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# Price Transmission and Asymmetric adjustment: the Case of Three West African Rice Markets*

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Between January 2007 and April 2008, 37 countries across the globe experienced food riots caused by widespread anger over the rapid rise in food prices (Janin, 2009). Overall, these events revealed the high degree of dependency of many poor countries on global food markets.

Most West African countries are highly dependent on imported food, especially rice. Rice consumption has greatly increased over the last decade driven by changing food preferences in the urban and rural areas, by the rapid urbanization and population growth. West Africa's rice production has not been able to match growth in demand resulting in a significant increase in imports. With regional rice imports totaling almost 19 percent of world rice imports (FAOSTAT, 2013), West Africa has become a significant player in world rice markets.

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•••/••• Food import dependency does not threaten food security in periods of low prices of imported rice but it becomes problematic in a context of high world prices of rice. Global rice prices reached a record high in the spring of 2008, with prices tripling from November 2007 to May 2008. The causes of this price spike are complex and are not attributable to a crop failure or a particularly tight global rice supply situation (FAO, 2011). The rise in rice prices is the result of the combined effects of trade restrictions by major suppliers (India), panic buying by several large importers, a weak dollar, and high oil prices.

The effects of the surge in world food prices have varied between developing countries according to their food import dependency and the degree to which prices on world markets were passed through to domestic prices. After the 2008 sharp rise in the international price of rice, the West African domestic prices of rice increased strongly after a delay of a few months varying with the policies implemented by the countries, the grain supply level and the exchange rate. It took 12 and 8 months respectively to the imported rice prices in N'Djamena and Dakar to go down, and in most of the countries, prices remained substantially above pre-crisis levels.

The paper underlying this policy brief, investigates price transmission between the international price of rice and the domestic prices of imported rice and local rice in three West African countries – Senegal, Chad and Mali – in an attempt to determine the impact of the increases in the world rice prices on the West African markets. The specific objectives of this paper are a) to determine whether domestic prices of imported and local rice respond faster to an increase or to a decrease in the international price of rice b) to test for asymmetry in the transmission of large and small shocks.

A variety of factors, including imperfect competition in the import chain and political interventions attempting to mitigate the impact of rising world food prices, may lead to asymmetry in the transmission of positive and negative shocks. The structure of rice imports in most West African countries is known to be either monopolistic or oligopolistic. Oligopolistic importers are likely to pass on more fully and more quickly shocks that raise their margins that shocks that reduce them, resulting in short-term asymmetric price transmission. In Mali, three main importers make up two-third of all imports in Mali (Baris et al., 2005) while 66 percent of all rice imports flow through only four importers in Senegal (USAID, 2009).

Although most West African countries have officially stopped intervening in rice production and marketing following the structural adjustment reforms of the eighties and nineties, governments continue to intervene. In response to the 2008 crisis, the Senegalese government removed temporarily custom duties on rice imports while the Government of Mali grants a temporary value added tax exemption for imported rice (Mendez del Villar et al., 2010). Additionally, a price control has been imposed over imported rice in both Mali and Senegal in 2008.

While the presence of market power in the supply chain and political interventions attempting to protect consumers are likely to lead to asymmetry in the transmission of positive and negative shocks, the presence of adjustment costs may prevent prices from adjusting for small shocks. If adjustment is costly, traders may respond to small changes in world prices by increasing or reducing their margins, leading to a zero pass through of small movements in world prices to domestic markets. Then, domestic prices of rice will adjust only if the fluctuations in the world prices exceed a critical level.

Asymmetric price transmission is assessed through the estimation of a Threshold Autoregressive (TAR) model, based on the idea that large shocks may bring about a different response than small shocks. TAR models are well suited to cases characterized by the presence of market power and adjustment costs. They

hypothesized that small deviations from equilibrium are not transmitted and that deviations must reach a critical level before triggering a response. The short-run price dynamics depends on whether the deviations are above or below a critical threshold, allowing the transmission of positive and negative shocks to be asymmetric.

The empirical analysis utilizes monthly retail prices of local and imported rice in Dakar, N'Djamena and Bamako. The results indicate that the world price of rice and the domestic prices of imported and local rice in Senegal, Mali and Chad are integrated in the long-run, with the exception of the local rice in Dakar. In Senegal, the market for local rice is essentially a thin residual market. Farmers produce rice primarily for subsistence and most of them are not commercially oriented. Many Senegalese still consider local rice as inferior in quality to imported rice suggesting that there is very little substitutability between imported and local rice.

The paper finds that the domestic price of imported rice in Bamako and the domestic prices of imported and local rice in N'Djamena are integrated with the world price of rice. In those three cases, domestic prices are affected in similar ways by changes in the world price regardless of the size or the sign of the deviations. By contrast, the process of adjustment is found to be asymmetric in two cases: the local rice in Bamako and the imported rice in Dakar, which are respectively the main staple food in Mali and Senegal.

The price of local rice in Bamako and the price of imported rice in Dakar do not adjust to small positive or negative shocks in the international price of rice. Small deviations from the long-term equilibrium that are not leading to a price adjustment fall into the inner regime, called by Goodwin and Piggott (2001) the "neutral band". Due to the existence of transactions costs, trade may be profitable only outside the band when the transaction costs are lower than the price difference. The neutral band contains respectively 62 and 49 percent of the observations in Dakar and Bamako, suggesting higher transactions costs in Senegal.

The price of local rice in Bamako and the price of imported rice in Dakar respond asymmetrically to large changes from the long-term equilibrium. Our results provide evidence that increases in the world price are incompletely and slowly passed-through to the domestic market, as compared to decreases in Mali. The negative asymmetric price transmission can be attributed to governmental interventions intended to protect consumers. The Malian government intervenes regularly through tax exemptions and food security stock management as to prevent local prices to increase excessively. If this policy favors consumers, it may discourage private actors to invest in the domestic market channel.

By contrast, the price of imported rice in Dakar is more responsive to large increases in the world price of rice than to large decreases. This positive asymmetric price transmission is likely to reflect a situation of market power in the import chain as well as the strong preference for imported rice in Senegal. The domestic price of imported rice adjusts well to large increases in the world price of rice as consumers are reticent to substitute rice with other grains. Since 2008, the Senegalese government has launched national programs to boost local rice production in order to achieve complete food self-sufficiency. Achieving rice self-sufficiency will require greater recognition that the rice market is not driven exclusively by price. Local rice must improve its awareness among consumers and make significant efforts in improving appearance, packaging and cleanliness in order to compete more effectively with imported rice.

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