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**Have Recent Increases in International
Cereal Prices Been Transmitted to
Domestic Economies?
The experience in seven large Asian
countries**

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Agricultural Development Economics Division

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Abstract

International cereal prices (in US dollar terms) have been increasing since 2003, but it is domestic prices that affect food consumption and production. This paper analyzes, for seven large Asian countries, the extent to which domestic prices have increased since 2003 and presents several conclusions. First, the data show that the increases in world cereal prices have been accompanied by a real depreciation of the US dollar. For many countries (but not all), this depreciation has neutralized a substantial proportion of the increase in world prices. Second, domestic commodity specific policies in several of these Asian countries have further stabilized domestic prices relative to the change in world prices. This has been especially true for rice, the main staple food in the region, but it is also true for wheat. On average, through the end of 2007, the increase in real domestic rice prices was about one-third of the increase in real US dollar world market rice prices. Third, for the specific cases analyzed here, producer or farmgate prices have changed by approximately the same percentage as consumer prices. Thus, in these Asian countries, domestic markets seem to be transmitting price changes between farmers and consumers rather efficiently. Fourth, the experience with urea fertilizer prices is more heterogeneous: some countries are following free trade, while others have stabilized prices in nominal terms.

Key Words: Asia, price transmission, rice, cereals.

JEL: F10, Q10.

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Have recent increases in international cereal prices been transmitted to domestic economies?
The experience in seven large Asian countries

Introduction

International agricultural commodity prices (in US dollar terms) have been increasing since 2003 for cereals, other foods and non-foods. There are many factors behind these increases: increased biofuels demand; higher oil prices that have raised prices for agricultural inputs such as fuel and fertiliser; continued growth in demand for resources from China and India that have led to reductions in net cereal and oilseed exports from these two giants in recent years; short-term supply shocks due to adverse weather conditions; low world prices in the early years of this decade, which may have reduced production incentives; and short-term trade policy changes such as reduced barriers to imports and increased restrictions on exports. Macroeconomic factors such as a weak US dollar and low real interest rates that affect both supply and demand have also played a role.

A key question, however, is the extent to which these changes in world market prices have been transmitted to domestic economies in recent years, especially for cereals. The extent of transmission is important for at least two reasons. First, it is domestic prices that affect the welfare of poor consumers and farmers, not world prices. Second, the magnitude of price transmission will help determine the extent to which adjustments by producers and consumers will stabilize world price movements. These adjustments (reduced consumption, increased production) will only take place if world prices are transmitted to domestic prices.¹

This short paper will examine the extent to which increases in international cereal prices during the past few years have been transmitted to domestic prices for several large Asian countries. The focus will be on rice, which is the staple food in these countries, accounts for a large share of the expenditures of the poor, and is also the most important agricultural crop in terms of area harvested. However, evidence on price transmission for wheat and maize will also be presented. The paper will also examine changes in both consumer and producer prices to see if these groups are being affected differently. Finally, some limited evidence on transmission of world fertilizer prices will also be analyzed because world urea prices have increased substantially and will have an effect on farm profitability if they are transmitted to farmers.

Data

The analysis in this paper uses data on domestic prices at different levels of the marketing system (farm, wholesale, retail), as well as data on exchange rates and the consumer price index. Most of the data are of monthly frequency, but annual data are used in some instances. For most countries, the data reflect national averages for the most widely traded quality, although in one or two cases they are for the capital city. In instances when data for both the nation and the capital city are available, the trends are quite similar (analysis not presented here). All data are for market prices, not government prices. Data come from standard government sources.

¹ Price transmission does not guarantee a large demand or supply response, however, because food demand and supply can be quite price inelastic. But zero price transmission does guarantee that there will be zero response.

International price data are for standard reference varieties of the major cereals: 100B FOB Bangkok for rice, hard red winter #1, FOB in the Gulf of Mexico for wheat, and yellow #2 FOB in the Gulf of Mexico for maize. While the world rice market in particular is quite heterogeneous, price increases during the past few years have been almost identical for 100B, 15% broken and parboiled 5% broken (all FOB Bangkok).

The core of the analysis is to perform a very basic calculation of cumulative changes in international and domestic prices in real (inflation-adjusted) terms between the fourth quarter of 2003 and the fourth quarter of 2007. A quarterly average is used even though monthly data are often available because monthly data can be quite volatile. Annual data would be even smoother than quarterly data, but use of annual data would also give less importance to the relatively high prices on world grain markets in late 2007. The fourth quarter of 2007 (Q4 2007) is compared with the fourth quarter of 2003 (Q4 2003) to control for seasonal factors. A base year of 2003 is used because international oil, cereal and fertilizer prices were relatively stable during the course of that year.

Finally, because international cereal prices (especially rice) have surged yet again in the first quarter of 2008 (Q1 2008), the paper also contains a preliminary discussion of domestic price trends during these three months based on whatever data are available at the time of writing.

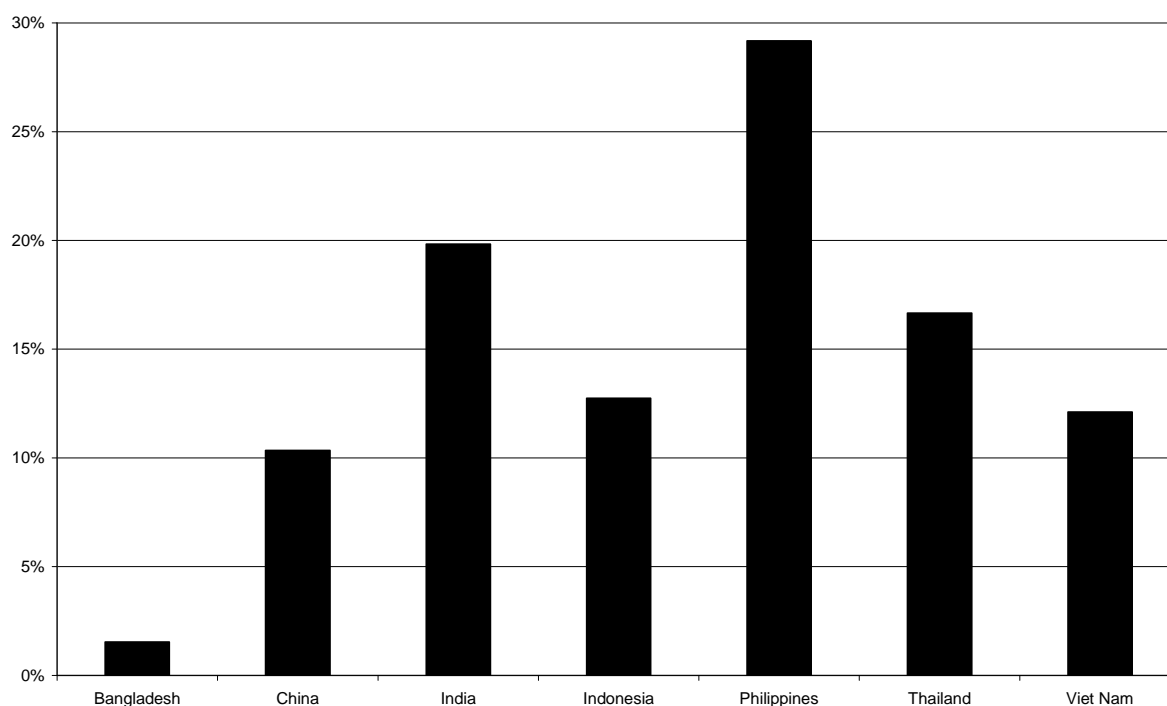
Exchange rates

World market prices have increased substantially in real US dollar terms in recent years (from Q4 2003 to Q4 2007) for rice (56%), wheat (91%), maize (40%) and urea, a source of nitrogen and the main fertilizer used by Asian farmers (107%). During that time, however, the US dollar has depreciated substantially against many currencies, and in fact, this depreciation is one cause of the recent high commodity prices. Figure 1 shows the percentage appreciation of the real exchange rate for the seven countries included in this analysis between Q4 2003 and Q4 2007. Further, Table 1 shows that real exchange rate appreciation has been quite widespread across different types of countries (categorized according to World Bank income class). Thus, the importance of the dollar's depreciation is not confined to the seven countries analyzed here.

Real exchange rate (RER) appreciation vis-à-vis the US dollar, to the extent that it occurs, will neutralize some of the impact of increased prices in US dollar terms. Because the magnitude of RER appreciation varies from country to country, changes in world market prices in *real domestic currency(DC) terms* will also vary from country to country, even for the same commodity. A comparison of the first and second columns of Table 2 shows that, for a substantial group of Asian countries, world market rice prices have effectively not increased by as much as is commonly believed (the "headline" number in column 1). For some countries, however, such as Bangladesh, world price increases have been substantial.²

² In some countries, exchange rate appreciation may be partially determined by world commodity price movements when the commodity in question is a major share of international trade, as will be the case for oil in some African countries. The value of international cereal trade in the Asian countries analyzed here is relatively small, however, compared to the size of their foreign exchange markets and compared to total exports and imports (this is true even at the current high level of prices). Thus, exchange rate changes in these countries are taken as exogenous for the purposes of discussing commodity price transmission. In terms of food security, it also implies that, unlike the 1960s and 1970s, shortage of foreign exchange will not restrict import demand.

Figure 1. Real exchange rate appreciation of domestic currencies versus the US dollar
Q4 2003 to Q4 2007



Source of raw data: IMF (2008).

Table 1. Real exchange rate appreciation (%) of domestic currencies versus the US dollar, 2003 to 2007, by World Bank income classification.

Income class	
Low income	16
Lower middle income	14
Upper middle income	19
High income	12

Source of raw data: USDA (2008). Calculation is a simple average of all countries in a given income class for which data were available.

Transmission to domestic economies

While the difference between columns (1) and (2) in Table 2 show that exchange rate appreciation in several Asian countries has muted the effects of rising US dollar world rice prices, the fact remains that world prices have increased throughout Asia, even in real domestic currency terms (since all price changes in column 2 of Table 2 are positive). This section will assess the extent to which changes in world prices in domestic currency terms have been passed through to consumers and farmers.

Pass through to consumers: rice

The impact on consumers will be assessed using changes in either wholesale or retail rice prices. It is reasonable to use wholesale prices to measure the impact on consumers because for the countries in this sample the wholesale market refers to rice that has been dried, milled and transported to a large market. Thus, these wholesale prices refer to rice that has almost reached the retail level, but is quite far removed from the farm level.

Table 2. Cumulative percentage changes in real rice prices, Q4 2003 to Q4 2007.

Country	(1) World price (US\$)	(2) World price (DC)	(3) Domestic price (DC)	(4) Pass through (%) = (3)/(1)
Bangladesh	56	55	24	43
China	48	34	30	64
India	56	25	5	9
Indonesia	56	36	23	41
Philippines	56	10	3	6
Thailand	56	30	30	53
Viet Nam	39	25	3	11

Notes: Data for China compare 2003 and 2007 (annual). Data for Viet Nam compare 2003 and 2006 (annual).

Column (3) of Table 2 shows the cumulative increase in domestic wholesale or retail prices from the fourth quarter of 2003 to the fourth quarter of 2007 in real domestic currency terms. A comparison of columns (2) and (3) shows that different countries have pursued different rice price policies, after controlling for exchange rate movements. One group of countries, defined as those for which column (3) is less than half of column (2), can be considered as “stabilizers.” These countries have used various commodity based policies (i.e. excluding exchange rate policies) to insulate the domestic economy from price increases on international markets. For example, India and the Philippines use government storage, procurement and distribution as well as restrictions on international trade. Bangladesh is less interventionist, but uses ad hoc changes in rice tariffs to stabilize domestic prices. Viet Nam uses export restrictions of various sorts. For all of these countries, the volatility of domestic prices during the past few years has been less than that of world prices (analysis not shown), thus justifying the use of the term “stabilizer.” As one example of the results of this type of stabilization, Figure 2 shows the evolution of monthly domestic prices in India between 2003 and 2007. It is obvious from visual inspection that domestic prices are more stable than international prices.

A second group, defined as those for which column (3) is at least 85% of column (2), can be considered as “free traders” in the sense that essentially all of the price movements on international markets, after taking account of exchange rates, are being transmitted to domestic markets. These two countries, for rice, are Thailand and China. Thailand has some government intervention in terms of procurement and storage, but domestic prices nevertheless follow world prices very closely (see Figure 3).³ China does not allow the private sector to trade at all, much less without restriction, so it is not a “free trader” in the sense that economists use the term. But at least through the end of 2007 it was allowing changes in international prices to be reflected more or less fully in domestic prices.

³ This has not always been the case. In the 1960s and 1970s, when Thailand was also often the world’s leading exporter, variable export taxes created a wedge between domestic prices and world prices quoted in Bangkok. The purpose of these export taxes was to stabilize domestic prices.

Figure 2. India domestic retail and world rice prices, inflation adjusted, 2003 to 2007.

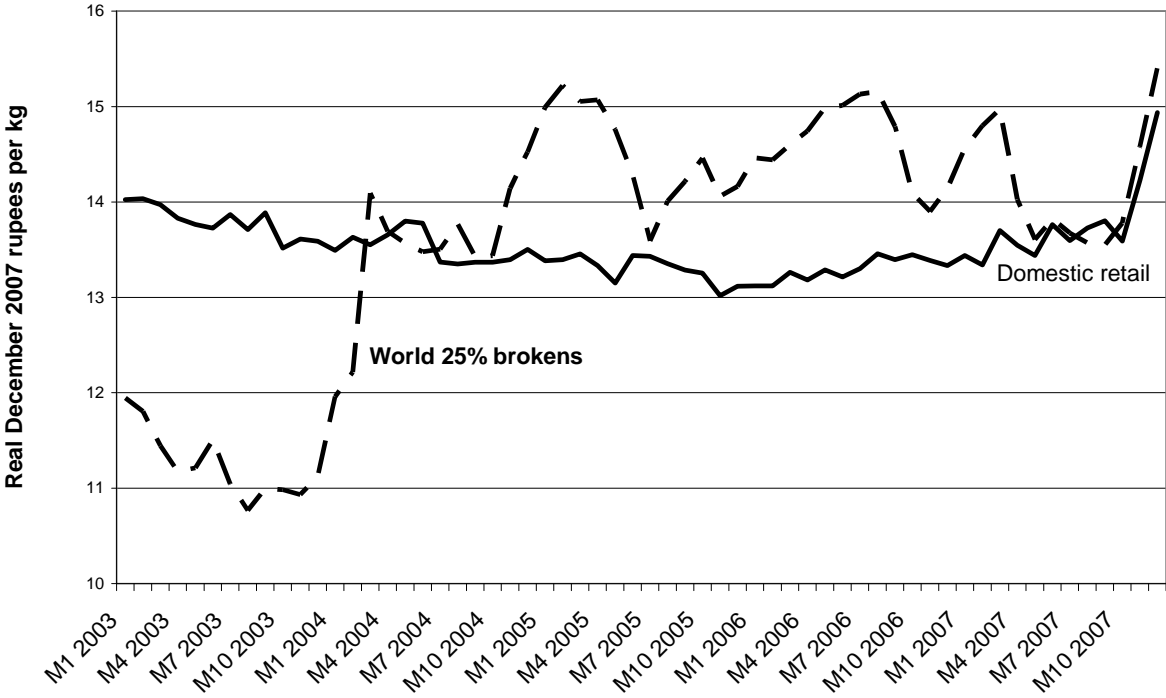
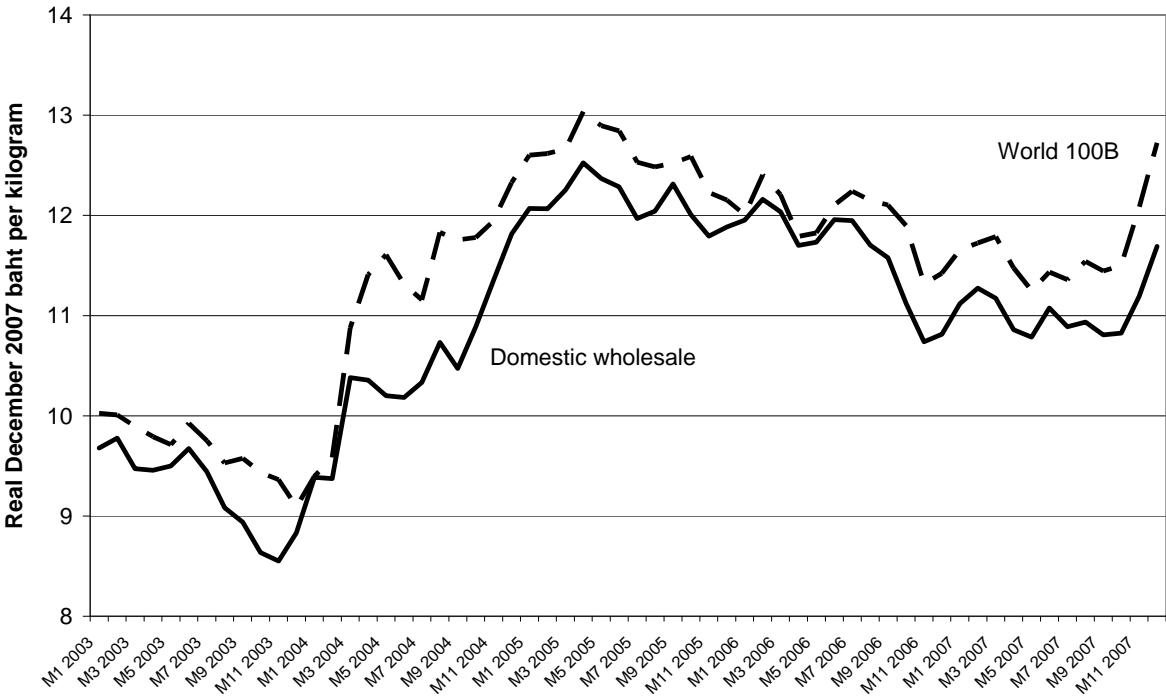


Figure 3. Thailand domestic wholesale and world rice prices, inflation adjusted, 2003 to 2007.



Indonesia does not fall neatly into either of these two groups. Historically, Indonesia has stabilized domestic rice prices (Timmer 1996), but domestic prices have been more volatile than international prices during the current decade. Domestic prices have skyrocketed at times in the past few years as rice imports were restricted in an attempt to boost farm incomes, even

when world prices were relatively stable.⁴ Thus, Indonesian domestic rice prices have been insulated from the world market, but Indonesia should not be classified as a “stabilizer.”

A key conclusion that emerges from Table 2 is that, for all countries in the sample except China, the percentage change in column (3) is less than 60% of that in column (1); see column (4). The simple average of column (4) across these seven countries shows that, on average, the increase in real domestic prices has been about one-third of the increase in real US dollar world market prices. Thus, there was substantial damping of changes in international rice price increases, at least through the end of 2007.

Price movements in early 2008

As noted earlier, prices on the world rice market surged in the first quarter of 2008, from an average of \$378 per ton in December to more than \$700 per ton by the end of March (all prices in this section are quoted in nominal terms). Prices on the Agricultural Futures Exchange of Thailand, while it is very thinly traded, reached over \$1000 per ton in early April. Furthermore, it has now become difficult to purchase imports at any price, as most traders do not want to enter into price negotiations.

These conditions on the world market have led to substantial price increases in many domestic markets during this time. In Bangladesh, wholesale prices rose by 29% from December 2007 to March 2008, and in the Philippines they increased by 25% from February to early April 2008. Prices in India have also increased recently, although the increase has been smaller and more gradual than in Bangladesh and the Philippines; average retail prices increased by 18% from October 2007 to March 2008. Thus, these three countries, which more or less successfully stabilized domestic rice prices during the past several years, have recently been affected by events on world markets, and domestic prices have increased much more rapidly than was desired. This experience in Q1 2008 represents a distinct break with the experience from 2003 to 2007. Nevertheless, domestic prices have not doubled in any of these countries, even though the world market price has. In that sense, price changes on world markets were still not completely passed through to domestic markets.

Not surprisingly, given its free trade policies with respect to rice, domestic rice prices in Thailand (Bangkok) increased sharply (17%) from January to February 2008. As of the middle of March, wholesale prices in both China and Indonesia had remained relatively steady over the past six months, especially compared to other countries in the region.

Pass through to consumers: wheat and maize

Table 3 corresponds to Table 2, but it pertains to wheat and maize instead of rice. Column (3) of Table 3 is not completely filled in because international prices refer to wheat grain, while some domestic price series refer to wheat flour. This presents a problem when international wheat grain prices rise suddenly, as they did in late 2007 (they increased by 86% from May to December in real US dollar terms). It is unlikely that wheat milling costs increased that rapidly in that short of a time span. Under these conditions, a wheat price increase on world markets that is completely passed through in *absolute* terms to domestic markets will raise domestic flour prices by the same *absolute* amount as international grain prices increased. But, since wheat flour prices are higher than wheat grain prices (due to the milling costs), the *percentage* increase in wheat flour prices will be smaller than the *percentage* increase in wheat grain prices simply because the flour price is higher. As a result, it does not make sense

⁴ Warr (2005) shows that these import restrictions have increased poverty.

in these circumstances to compare percentage increases in prices for wheat and wheat flour;⁵ instead, absolute price changes were compared. For both India and Indonesia, the absolute change in domestic wheat flour prices was about half the absolute change in international wheat grain prices (comparing Q4 2003 with Q4 2007 in real domestic currency terms).

Table 3. Cumulative percentage changes in real wheat and maize prices, Q4 2003 to Q4 2007.

Country	Commodity	(1) World price (US\$)	(2) World price (DC)	(3) Domestic price (DC)
Bangladesh	Wheat	91	89	101
India	Wheat/Flour	91	53	see text
Indonesia	Wheat/Flour	91	66	see text
Philippines	Maize	40	-1	5

To summarize the data for wheat, Bangladesh is not stabilizing domestic wheat prices. India is stabilizing domestic wheat prices, but there is less stabilization than for rice. In the case of Indonesia, domestic rice and wheat prices have increased by approximately the same amount. With respect to maize in the Philippines, it is difficult to draw conclusions about commodity price stabilization policies, since the appreciation of the peso has been strong enough to keep world maize prices in real local currency terms essentially stable.

In general, then, Asian countries seem to stabilize domestic wheat prices less than for rice, but wheat price stabilization is still substantial in some countries. The lesser importance accorded to wheat price stabilization occurs because wheat is much less important than rice in terms of crop area and it is also much less important in terms of consumption for the poor. The conclusion that Asian countries stabilize rice prices more than wheat prices is similar to the results found by Sharma (2002) in an earlier study that examined price increases on domestic markets during the last major world price boom in 1995-96.

Pass through to farmers: farm prices and consumer prices

Table 4 shows the percentage change in real farm prices compared to the percentage change in real consumer (retail or wholesale) prices for several commodity/country combinations for which data were easily available. For these countries, the percentage changes in consumer and producer prices are remarkably similar in all cases, suggesting that markets are well integrated and that price changes at one level of the marketing system are passed through to other levels. It should be noted that countries in East and Southeast Asia generally have better infrastructure than countries in sub-Saharan Africa, so the analysis could look quite different in other parts of the world.⁶

Pass through for fertilizer prices

Although data on domestic fertilizer prices are more limited, the extent of transmission of fertilizer prices from world to domestic markets seems to be more heterogeneous in these countries. The analysis here focuses on urea, which is the main source of nitrogen and is by far the most important fertilizer for most Asian farmers.

⁵ This problem is not serious for rice in the analysis above because international, wholesale and retail rice prices are all for milled grain, not for the paddy produced at farm level.

⁶ The issue of different price levels mentioned earlier for wheat and wheat flour is not a major problem here. Only one entry in Table 5 pertains to wheat, and it is for Bangladesh where the wholesale price data are for wheat grain, not wheat flour.

Table 4. Percentage change in real domestic producer and consumer prices
Q4 2003 to Q4 2007

Country	Commodity	Producer	Consumer
Bangladesh	Rice	8	2
Bangladesh	Wheat	42	39
China	Rice	28	30
Indonesia	Rice	28	32
Philippines	Maize	9	5
Philippines	Rice	7	3

Notes: Data for Indonesia compare Q1 2003 and Q1 2007. Data for Bangladesh compare Q4 2003 and Q4 2006. Data for China compare 2003 and 2007 (annual).

From Q4 2003 to Q4 2007, world urea prices increased by 107% in real US dollar terms, more than the increase in rice, wheat and maize prices during the same period. Again, however, real exchange rate appreciation neutralized much of this increase for many Asian countries.

In Bangladesh, domestic policy has stabilized *nominal* urea prices, with the result that in real domestic currency terms urea prices declined by 25% during a period (from August/October 2003 to August/October 2007) when world market prices increased by 79% in real domestic currency terms. In the Philippines, however, urea retail prices increased by 33% in real domestic currency terms from Q4 2003 to Q4 2007, which, in absolute terms, is almost identical to the increase in world market prices during the same period.⁷ Thus, the Philippines has been following a policy of free trade in urea fertilizer. In Viet Nam, domestic urea prices have also risen substantially, and in absolute terms the increase in domestic prices was about two-thirds that of the increase in international prices (in real domestic currency terms).

Summary

The analysis here has made several key points. First, the recent surge in world cereal prices has been accompanied by a real depreciation of the US dollar. For many countries (but not all), this depreciation has neutralized a substantial proportion of the increase in world prices.

Second, domestic commodity specific policies in several of these Asian countries have further stabilized domestic prices relative to the change in world prices. This has been especially true for rice, the main staple food in the region, but it is also true for wheat. On average, through the end of 2007, the increase in real domestic rice prices was about one-third of the increase in real US dollar world market rice prices. Although this might seem somewhat small, this should not be taken to imply that events on world markets have no consequences for food security: even relatively small price increases of 10 to 20% for staple foods have serious implications for the household food security of the poor.

Third, for the specific cases analyzed here, producer or farmgate prices have changed by approximately the same percentage as consumer prices. Thus, in these Asian countries, domestic markets seem to be transmitting price changes between farmers and consumers rather efficiently. Fourth, the experience with urea fertilizer prices is more heterogeneous:

⁷ Again, there is a problem of levels as with wheat, since retail urea prices are substantially higher than world urea prices FOB Ukraine.

some countries are following free trade, while others have stabilized prices in nominal terms, which, in times of rising prices, is an even more extreme departure from free trade than is stabilization in real terms.

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