PRACTICAL IMPLICATIONS OF SOME THEORETICAL ASSUMPTIONS IN PERFORMANCE ANALYSIS: THE MAIZE MARKET IN GHANA

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ABSTRACT

Food markets serve as important indicators of the state of an economy due to their ability to direct resource allocation through the pricing mechanism. Prices alone however fail to reflect the proper signals if the process of price formation and the resulting market prices are assumed to be complete indicators of current and future market conditions without due cognisance of the specific environmental constraints and opportunities that characterise the marketing system.

The correlation co-efficient of market prices or its contemporary modifications remains one of the most popular methods of assessing market performance. However such tools can yield misleading results if applied across spatial markets with a non-homogeneous harvesting period or market infrastructure, but a common trading market.

In analysing the performance of the maize market in Ghana from a heuristic standpoint, the paper attempts to highlight some pitfalls which might be obscured when the correlation co-efficient, as a measure of market performance, is interpreted without due consideration of the peculiarities of the marketing system involved.

Keywords: *Correlation co-efficient, market integration, co-integration, market performance.*

INTRODUCTION

The performance of any market can be analysed by employing a variety of tools or methods in order to enhance an appreciation of the pricing mechanism and behaviour of the market actors. Some of the common methods used in performance analysis include the price spread between two vertical operators in the marketing process, the cost-profit composition of the returns that accrue to providers of marketing services and/or the sign and magnitude of the correlation between prices in trading markets.

Each of these provide a certain level of insight into the performance of the marketing system, though no single one of these can provide a comprehensive conclusion about the total performance of the system. The correlation co-efficient of market prices or its modifications is by far one of the reliable and popular modern methods of assessing market performance, due to the fact that price is an important summary indicator of market economic activity.

The correlation co-efficient takes its strength from the fact that, given the conditions and assumptions of a perfect market, price changes in one of a pair of markets that trade with each other generates a series of signals that are transmitted to the other market. Thus, given the consequent adjustment of stocks and other rational pricing behaviour of traders in these markets, prices should move in unison in all markets. Whiles the general application of this approach commonly involves a pair of markets at a time, modern researchers such as Ravallion [1], Gupta and Mueller [2] and Delgado [3] have sought to broaden the approach by simultaneously examining the price behaviour in more than two markets at a time. Ravallion for example postulated and sought to examine the price relationships between a central market connected to a spatial ring of intermediate markets, which serve as its main supply source; and obtained quite intriguing insights into the performance of the rice market in Bangladesh with such an approach. The co-efficient, with or without other performance tools is however unable to provide much of the needed information, especially in some developing countries like Ghana where marketing activity and trader behaviour is not subject to formal arrangements but rather operates more or less in response to natural and man-made constraints imposed by the marketing environment.

Such co-efficient is thus neither able to provide solutions to certain peculiar and intrinsic "abnormalities" of the system nor answer certain questions arising out of analysis using empirical market price data.

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For example, while Delgado [3] was able to obtain useful results on seasonal and market integration of the post-harvest grains market in Northern Nigeria by using the Variance Components approach, he was unable to discover any conclusive reasons for the unexpected "bump" in October prices, when prices were expected to be declining in response to increased supplies from the harvest. Similarly in Ghana, despite a robust co-integration model to study , among others, the inter-commodity price transmittal between grain markets in the north-south trade in the country, Alderman [4] found that while it took a few days to move commodities between markets, about three months were needed to achieve market integration. Thus while theory would suggest a short-run market integration, a long-run market integration was actually taking place.

This study, by using a case study of the maize market in Ghana, seeks to examine some of the possible reasons that are likely to be overlooked in the analysis of the food market and therefore render theoretical norms inadequate assessors of the performance of the market. It is extracted from a broader study [5] that adopted a heuristic approach to the study of market integration with the view of understanding the basic pattern of trader organisation and behaviour in response to environmental constraints within the marketing system.

METHODOLOGY

Three regions: Greater Accra, Brong-Ahafo and Northern were used to model the maize market in Ghana. The choice of Regions was based on the spatial distribution as well as the climatic diversity of the maize market. While Greater Accra represents the maize deficit market, Brong-Ahafo and the Northern Region represent the maize surplus markets in the country. On the other hand, Greater Accra and Brong-Ahafo are located in the southern sector which experiences two harvest seasons while the Northern Region experiences one harvest season. Thus trade flows among these can provide a useful insight into the performance of the national food marketing system.

As a first step a simple correlation analysis of the CPI-deflated, detrended and deseasonalised

wholesale price data for the three markets gave the following co-efficients: Greater Accra – Brong-Ahafo, 0.96; Greater Accra – Northern Region, 0.88; Northern Region – Brong-Ahafo, 0.80, all values of which were significant at the 5% level. In addition the data were plotted in order to highlight the differences in price patterns for the selected market. Figure 1 shows the pattern of wholesale prices for the three Regions using average monthly data for 1985-1990. It can be seen from the graph that peak wholesale prices for Greater Accra and Brong-Ahafo occur in June while the lowest prices occur in September. The Northern Region on the other hand experiences peak maize wholesale prices in July and lowest prices in October, indicating a one month lag between the northern and southern wholesale prices. One basic assumption of the study is that despite the presence of certain major markets such as at Techiman and Kumasi along the route, a substantial quantity of maize is transferred direct from the North for sale in Greater Accra markets due to the extremely high demand in those markets.
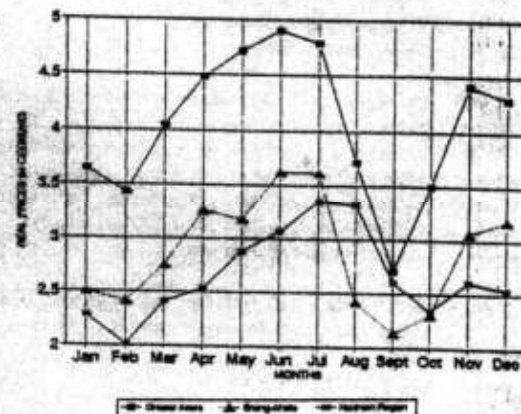

Figure1: Maize Wholesale Prices in Ghana
(Original data from PPMD, MOFA, Accra)

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Measures of market integration based on the correlation of prices between pairs of markets rest on the assumption that trade is dynamic between the markets from one harvest to the

next. In developed countries with well-organised market information, storage and haulage systems, this assumption may well hold. However within the Ghanaian situation, this is not the case; and the reasons for the invalidity of the assumption in fact provide the basis upon which the performance of the system can be evaluated. For instance, the major harvest in Brong-Ahafo being between late July and September, prices are at their lowest in September in both Brong-Ahafo and Greater Accra. If one assumes efficient (mostly informal) information flow, and trade is continuously taking place among the three markets, then prices in Greater Accra should be low in November, two months after harvest more or less in line with Brong-Ahafo prices. The contradiction to the high price level in Greater Accra is however due to the fact that the North has only one harvest season around October-November, so that with trade taking place, Northern maize starts arriving in Greater Accra at the time when maize from the Brong-Ahafo (and other regions which harvest in August-September) is available in the markets in Greater Accra. At any rate, this should depress prices to a level below that at which the Northern arrivals should sell, for Northern-Greater Accra trade to take place. That this is not so implies that an aspect of the trade is not revealed by the data or analysis, and any analytical model, no matter how robust, can fail to explain that aspect of the performance of the market.

An in-depth analysis of the marketing system using data obtained through participant observation indicates the reasons for such apparent anomalies at different times of the year. During the southern harvest which comes a month or two earlier than the Northern one, maize is bought by traders and transported to both the Northern and Greater Accra Regions. Due to the proximity of the Brong-Ahafo Region to the high demand markets in Greater Accra, a relatively good transport network facility and fewer unauthorised check barriers, more maize moves into Greater Accra Region than the Northern Region. Even though maize is consumed more in the Northern Region than in the Brong-Ahafo, it is still secondary to sorghum and guinea corn which are consumed more extensively in the Northern sector of the

country than in the Southern sector. With the availability of these coarse grains, the quantity of maize brought in by wholesalers causes a transitory market surplus and thus lowering maize prices. Hence a situation is created where maize prices are lowered simultaneously in both Greater Accra and the Northern Region. During this period, prices tend to move in the same direction and the correlation of prices is likely to give high positive co-efficient which are likely to be higher for Brong Ahafo – Greater Accra than Northern – Brong Ahafo.

During the Northern harvest which follows, more maize becomes available, leading to lower prices in the Northern Region than the Brong-Ahafo. Theoretically, one expects some of this surplus maize to be moved to Greater Accra, where given a transport situation compatible with a competitive market situation, the price of Northern maize should be lower than that from the Brong-Ahafo which because of its earlier harvest, could have attracted some storage cost at this time. However due to transportation bottlenecks including possible vehicle breakdowns and the 'forced gift' practice at checkpoints, Northern maize arriving in Greater Accra at this time is more expensive than Brong-Ahafo maize. As explained below, this further gives a correlation coefficient that can be wrongly interpreted.

Analyses of market integration are made under the assumption of continuous trade during the year between the markets. This appears not to be the situation in the three groups of markets analysed. Thus when maize flow is occurring between Brong-Ahafo and Northern Region there is little or no maize flow between the Northern Region and Greater Accra. A correlation of Greater Accra and Northern Region maize prices yields a high positive coefficient when very little or no trade is taking place between the markets. This is because the difference in harvesting times gives rise to trade in a common market (Brong-Ahafo) during September/October to February. At the end of this period when a large percentage of available maize for sale in the Brong-Ahafo has been exhausted, prices begin to rise in Brong-Ahafo, inducing a consequent rise in Greater Accra pries. From late February, maize from the North, (despite the extra associated charges

arising from an inefficient grain transportation system) becomes comparatively cheaper in the Greater Accra markets than Brong-Ahafo maize. Thus maize flow from the North is increased, though, due to its low importance in the Brong-Ahafo diet, little or none of it is directed to the Brong-Ahafo markets.

From late February to the next harvest in August-September, a different pattern appears in the maize flow as maize prices rise gradually in all markets:- (1) Northern Region because maize outflow to the profitable markets in the south is increased, reducing supply; (2) Greater Accra because the Northern supply is insufficient (unlike the Brong-Ahafo supply) to meet the demand; and (3) Brong-Ahafo because local supplies have been greatly reduced due to trader activity. Thus the correlation of prices between markets during this time is likely to yield high coefficients for any of the pair of markets.

For the three Regions an annual pattern can therefore be traced where between September and February, a period of six months, price levels are low and maize flows are generally in the same direction (outwards) from the common supply markets in Brong-Ahafo. By late February/early March prices begin to rise in Brong-Ahafo due to the reduction in supplies and this induces a rise in Greater Accra markets. Consequently maize starts arriving from the North but not in sufficient quantities to significantly affect market prices. Between this period and June/July prices continue to rise in all the markets with Brong-Ahafo wholesale prices reaching their peak in June, reflecting the supply situation. Both Greater Accra and Northern Region prices move together reaching their peak in July as the non-speculative supplies in the North get exhausted. During the remaining weeks before the next harvest, maize stored by wholesalers and other regular speculators is gradually released into the market as preparations are made towards the next harvest.

Thus contrary to what might be inferred through a correlation of monthly prices during the year, prices in the Northern and Greater Accra move in unison only during four months while Brong-Ahafo and Greater Accra prices move in unison for about six months, and Brong-Ahafo –

Northern prices move together for about two to three months. In addition, the effect of the Brong-Ahafo as a common supply market tends to exaggerate the similarity in price movements in the Northern and Greater Accra markets during the part of the year even though no substantial trade capable of causing the observed price change takes place around that period.

CONCLUSION

Accurate analysis of the market performance in developing countries can be a thorny issue as Harriss [6, 7] has acknowledged. Market integration can be used to assess the performance of a market through its primary tool, the correlation coefficient. While price data can indicate market integration through the coefficient, it can by no means be interpreted as a foolproof measure of market performance. This is because in developing countries like Ghana, due to inadequacies of market infrastructure, the marketing system operates more along informal lines in response to existing and new constraints and opportunities presented by the environment. Thus price determination tends to be influenced, to a large degree by several local factors such as physical accessibility to market, credit relationships between buyers and sellers as well as the cultural-social reasons for coming to the market [8]. Apart from making price predictions difficult, it equally makes it uneasy to assess economic profit levels of market intermediaries. The focus of this study has been to direct attention to the assumptions in analysis indicators that are likely to be taken for granted, leading to wrong interpretations, unless the roles played by specific environmental factors are fully acknowledged.

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