countries tend to insulate their markets more than other countries raises important questions for their policy makers. That this occurred despite a higher cost to large importing countries than others of unilateral insulating action[4] is something of a puzzle. Are policy makers taking full account of the impact of their actions on international prices? In the case of food-exporting countries, their insulating action improves their terms of trade but risks alienating their trading partners. Perhaps part of the explanation is that the largest developing countries have historically been close to self-sufficient, and hence their policy makers are not overly worried about developing a reputation as an unreliable exporter—a goal that appears to have contributed to a pressure by farm interests against export restrictions in such countries as the United States and Australia.

[4] The welfare costs of unilaterally reducing the domestic price rise are higher in a food-deficit large country than a small one because such action by a large importing country causes the world price to rise and hence increases the welfare cost of achieving any given reduction in the extent of the rise in the domestic price.

At the regional level, there may be scope for policy commitments that reduce the adverse impacts of beggar-thy-neighbor policies. If, for instance, regional groups were able to make binding commitments to allow exports to flow even during times of shortage, then this may reduce the deep-seated concerns of policy makers in importing countries about the availability of sufficient importable food in times of crisis.

It is understandable that countries depending heavily on the international food market worry that they might be vulnerable to export controls or taxes imposed by their suppliers. At the WTO, many importing countries have put forward proposals for disciplining export barriers (Congo 2001, Japan 2000, Jordan 2001, Korea 2001, Switzerland 2000). Some of these proposals are far reaching. For example, the Jordan proposal is to ban export restrictions and bind all export taxes at zero. The proposal by Japan involves disciplines similar to those on the import side, with export restrictions to be replaced by taxes and export taxes to be bound. Recognizing that importers' concerns about the reliability of supply might inhibit liberalization, some exporting countries have also advocated multilateral restrictions on the right to use export restrictions. In the preliminary negotiations on agriculture held between 1999 and 2001 under Article 20 of the Uruguay Round Agreement on agriculture, the Cairns Group (2000) and the United States (2000) put forward proposals for disciplines on export barriers and/or taxes.

The ability of importing countries to lower protection when prices rise is currently unconstrained by WTO rules, except that countries with low initial tariffs have little scope to reduce their protection when world prices rise. They can, though, introduce import subsidies, and indeed some countries did in 2008. If exporting countries were to be restrained by WTO rules from introducing export barriers, however, there would be less need to be concerned about the effects of tariff reductions on international prices.

Conclusions

In this paper, we have analyzed the distributional and poverty impacts of the food price insulation that was observed in the period of 2006–2008 when prices of many staple food items increased sharply. For four major food items—rice, wheat, maize and edible oils—which comprise nearly half of poor people's food expenditure, we have estimated how much the observed insulating actions of developing countries, taken as a whole and individually, affected international and domestic food prices and how much it alleviated an increase in global poverty.

As in other recent studies, we find that the observed patterns of price insulation resulted in a rise of international prices which partly offset the benefits of insulation. We also find, however, that developing countries as a group insulated more than developed countries and, as a result, parts of the price increases were "exported" to developed countries. This pattern of insulation applies to all four commodities considered in this study, but least so in the case of rice because developed countries represent only a tiny portion of global rice consumption. We find too that were all developing countries to have acted identically such that their insulation was the same as the aggregate actually observed, that alone would have prevented an estimated 32.5 million extra people falling into poverty.

In addition to the observed insulating responses by developing countries resulting in "exportation" of higher prices to the developed countries, a lot of the transfers of higher prices also happened among developing countries themselves. In particular, large countries, especially China and India, insulated much more than the rest of the developing world, which meant the domestic prices of such heavily insulating countries rose less at the expense of greater price rises other developing countries. Nonetheless, this was good from the viewpoint of global poverty alleviation: it prevented an extra 57.5 million people from falling into poverty. Even so, it led to higher poverty in some smaller low-income developing countries.

One further result worth emphasizing is that the effectiveness of price insulation in reducing poverty is much lower than it might appear on the surface. While the apparent poverty reduction associated with price insulation in 2006–08 is estimated to be 146.3 million if one ignores the impact of insulation on international prices, the estimated effect when the latter impact is included is about half that number, at 75.8 million for the set of commodities considered in this paper.

A number of caveats to this analysis need to be kept in mind, however. First, we have examined the price effects for just four food items. Including all food items is unlikely to alter the main conclusions though because the four included items are very dominant except in small low-income countries not well integrated into global food markets.

Second, we have not taken account of any indirect effects on poor households that come via factor markets. In agrarian economies with the vast majority of workers employed in agriculture, an increase in farm product prices may raise unskilled wages. That would lower the adverse impact on landless laborers of higher food prices, although we have not found this channel of effect to change the results substantially in earlier work in this vein (Ivanic and Martin 2008; Ivanic, Martin and Zaman 2012).

Third, our results are based on a sample of developing countries which excludes China, the largest developing country, because of the lack of access to household data for China. If the poor households in China and other excluded countries are very different from those in our sample in terms of their food consumption and production patterns, their inclusion in the future could affect the results.

One important final point is that, notwithstanding the apparent benefits of insulation in terms of poverty avoidance in this case, trade measures are very unlikely to be the most efficient instruments for achieving this outcome. Poverty concerns are generally best dealt with using generic social safety net measures that can offset the adverse impacts of a wide range of different shocks on poor people—net sellers as well as net buyers of food—without imposing the costly by-product distortions that necessarily accompany the use of n^{th}-best trade policy instruments for social protection. They could take the form of targeted income supplements to only the most vulnerable households, and only while the price spike lasts. This is a far more feasible approach now than just a few years ago, thanks to the digital information and communication technology (ICT) revolution. In the past it has often been claimed that such payments are unaffordable in poor countries because of the fiscal outlay involved and the high cost of administering such handouts. However, recall that in roughly half the cases considered above, governments *reduce* their trade tax rates, so even that intervention may require a drain on the budget of many finance ministries—as does replacing a non-prohibitive export tax with a ban. In any case, the option of using value-added taxes in place of trade taxes to raise government revenue has become common practice in even low-income countries over the past decade or two. Moreover, the ICT revolution has made it possible for conditional cash transfers to be provided electronically as direct assistance to even remote and small households, and even to the most vulnerable members of those households (typically women and their young children). If those targeted have a greater propensity to spend on food than those being taxed to fund the transfers, Do, Levchenko and Ravallion (2012) point out that they would boost the global demand for food and hence there would still be a beggar-thy-neighbor impact on international prices. Almost certainly, however, that would be smaller than the impact generated by the much blunter approach of altering trade restrictions.

References

Anderson, K. (2009), *Distortions to Agricultural Incentives: a Global Perspective 1955-2007,* Palgrave MacMillan and the World Bank, New York and Washington DC.

Anderson, K. and S. Nelgen (2012a), 'Agricultural Trade Distortions During the Global Financial Crisis', *Oxford Review of Economic Policy* 28(1), Spring (forthcoming). doi:10.1093/oxrep/GRS001.

Anderson, K. and S. Nelgen (2012b), *Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2010*, Database at www.worldbank.org/agdistortions.

Cairns Group (2000) 'WTO Negotiations on agriculture—Cairns group negotiating proposal: Export Restrictions and Taxes' World Trade Organization, 21 Dec G/AG/NG/W/93.

Congo (2001), 'Negotiating Proposals by the Democratic Republic of the Congo', World Trade Organization, Geneva, 12 March, G/AG/NG/W/135.

Deaton, A. (1989), 'Household Survey Data and Pricing Policies in Developing Countries', *World Bank Economic Review* 3(2): 183-210.

Do, Q.-T., A.L. Levchenko and M. Ravallion (2012), 'Coping with Food Price Shocks: Trade versus Social Protection Policies', paper to be presented at the NBER Conference on the Economics of Food Price Volatility, Seattle WA, 15-16 August.

Gouel, C. and S. Jean (2012), 'Optimal Food Price Stabilization in a Small Open Developing Country', Policy Research Working Paper 5943, World Bank, Washington DC.

Ivanic, M. and W. Martin (2008), 'Implications of Higher Global Food Prices for Poverty in Low-Income Countries' *Agricultural Economics* 39:405-16.

Ivanic, M., W. Martin and H. Zaman (2012), 'Estimating the short-run poverty impacts of the 2010 surge in food prices', *World Development*, in press.

Japan (2000), ‘Negotiating Proposal by Japan on WTO Agricultural Negotiations’, World Trade Organization, Geneva, 21 December, G/AG/NG/W/91.

Jordan (2001), ‘WTO Agriculture Negotiations: Proposal by Jordan’, World Trade Organization, Geneva, 21 March, G/AG/NG/W/140.

Korea (2001), ‘Proposal for WTO Negotiations on Agriculture’, World Trade Organization, Geneva, 9 January, G/AG/NG/W/98.

Martin, W. and K. Anderson (2012), ‘Export Restrictions and Price Insulation During Commodity Price Booms’, *American Journal of Agricultural Economics* 94(2): 422-27.

Ravallion, M., S. Chen and P. Sangraula (2007), ‘New Evidence on the Urbanization of Poverty’, *Population and Development Review* 33(4): 667-702.

Switzerland (2000), ‘WTO: Negotiations on Agriculture: Proposal by Switzerland’, World Trade Organization, Geneva, 21 December, G/AG/NG/W/94.

Timmer, C.P. (2010), ‘Reflections on Past Food Prices’ *Food Policy* 35: 1–11.

United States (2000), ‘Proposal for Comprehensive Long Term Agricultural Trade Reform’, World Trade Organization, Geneva, 23 June, G/AG/NG/W/15.

World Bank (2007), *World Development Report 2008: Agriculture for Development*, Washington DC: World Bank.