



POLICIES FOR THE EFFECTIVE MANAGEMENT OF FOOD PRICE SWINGS IN AFRICA

THE TRANSMISSION OF INTERNATIONAL MAIZE PRICE SIGNALS IN EASTERN AND SOUTHERN AFRICA

INTRODUCTION

When analysing the impact of food price booms and slumps on producers and consumers, the extent to which prices in developing countries respond to price shocks in the international market is central. Understanding the behaviour of domestic prices and the factors that determine their level is important in order to design policies that effectively manage price volatility. This brief examines price transmission from the international maize market to the markets of Eastern and Southern Africa and discusses the factors that influence international price pass-through in a number of countries in the region.

In summary, changes in the prices of international yellow maize and South African white maize are transmitted to the Eastern and Southern African markets, with price transmission being characterized by:

- a slow adjustment of domestic prices to international price changes; and,
- a lack of response of domestic prices to international market shocks in the short run.

WHAT IS PRICE TRANSMISSION?

The concept of price transmission is based on competitive pricing. Changes in supply and demand in one country will affect domestic prices which in turn will instigate trade with other countries. In theory, as trade restores market equilibrium over a period of time, prices in the domestic market should equalize with those in foreign markets, reflecting complete price transmission. Therefore, prices of a commodity sold in competitive foreign and domestic markets should differ only by transport costs. In practice, price transmission can be slow or far from complete due to a number of reasons including policies, transport costs, non-competitive traders and consumer preferences.

FACTORS SHAPING INTERNATIONAL PRICE PASS-THROUGH

Trade and price stabilization policies often hinder price transmission. While import and export bans and quotas impede price transmission, import tariffs and export taxes do not. The latter allow international price changes to be fully transmitted to domestic markets in proportional terms, unless they are prohibitively high and weaken the incentive to trade.

Government intervention in the form of stock management and open market operations such as food procurement or sale is common across African countries. Such policies impede price transmission depending on the government's price targets, its capacity and budget to realize food purchases and sales at predetermined price levels and its ability to manage food inventories and trade continuously. These price stabilization policies are often implemented in conjunction with border measures.

Apart from policies, domestic markets can also be partly insulated by large margins that arise from **high transport and marketing costs**. In developing countries, poor infrastructure, transport and communication services give rise to significantly high delivery costs of the locally produced commodity to the border for export, or the imported commodity to the domestic market for consumption. Such high margins hinder the transmission of price signals, as they prohibit arbitrage. As a consequence, changes in international prices are not fully transmitted to domestic prices, resulting in producers and consumers adjusting partly, if at all, to shifts in global supply and demand.

Non competitive markets may also be characterized by incomplete price transmission. Market power is often cited as impeding price pass-through. Non competitive behaviour in the market implies that intermediaries with power over price may exercise pricing strategies that result in a slow and incomplete pass-through of international price decreases, but in a rapid and complete transmission of international price increases to retain higher margins.

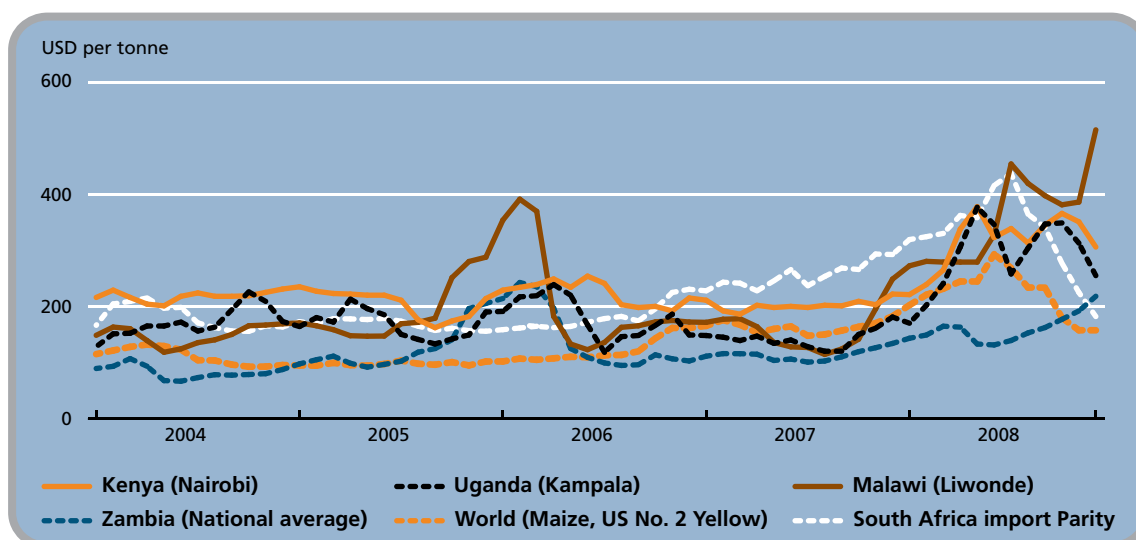
Consumer preferences may also result in incomplete price transmission even under competition and free market conditions. Domestically produced food often has different attributes than those of internationally traded food commodities, which limits the possibilities of substitution between imported and domestic food for consumption. In Eastern and Southern Africa, consumers prefer white maize to the internationally traded yellow maize. As consumers are not willing to substitute one type of maize for another, domestic maize prices may depend mainly on local or regional supply and demand shocks, rather than on global market conditions.

HOW DID PRICES IN EASTERN AND SOUTHERN AFRICA FEATURE IN THE 2007-08 PRICE EPISODE?

In general, food prices in Africa are quite volatile. A variety of reasons, such as weak supply response, climatic shocks and poor infrastructure, which often isolates regions and countries, all lead to increasing price variability and present major challenges for governments. Consumer preferences over maize varieties could also insulate domestic markets, making them subject to domestic shocks only.

In spite of the above reasons, prices for white maize in several markets in Eastern and Southern Africa have moved in line with the world price of yellow maize, following an upward trend from the beginning of 2007 until the peak of July 2008 (see Figure 1). As world prices collapsed in the summer of 2008, prices in most African countries followed, although at varying rates of change. Indeed, during the last decade domestic prices have often moved towards import parity levels, suggesting that African markets are becoming increasingly integrated with the international market of yellow maize. Market experts suggest that the region may be characterized by a structural deficit in the trade of maize. Such a deficit may result from the lack of technology and low productivity in many countries in the region, the reduction in exportable surplus in South Africa and the transformation of Zimbabwe from an exporter to an importer¹.

Figure 1 – Maize prices in eastern and southern Africa



Trade is central in integrating food markets. However, two markets may be integrated through trade with a third market, even if there is no direct trade between the two. In Africa, despite border measures that restrict trade, informal trade in food commodities is widespread, which leads to increased market integration in the region².

Price information is also vital for the efficient functioning of a market. Large physical markets, auctions and commodity exchanges react rapidly to new information in international prices. They also provide information to traders in smaller physical markets. In many countries trade is facilitated by using prices from futures exchanges as a benchmark for setting the price for physical transactions. As information flows from one principal market to another smaller market, changes in principal markets are transmitted to smaller markets. For example, prices in Southern Africa usually respond to changes in South African Futures Exchange (SAFEX) prices. No doubt, the direction in which price information flows provides additional information for effective policy implementation.

HOW IS PRICE TRANSMISSION MEASURED?

In practice, we cannot quantify the extent of price transmission from the international to domestic markets in terms of a single parameter similar to the price elasticities in supply or demand. Indeed, there are no unambiguous measures for price pass-through and analysts are not able to easily conclude whether price transmission is complete or incomplete.

Instead, practitioners utilize econometric models and assess a number of attributes of the relationship between prices. These attributes refer to co-movement and the time it takes for domestic prices to adjust to international price changes.

- **Co-movement** can be thought of as a long-run relationship between prices that is shaped by market forces. If markets are integrated through trade, changes in one market will affect the prices of both markets, hence prices co-move in the long run. In the short run, prices could drift apart, as shocks in one market may not be rapidly transmitted to the other. In this case prices eventually adjust to their long-run equilibrium, as market forces will ensure that these divergences from their underlying relationship are short-lived.
- The **speed of adjustment** to the long-run price equilibrium is important in evaluating price transmission. Full adjustment of prices to changes in short periods (one or two months) is not impossible, but it is usually a characteristic of large and efficient markets. In

¹ For detailed analysis see Jayne, T.S., Zulu B. and Nijhoff J.J. 2006. Stabilizing food markets in eastern and southern Africa. Food Policy 31, pp. 328-341.

² See for example FEWSNET. 2008. Informal cross border food trade in Southern Africa. Bulletin No. 42, May.

developing countries, where national and regional markets are separated by poor transport and communication infrastructures, adjustment is slower. For example, in the Ethiopian coffee market, an export-oriented sector in Africa where pricing is based on an efficient auction system, full adjustment of the price of Ethiopian arabica coffee to changes in the international coffee price takes place in 3.7 months³.

DO YELLOW AND WHITE MAIZE PRICES CO-MOVE?

The relationship between the prices of yellow and white maize is of central interest to Eastern and Southern Africa. Co-movement between the price of locally produced white maize and that of the internationally traded yellow maize would imply that these markets are integrated and consequently, in the longer run, international maize price episodes would likely affect maize markets in these regions. On the other hand, lack of co-movement would mean that changes in the international yellow maize price are not likely to affect the Eastern and Southern African white maize markets.

South Africa produces and trades both yellow and white maize. The SAFEX offers an efficient mechanism for trade and provides information on prices within a competitive market environment with minimum government intervention. It also offers futures contracts on maize, providing traders in Southern Africa with a benchmark for pricing physical trade.

Our price transmission analysis provides strong evidence that South African prices of both yellow and white maize co-move with the international price in the long run⁴. From one month to another, international prices do not affect the SAFEX yellow and white maize prices either instantaneously or with some short delay (two or three months). Both South African white and yellow maize prices adjust to changes in the international price slowly, with full adjustment taking approximately 7 to 8 months. This is a rather slow adjustment to shocks, suggesting that domestic and regional market fundamentals influence price behaviour in the shorter run.

PRICE TRANSMISSION IN SOUTHERN AFRICAN MARKETS

There is strong evidence that local maize markets in Malawi are integrated with both the international and the South African maize markets, with prices in the country co-moving with both the international yellow maize and the SAFEX white maize prices. Nevertheless, with the exception of Bangula, a market close to the border with Mozambique, adjustment of prices to international price changes in Malawi is slow. On average, it takes from 4.7 to 7.7 months for the prices to fully adjust to change in the international price. This suggests that domestic market conditions, and probably open market operations by the Malawian Agricultural Development and Marketing Corporation (ADMARC), determine short-run price movements. Within the country, prices of different markets co-move with each other, while in the shorter run, price shocks in one part of the country do affect other markets, although not rapidly. In general, adjustment between prices in different markets takes place in approximately 4 months, suggesting that poor infrastructure hinders arbitrage.

Price adjustment in maize markets in Malawi

	Chipita	Karonga	Rumphi	Bangula
Months to full adjustment to:				
World price	6.6	4.7	no co-movement	3.8
South African price (white maize)	5.0	4.8	8.3	4.7
	Salima	Mitundu	Liwonde	Mzuzu
Months to full adjustment to:				
World price	no co-movement	5.8	7.7	5.5
South African price (white maize)	5.3	5.0	6.4	6.1

Price adjustment in maize markets in Zambia

	Lusaka	Chipata	Kabwe	Choma	Kasama	Ndola
Months to full adjustment to:						
World price	no co-movement	no co-movement	4.8	no co-movement	5.5	3.2
South African price (white maize)	7.6	8.3	5.3	6.7	7.7	3.1

In Zambia maize prices are also found to co-move with the South African price of white maize. However, there is weak evidence that prices in a number of markets are related to international prices in a direct manner. Prices in most Zambian markets appear to adjust to their long-run relationship with South African prices slowly. In many markets, full adjustment to changes in SAFEX prices occurs after

³ See Rapsomanikis, G., Hallam, D., and Conforti, P. 2004. Market integration and price transmission in selected food and cash crop markets of developing countries: Review and Applications. Commodity Market Review, 2003-2004, FAO Trade and Markets Division.

⁴ The analysis was based on cointegration tests and used South African SAFEX spot prices for both yellow and white maize and the price of the US yellow maize No. 2, Gulf, reflecting the international price. For most countries, the cointegration tests were performed utilizing monthly data spanning from January 1998 to July 2008.

approximately 5 to 8 months. Prices in Ndola, a market on the border with Congo, are found to adjust to both international and South African price shocks quite rapidly, or in the course of three months.

Within the country, domestic markets are found to be well-integrated among them, indicating that transport costs and other factors do not hinder the flow of information from one part of the country to another. Price shocks in one market are expected to be smoothed out quite rapidly, in approximately 2 months.

PRICE TRANSMISSION IN EASTERN AFRICAN MARKETS

Price adjustment in maize markets in Kenya

	Nairobi	Mombasa	Eldoret	Kisumu
Months to full adjustment to:				
World price	6.2	9.1	9.1	6.2
South African price (white maize)	no co-movement	no co-movement	11.1	7.7

are also found to directly co-move with the South African white maize price. Nevertheless, maize prices in Kenya tend to adjust to their relationship with the international market price very slow, in approximately 6 to 9 months. Adjustment to SAFEX prices is even slower, also suggesting a very weak relationship between markets in Kenya and South Africa.

In Kenya, international price pass-through may be hindered by the operations of the state-run National Cereals and Produce Board (NCPB), which maintains a strong influence through its involvement in the procurement of imported or domestically produced maize, and the subsequent release of food at predetermined prices.

Although maize is not the main staple food in Uganda, maize production has been exhibiting a steady increase during the last decade, with the country becoming a net exporter. Some maize imports originate from the United States, while Uganda traditionally exports to countries in the region, such as Kenya, Rwanda and Tanzania. In general, international price changes do not appear to be directly transmitted to Ugandan markets. There is weak evidence that prices in the capital, Kampala, co-move with either the international or the South African prices.

However, in Mbale, a region at the border with Kenya, prices were found to directly co-move with international prices. On average, such a weak transmission of international price signals confirms Uganda's position as a small – and possibly not well developed – maize market in the region. Nevertheless, there is evidence that Ugandan maize prices co-move with prices in Kenyan markets. For example, maize prices in Kampala adjust to changes in Kenyan prices within 6 months, suggesting a rather weak relationship. Within Uganda, there is a strong evidence that market prices appear to co-move with each other. The market in Kampala appears to be central, in the sense that it provides price information to other markets. Maize prices in Kabale and Mbale are also found to adjust rapidly to the Kampala market prices with full adjustment taking place rapidly in approximately 2.2 months.

Price adjustment in maize markets in Uganda

	Kampala	Mbale	Kabale
Months to full adjustment to:			
World price	no co-movement	3.3	no co-movement
South African price (white maize)	no co-movement	no co-movement	no co-movement
Kenyan price	5.8	7.1	no co-movement

Kenya is an important producer and consumer of maize and assumes a net importing position. Over the last decade, the United States and South Africa, as well as other African countries in the Eastern and Southern African region have been Kenya's most important trade partners. On the whole, domestic prices are higher than international prices due to high import tariffs and high transaction costs.

For all domestic markets examined, there is evidence that prices co-move with international prices. In markets in the western part of the country, prices

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