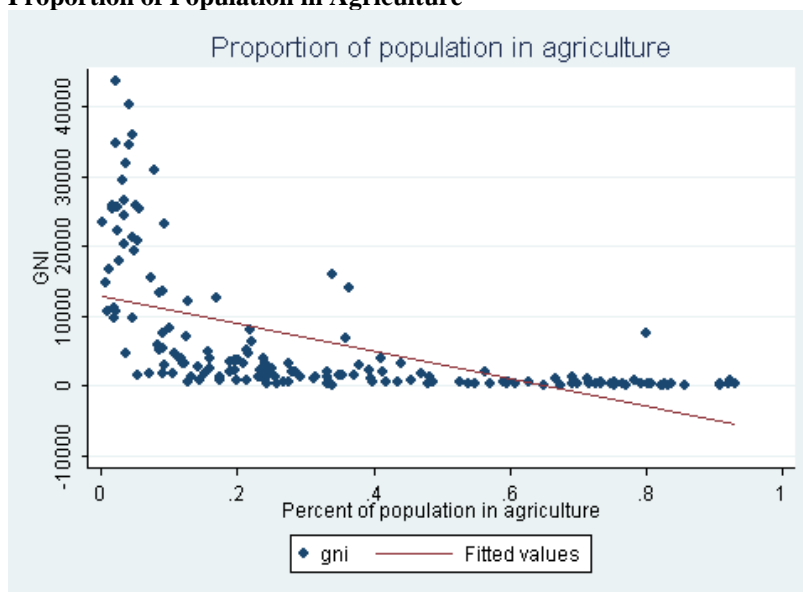


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**Asymmetric Price Transmission in Agricultural Markets<sup>1</sup>  
UNCTAD Discussion paper  
22 September 2014**

Many poor countries have a large proportion of their active population working in agriculture. In many cases, the amount of revenue they receive will be crucial for their survival. Using data from the World Development Indicators (2010) one sees that in the year 2000, the world's 25 per cent poorest countries had at least a quarter of their population working in agriculture, and half of these 25 per cent poorest had over 70 per cent of their population active in agriculture. An illustration of this is given in Figure 1. Thus poorer countries will be more exposed to large falls in agricultural prices. Understanding the determinants of changes in agricultural prices is therefore crucial for the poorest countries.

Figure 1  
**Proportion of Population in Agriculture**



<sup>1</sup> This note is a summary of the paper entitled "Asymmetric Price Transmission in Agricultural Markets". It is available in the Working Paper Series of the University of Geneva, WPS 13-10-2, available at the following address: <http://www.unige.ch/gsem/dsec/research/wps/13102.pdf>. It is forthcoming in the Review of Development Economics.

In this paper the focus is on the extent of asymmetry in the price transmission from international to local markets. Whether a farmer is selling locally or exporting, the price he will receive for his production will be directly or indirectly affected by prices determined in world markets. Indeed, Mundlak & Larson (1992) show that variations in local agricultural prices are mainly explained by variations in world prices. But the transmission from international to local markets may not necessarily be symmetric. Depending on market conditions falls in international prices may be better transmitted to local markets than increases in international prices. The consequences of this asymmetric price transmission could be particularly harmful in poor countries where farmers often live close to the poverty line. In fact, Mosley and Suleiman (2007) suggest that a portion of the small farmers are below the poverty line in some of the poorer countries. They also put forward that the one sector that has had a strong ability to stimulate pro-poor growth processes, especially in East and South Asia, is smallholder agriculture.

Why would one expect a better price transmission when agricultural prices fall? Agricultural markets are characterized by the presence of large international intermediaries, with strong monopsony power over often small and numerous producers. Murphy (2006) shows that in the United States two companies (Cargill and Archer Daniels Midland) export 40 per cent of all U.S. grains. Rogers and Sexton (1994) show that in the United States more than 60 per cent of all food and tobacco markets can be considered as non-competitive when measured by their top four-firm concentration ratio (with a threshold at 50 per cent). Figures for other countries are similar. For example in Vink and Kirsten (2002), concentration ratios for the four largest firms for South Africa are also large: 47 per cent in slaughtering, dressing and packaging livestock, 65 per cent for vegetables and animal oils and fats, 43 per cent for flour, 37 per cent for animal feeds, 99 per cent for sugar, golden syrup and castor sugar, 80 per cent for coffee, coffee substitutes and tea.

In this paper it is shown that in the presence of strong monopsony power of agricultural intermediaries with sufficiently convex marginal cost functions one can expect a price transmission that is stronger following a price decline than for a price rise. This is consistent with the use of this monopsony power by intermediaries. Indeed as the international price falls, local prices will fall proportionally more than when international prices increase. This prediction is confirmed when confronted to a sample of 161 agricultural products produced in 117 countries over a period of 35 years. Moreover, the asymmetry seems to be driven by the results for markets where large international intermediaries are present or when exports represent a large share of total production which increases the monopsony power of international intermediaries.

Questions of asymmetric price transmission have been widely studied for oil markets, known as the literature on "Rockets and Feathers", where prices rise like rockets but fall like feathers. Many researchers have been analysing the evolution of oil output prices. Tappata (2009) analysed the theoretical aspect of potential asymmetric responses of oil retail prices. Many empirical studies come to the conclusion that asymmetry does exist. This is the case of studies such as Galeotti, Lanza and Manera (2003) or the main study on the topic done by Borenstein, Cameron and Gilbert (1997). The latter has several explanations for asymmetry. The one that seems to be closest to what is found for agriculture is one of costly search of consumers. The idea is that the consumer will believe that a change in price at the retail station during a period of volatile crude oil prices will really be due to a change in this price, whereas in less volatile periods he will believe that the station's margin is changing. He will put more effort into searching for a lower price elsewhere if he believes that it is that specific station increasing its price. This is because the consumer's expected gain of search is higher in this case. This, in turn, leads to a higher market power of retailers who can dampen the rate

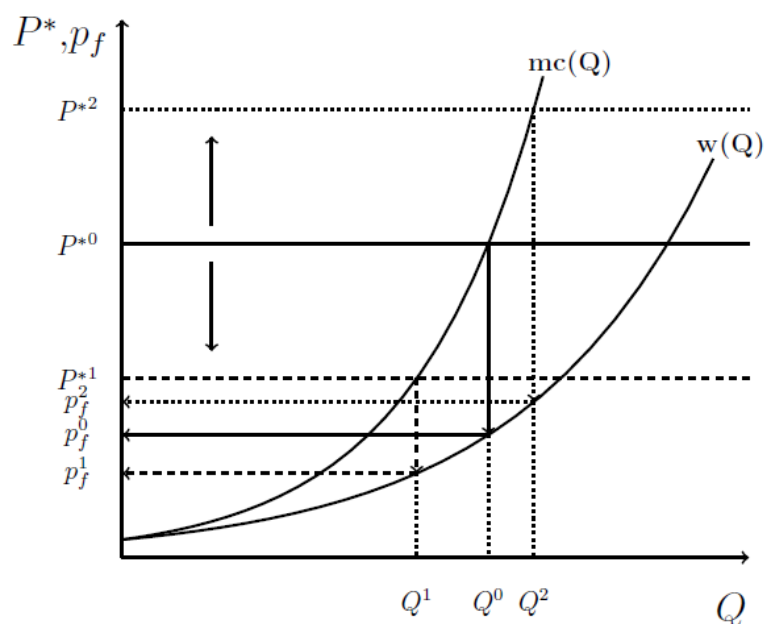
of pass-through of upstream price decreases. This paper shows similar effects for agriculture, however affecting the producer side rather than the consumer side.

The results are interesting from a policy perspective and give room for active competition policies when facing large international intermediaries. Levinsohn (1994) suggests that many countries are more lax in their competition policy when dealing with export markets, perhaps because anticompetitive practices in an export market will not be harmful for domestic consumers. However, the asymmetric price transmission identified in this paper would lead to increased losses for often poor farmers. More generally, as argued by Murphy (2006), market power in international markets is not factored into the models and assumptions that inform the trade and agriculture debate, which can mislead policy makers in terms of the distribution of the gains from trade liberalization in these markets. This result can also offer some interesting perspectives in terms of aid-effectiveness. Some studies such as Mosley and Suleiman (2007) have made clear some important aspects of aid, such as the importance of food crops due to their high poverty leverage. The result of this paper concerning intermediaries may complement such studies, proposing some strategies that may be adopted within the agricultural sector. An asymmetric price transmission could also alter the usual way of approaching the analysis of welfare linked to price changes. De Hoyos and Medvedev (2011) study the changes in welfare created by the price transmission from international prices to domestic prices. They put forward the importance of the degree of price transmission in explaining short to medium-term poverty effects. The presence of asymmetric transmission can give new insights to such theories and a new way of thinking about the effects of international price changes for welfare.

Agricultural markets are characterized by a large dispersion of farmers, as noted by Sexton (1990), which are numerous and therefore act as price takers. He also emphasizes the bulkiness and/or perishability of raw products that will have an influence on market structure. This could lead to what he calls spatial oligopsony power of processors or wholesalers. As quoted in OECD (2008) it is the difficulty for sellers to find other buyers which determines the extent of a buyer's monopsony power. Murphy (2006) says that most farmers lack the storage and capital needed to get their goods to distant markets, so they are left selling locally, to middle-men who now have more suppliers to choose from.

Market power can be modelled based on Sexton (1990), where wholesalers are considered homogeneous and act as price takers in their selling markets, notably due to the size of international markets. The fixed cost associated with exporting is too high for the individual farmer to face, such that he has to pass by a wholesaler. This is consistent with the literature, notably with Gopinath, Sheldon and Echeverria (2007) who say that agriculture is unique as farmers often do not export directly since it is marketing firms that make the export decision. This situation in which the intermediary has monopsony power over the farmers, may lead to a situation in which the intermediary reaps part of the benefits during a price rise, only partly increasing the price he offers to the farmer, but transmits the whole of the price change if the price falls. This situation is depicted in Figure 2, where one can see how a change of the international price, denoted  $P^*$  on the figure will move the intermediary's supply (depicted by the horizontal line) upwards or downwards, and lead to a farmers price of  $pf$ . Quantities are denoted by  $Q$ ,  $w(Q)$  is the farmers' supply and  $mc(Q)$  the marginal cost curve of the intermediary.

Figure 2  
**Price Transmission for Various International Prices**



In order to estimate the impact of international agricultural price variations on producer prices, yearly data on export and producer prices from the Food and Agriculture Organization of the United Nations (FAO) is used. The producer price is the price received by farmers as collected at the point of sale for primary crops, live animals and livestock primary products. FAO's export data is produced according to the International Merchandise Trade Statistics Methodology and mainly comes from national authorities and other international organizations. The export values are reported as Free-on-Board (FOB) such that insurance and transport costs are not included. It is an unbalanced panel of 161 items, 117 countries and 35 years, ranging from 1966 to 2000.

Various econometric regressions are run on this data to establish whether the price transmission is stronger when the international prices fall than when they rise. It is found that on average, international price rises of 10 per cent lead to farmer price rises of the order of 6 per cent whereas international decreases of 10 per cent lead to farmer price decreases of 9.8 per cent. A second step focuses on the influence of intermediaries in explaining this asymmetry and the results show that they do play an important role in this mechanism.

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