



PRICE COMMUNICATION AND EFFICIENCY MEASURES IN FOOD GRAIN MARKETS IN NIGERIA

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Abstract

Quite often, there are distinct disparities between the wholesale and retail prices of these commodities across markets. This study therefore investigated the degree of integration and price communications in food grains markets. Data were drawn from 12 markets across four states in the South West region of Nigeria. Multi – stage sampling technique was used in the collection of data which involved on- the- spot weighing of food grains. For rice markets in Oyo State of Nigeria, there were strong inter-relationships between the retail and wholesale prices of the commodities. Strongest price relationship was however noted for the product in Oje market with adjusted R2 value of 71 %. Similar trends were also observed in the other three divisions with the highest R2 value of 83 % in Kuto market and the least value of 41 % in Osele market. On the average, cowpeas have the highest elasticities, followed by rice, while maize has the lowest. There should be a stable agricultural policy that will ensure moderate wholesale prices, and by extension retail prices, of food grains so that the average household consumption level of the commodities could be sustained at high levels.

Keywords: Foodgrains, Price communication, Market prices, Efficiency, Elasticity



INTRODUCTION

Over the years, marketing of agricultural output is seen as one of the most important factors affecting agricultural production in Nigeria because a typical small farmer plans his current production on the marketing experience of his previous farm output. The dynamics of food marketing is changing rapidly with increasing urbanization and involvement of more key institutions in the performance of agricultural markets (Dipeolu, 2000). Changes in a market situation can occur due to factors such as price and market structure. These entail the number of relative size of buyers and sellers, degree of product differentiation, ease of entry and exist of the buyers and sellers into and out of the market among others. Spatial price variation is the variation in the movement of price through space. The knowledge of market integration was also used in this study. On the other hand, market integration is the co-movement of prices across spatially separated market.

It is clear that the price for agricultural products vary from locations between the farm gate and the market; hence policies aimed at improving the markets for agricultural products need to take cognizance of these variations when handling market issues. The lack of specific knowledge and understanding of existing formal and informal marketing institutions in urban Nigeria and their impact on the urban food system formed the basis for this research. Prices are the most readily available tool to reliable information that guides the farmers' planting decision in Nigeria. A farmers planting decision depends on anticipated profit which invariably depends on anticipated prices of planted crops. This has made price an important tool in the economic analysis of markets. In a developing economy like Nigeria, the dynamic of the exchange of information and its effect on the pricing processes are not well understood. This made prices the most reliable information source in the Nigeria's agricultural marketing system.

Marketing systems do not operate in a vacuum. They are influenced by such economic factors as consumer's income, his propensity to consume and propensity to save, among others. Foodgrains generally have an inelastic demand with respect to price because they are generally regarded as essential commodities particularly among the low and medium level Nigerians. Therefore, consumer's income and tastes are particularly important in this respect because they largely determine the quantities of foodgrains that are purchased, *ceteris paribus*.

The co-movement of price is an indication of the degree of market integration while dynamics of price adjustment give important information about the integration of the markets. Market integration is the inter-relationship between price movements in two markets and it ensures that a regional balance occurs among food-surplus regions and regions producing non food cash crops (Delgado,1986).The degree of association between retail and wholesale markets and also between one retail market and another indicates the process of price

determination. It is only in the short run that food price can be expected to be determined at the farm and wholesale levels and in the long run, consumer demand is the decisive and dominant variable. This means that in the long run, it is the retail price which determines the wholesale price (Damisa,1999).

Prices move from time to time and their margins are subject to various shocks. When a long-run linear relation exists among different prices in series, these series are co-integrated. In a competitive market structure, prices in different markets are expected to move together since all are influenced by the same set of forces and are tied together by transfer costs. Despite this however, price disparity does occur. Even though an individual trader may be unable to influence prices, the conditions of perfect homogeneity and knowledge of agricultural products (grains) may not be satisfied in actual market transactions. Imperfect knowledge may therefore result in inadequate flow of grains and hence in price difference that are greater than the costs of shipment.

The prices of agricultural products (grains) are influenced by changes in the marketing, government marketing policies, supply and demand situations, structure and concentration of marketing channels. The major causes of change in the price of grains (rice, maize, and cowpea) are due largely to transportation cost, storage facilities and market levy charges. The liberalization of grains markets in Ogun State of Nigeria has significantly changed the structure of the markets. In the post-liberalization period, the activities of private grains traders have tremendously increased. On the other hand, the government's role in the grains trading activity decreased and accounted only for less than 5% of the grains market. There is a new emerging grains marketing structure which is dominated by private traders as opposed to the pre-liberalization period of the government -controlled marketing system.

The monitoring of the impacts of market liberalization on grains (rice, maize and cowpea) prices in Ogun of state of Nigeria is mainly limited at the wholesale level. There is limited information on the nature of price relationships between wholesalers and retailers in the vertical grains marketing system and spatial price linkages under the new emerging grains marketing structure. The outcome of such price transmission analysis is crucial for the understanding of the relationship between prices at different levels of marketing and locations, which provides insight into the new marketing issues and policies. The intuitive idea behind the measurement of the market integration is the interaction among prices in spatially separated markets. The lack of or insufficient market information flow through the marketing system and high costs of transportation negatively affects the price linkages. Most specifically, market integration is restricted to the interdependence of price changes across spatially separated locations in a market (Wyeth,1992). Middlemen are therefore able to evaluate the amount of

money consumers will have to spend when the products arrive at the retail markets so that distributors are able to speculate and anticipate demand at the retail end of the market.

Marketing of Foodgrains in Nigeria

There have been series of write-up on the ways foodgrains are marketed in Nigeria. But for now, a particular reference is made to Olukosi and Isitor (1990) who observed that the marketing system for foodgrains was characterized by many buyers and sellers. These sellers were said to be offering small quantities for sale at a time at the rural markets which are held periodically either once or twice per week. Grains are brought by the farmers to the rural markets where the rural buyers participate actively in assembling the grains. The farmers usually carry the grains to the markets in bags while the mode of transportation is usually by head potterage, bicycle, and tricycle or by motor vehicles. Prices are often determined through the process of haggling and therefore may vary from one buyer to another as there are no standardized methods of measurement for the grains. In the southern parts of the country, for instance, the grains are sold in basins, tins or bags, whereas in the northern parts of the country grains are sold in metal bowls or bags. Even where bags or metal bowls are used in all the markets, the sizes vary from one market to another and from one seller to another. This is why some Local Government Authorities introduced the use of standard bowls which all traders must use. Thus, from the isolated and non-isolated rural markets, near the farm gates, the grains are assembled in big lots and moved by motor vehicles to bigger rural non-isolated markets in town and cities.

Objectives of the Study

The general objective of this study was to assess the level of price communication in food grains (cowpea, maize and rice) marketing system in the South West region of Nigeria. Specifically, the study intended to;

- a) Examined the marketing margin and the degree of competitiveness among different markets for foodgrains
- b) Determined the extent of price transmission through different marketing levels and across markets.
- (c) Determined the causal relationship in grains prices between different marketing levels and across markets
- (d) Examined the level of variability of grains prices and price spreads for different marketing levels and across markets

LITERATURE REVIEW

In this sub-section, the researcher clearly identified and reviewed the relevant literatures on the subject matter. This exercise entailed intense library search for topics on the marketing and distribution of foodgrains and price variability both in space and time. The contributions of various past researchers on foodgrains marketing and distributions were also discussed as given below.

Harriss and Palaskas (1991) defined market as complex institutions encompassing hierarchies and interlinked transactions, which may involve simultaneous considerations of various commodities. A number of factors may however, cause the prices of the same commodity to differ in a non-proportional manner between markets. Non-homogenous commodity quality (whether real or assumed) for instance, may cause prices of the same commodity to differ by more than the cost of commodity arbitrage between markets. In such a case, a market integration test becomes more complicated involving a test for homogeneity or commodity quality as well as a test for stable price differential. Delgado (1986) defined market integration as the existence of stable price spreads between markets despite temporary price changes within seasons or over the years.

Fafchamps, *et al* (2003) stated that market liberalization varied from place to place and that the movement had affected both international and domestic markets. This differs markedly across sectors and countries. Staatz, *et al* (1989) observed that market liberalization is generally true in Africa and particularly in Nigeria that market fees do not increase proportionally with trade volume. Abalu (1986) observed that the presence of a large number of traders for a commodity grain suggests that competition is getting fierce and the proportions of sampled market participants shows that wholesalers and retailers are the two most dominant groups in the markets. This implies that there is vertical integration across the marketing chain. Ravallion (1986) stated that such equilibrium will have the property that if trade takes place at all between any two regions (market), the price in an importing region (markets) equals the price in the exporting region (market) plus the unit transport cost incurred by moving commodity between the two regions (markets).

Bias and Donovan (2004) observed that maize is the staple food and principal marketed crop in Mozambique of the basic food grains. Only maize is commonly marketed, with about 20 percent of the total production sold and 21 percent of households participating in maize markets, for the past two decades, policy and institutional frameworks in Mozambique have gone through dramatic changes as the country moved from a government that was highly centralized to a government that is decentralized with an open market oriented economy. Maize markets have been affected by these changes. The theory attests that market liberalization

improves the efficient utilization of resources. Efficient utilization in turn is affected by market efficiency which among other things, is dependent upon the level at which markets are integrated.

Donovan (1996) and Abdula (2001) applied price correlations while Abdula (2005) used Co-integration analysis to measure maize integration in Mozambique. These methods relied on price data alone and have been criticized for their ignorance of transaction costs, despite the important influence that the presence of transaction costs may exert on equilibrium spatial price relationships.

Penzhorn and Arndt (2002) and Tostao and Brorsen (2005) hold contrary view to the position of Donovan (1996) and Abdula (2001), in their consideration of data on transaction cost in their studies within the framework of the Party Bound Model (PBM). The PBM relies on price and actual transaction costs data. However, the PBM has been criticized because of the difficulty in accurately measuring transaction costs. In this study, a methodology commonly referred to as the 'threshold vector autoregressive or threshold vector error correction model (TVAR/TVECM)' was applied. The method acknowledged the influence that transaction costs exert on the integration of spatial markets, but operates without directly relying on transaction costs data which may not have been measured accurately or be available at all.

Balke and Formby (1997) noted that in addition to this, its advantage over the PBM arises from its ability to estimate dynamic price relationships i.e. the duration of adjustment processes following shocks. One major weakness of threshold models however, is the assumption that transaction costs remain constant throughout the study period. In a country like Mozambique, (and Nigeria) where poor road conditions, especially during the rainy season hamper free flow of maize and hence causes seasonal changes in transportation (transaction) costs, constant transaction cost assumption implied by threshold models may not be reasonable. In this study, attempt is made to account for seasonal variations in transportation costs occurring as a result of the impassable nature of most roads during the rainy season with the help of seasonal dummies. Bias and Donovan, (2003) observed that in Mozambique, both formal and informal traders usually compete for maize, but most traders operate on an informal level. Formal traders hold a trading license, but informal traders do not. Becoming a formal trader requires money, a large amount of paper work and considerable time (Tostao and Brorsen, 2005). In addition to being obliged to pay taxes, formal traders are subject to inspections involving the Ministries of commerce, Health, Labour and State Administration. The costs involved in formalizing trading activities are believed to have triggered the emergence of informal traders. Informal traders are not officially recognized and do not pay taxes, although they pay a symbolic stall fee to municipal authorities. Informal traders have limited access to

formal credit (working capital) and the quantity of maize they transact depends mostly upon informal or family credit. Maize is transported mainly by trucks, although only 47 percent of the roads in Mozambique.

Jayne and Jones (1997) indicated that one of the challenges for the future is that the development of market mechanisms could reduce the small farmers' vulnerability to price and supply instability thereby reducing the costs of government stabilization programs. In this regard understanding and strengthening the mechanisms of grain (rice) price transmission helps to formulate cost effective price stabilization programs and in assessing the effects of food on grain prices. In 1995/1996 cropping season the depressed producers' price had prompted the government to implement producers' price support intervention to purchase maize, beans and rice from the farmers through the Ethiopian Grain Trade Enterprise (EGTE).

Asfaw and Jayne (1997) observed that the government's role in the grain trading activity decreased and accounted for less than 5 percent of the grain marketed. Thus, there is new emerging grain marketing structure which is dominated by private traders as opposed to the pre-liberalization period of heavily government-controlled market liberalization on grain prices in Ethiopia. So far, it is mainly limited at the wholesale level. Kinnucan *et al*, (1987) noted that there are several factors, which could influence the pricing behaviour of different market participants at a given marketing levels such as traders' access to and assimilation of market information, structural differences and diversity at each marketing level, and the nature of the products. This, based on existing information, provides the description of Ethiopian grain market structure at three: Producer market, wholesale market and retail market and how these structures relate to the grains pricing behaviour of different market participants.

Gebremeskel *et al*. (1997) found that in Ethiopia there are four major channels through which producers sell their produce in two local markets. The largest channel is farmers direct sell to the interregional wholesalers (Private traders, Privates Companies and EGTE), which accounted for 35.7% of the grain marketer. The farmers also sold their grains directly to the local consumers (31.4%) and retailers (19.8%) in the local markets. About 12.1% of the grains was also purchased from the farmers by the local assemblers who largely (76%) sold to the inter-regional traders. Thus, directly or indirectly through the local assemblers, the wholesale traders accounted for the largest share of grains marketed by the farmers.

Kohls and Uhl (1985) noted that there was an average of four – firm concentration ratio in a market, which is not concentrated in less than, or equal to 33 percent. Thus, at the individual market level, the whole markets in Ethiopia were not concentrated. Under this condition, one might hypothesize that the direction of causal relationship is either from wholesale market to the producer or from the producer to the wholesale market and wholesalers

are not exercising market power. Furthermore, if the wholesale traders are not exercising market power it can be hypothesized that in the local market producer prices respond equally to price decreases and price increases at the wholesale level. In other words, there is symmetric relationship between wholesale and producer prices.

However, from the researchers' observations there is no big retail groceries engaged in retailing grains. In the local markets small traders and families with low income buy grains and sell it to the consumers in the same market or transport to other bigger markets to get some profit. There are also a number of flour mills in the urban areas, which engage in retailing of grains. In some cases, the wholesale traders themselves are also engaged in the retailing of grains. As such, there is no concentration of grain markets at the retail level in which case it is possible to hypothesize that retailers influence the prices at which they buy from the wholesalers and sell to the consumers. It is also possible to hypothesize that wholesale traders are operating competitively when selling the grains to the retailers. Thus, the price decreases at the wholesale level. There are also factors which affect the nature of price relationships among marketing levels and spatial market participants' access to market information, cost of transportation and the nature of the products. The lack of or insufficient market information flow through the marketing system and high costs of transportation negatively affect the price linkages.

Palaskas (1995) noted that the empirical models which can be used to assess the nature of grain price transmission through marketing channels are already developed and applied. He added that markets are complex institutions, encompassing hierarchies and interlinked transactions that may involve the simultaneous consideration of various commodities to expect that a simple measure based only on a price sources can be described the process of transmission of information conveyed by price signals is quite ambitious. A more systematic effort to relate the available measures of market integration to structural factors should be undertaken.

Gluschenko (2003, 2004), opined that the market is deemed integrated if the law of one price holds on it, controlling for transportation costs. Hence, in an integrated market, the price of tradable goods at any location is determined by the national market and not by local demand. Otherwise the strength of dependence of local price on local demand measures market segmentation (or conversely, integration: the smaller the segmentation, the higher the integration). There is practically achievable degrees of integration in Russia, two versions of estimations yield the values of 0.047 and 0.055. The value of β over Russia excluding difficult-to-access regions for 2000 equals circa 0.06, the estimates for the US and Russia proved to be very close. This suggests that the Russia β has, In fact, the Crude value of 0.1. However, this

does not cancel a conclusion made by Gluschenko and Kulighina (2006). The results obtained suggest that the degree of integration of the Russia market in 2001 – 2007 is rather stable, fluctuating around some stable level. These fluctuations can be assigned for the most part to random shocks and sometimes to seasonal phenomena. It can be believed that the degree of integration in 2001 – 2007 is roughly the same that was reached by 1999 – 2000. In contrast to previous findings, no sufficient difference is found between integration in Russia excluding difficult – to – access regions and European Russia. The pattern obtained gives grounds to surmise that levels of integration in 2001 – 2007 are those of practically achievable degrees of integration in Russia at present time.

Fafchamps *et al* (2003) stated that market liberalization varied from place to place, the movement has affected both international and domestic markets. This differs markedly across sectors and countries. Staatz, *et al* (1989) observed that, market liberalization is particularly true in Africa in general and Nigeria in particular that market fees do not increase proportionally with trade volume, they affect primarily small to medium size traders, they are a regressive tax. Abalu (1986) observed that the presence of a large number of traders for a commodity grain, suggest that competition is tend to fierce and the proportions of sampled market participants shows that wholesalers and retailers are the two most dominant groups in the market surveyed. The small category is the assembler. This implies that there is vertical integration across the marketing chain.

Adekanye (1988) stated that, the absence of adequate information on commodity marketing in the north-southern of grains marketing policy in Nigeria will take place in an information vacuum. Okeke (1997) stated that, the information vacuum is the result of little empirical knowledge of market structure, the behaviour of the various actors in the marketing system and the constraints they face that impede further innovation in the food sub-sector. Onu (2000) stated that, the food grains play an especially important role in Nigeria as staples in many homes and secondly, the structure and conduct of the food grain market can affect the economy of the people in the communities and the nation's economy in significant ways. Dedyanto (2001) observed that regarding the disappearance of the very information barriers, it is expected that the price will move naturally following the law of supply and demand equality. The traders provided information on the transactions they undertook during the trading year. A transaction is essentially a load that is assembled by the trader in the supply market, transported to the sales markets and sold over a period of time. Sushil (1993) stated that the parameter and variables that influence rice price equilibrium could be derived by using system dynamic approach (SD) for complex system. Gersovitz (1989) stated that marketing costs per unit are in general functions of the quantities handled by each individual trader, the distance

traveled between trader and his or her supplier and the number of intermediaries between producer and consumer and marketing efficiency is achieved by concentrating all trade into the hands of a single trading firm and market efficiency can thus be studied by analyzing the shape of the unit cost function.

METHODOLOGY

Sampling and Data collection

Primary data, collected with the aids of structured questionnaire from the food grains traders was used. The target middlemen were the wholesalers and retailers of grains traders. The data was drawn from 12 different markets spread across four states in the South West region of Nigeria. Multi – stage sampling technique was used in the collection of data which involved on- the- spot weighing of food grains. Specifically, information were obtained from foodgrains marketers in Bodija,Oje and Iloro markets (Oyo State), Ayetoro, Kuto and Makun markets (Ogun State), Iyalaje, Iloro and Osele markets (Ondo State) and Ojido, Oja-Oba and Mojere markets (Ekiti State) Complete enumeration was done for the wholesalers and retailers and twenty respondents were randomly sampled from each of the twelve markets. Thus, a total of 240 respondents were analyzed for the study which lasted 6 months. Secondary data were also collected from published materials such as quarterly bulletins, annual reports of corporate institutions, textbooks, journals and other relevant materials. Secondary data was mainly the retail price series that was collected from the statistical division of the Ministry of Finance and Economic Planning covering the period between 2000 and 2017. This period was basically selected because it witnessed the era of immense price variations across foodgrain markets especially in distant locations in rural areas within the south West region of Nigeria. Factors such as irregularity in rainfall pattern, insect pest attack and agronomic variables such as soil pH, texture, fertility and temperature, among others. Thus, household consumers of the commodities, in some cases had limited access even for their livestock. This scenario has an over-bearing implication on the consumers' welfare and productivity of labour. This study therefore, investigated the level of variability in foodgrain prices across markets that are spatially separated in the region.

Analytical Techniques

Both quantitative and descriptive analyses were carried out in the study. The socio – economic and demographic variables like age distribution, sex, benefit from larger sales, problem on marketing, problem against expansion, level of education of traders involved, identification of marketing channels, identification of sources and amount of initial capital was

analyzed using descriptive statistics. The simple or multi- linear regression model was used to determine whether the retail price reflects the marketing costs adequately.

Estimation of Market Parameters

(A) Marketing Margin: $\frac{\text{Consumer Price} - \text{Purchase Price}}{\text{Consumer Price}}$

For the purpose of this survey study, marketing costs include such costs as transportation cost, storage facilities cost, market levy charges and other costs (risk) were considered.

(B) Pricing Efficiency

The ratio $\frac{P}{Uc}$ was used as a measure of pricing efficiency,

Where,

P = Retail Price per kg and Uc = Cost per kg incurred by the marketer including unit cost of purchase, unit marketing costs and a profit margin as defined/estimated above.

When $\frac{P}{Uc} = 1$, there is pricing efficiency.

It implies that retail price reflects all costs, i.e all costs were accounted for in the retail price.

If $\frac{P}{Uc}$ is greater than or less than 1, there was price inefficiency

Regression Model measuring retail-wholesale Price relationship

To investigate retail-wholesale price relationship, the regression model stated below, was used:

$$Pr = \alpha + \beta Pw \dots\dots\dots (1)$$

Where,

Pr is the retail price and Pw is the wholesale price of grains while α and β are the regression coefficients. In computing the extent to which changes in the retail price of grain respond to change in their wholesale price, the model is represented by

$$\frac{dp_r}{dp_w} = \frac{pw}{pr} \dots\dots\dots (2)$$

Where,

$\frac{dp_r}{dp_w}$ and $\frac{pw}{pr}$ represent the derivative of equation which measures the elasticity of the retail and wholesale prices of grains respectively.

Analysis of Foodgrains Price Transmission

The analysis of the nature of foodgrains price transmission through different marketing levels and across markets was done to see the vertical and spatial integration of grains markets. The first approach in the analysis of grains price transmission was to determine which marketing levels (or locations) played an important role in determining the prices of grains. The directions of price movement were also tested empirically using Granger Causality test. The model to test the null hypothesis that in a given market the wholesale price caused changes in retail price is given as follows.

$$R_t = \theta_1 + \alpha_{1i} \sum_{i=1}^n R_{t-i} + \beta_{1i} \sum_{i=1}^n W_{t-i} + \varepsilon_{1t} \dots \dots \dots (3)$$

Where,

R_t is the retail price time t , θ_1 , is the intercept, α_{1i} s are the coefficients on the lagged value of retail prices. β_{1i} s are the coefficients on the lagged values of wholesale price, i is the lag length used for retail and wholesale prices and ε_{1t} is the disturbance term at time t . On the other hand, to test the null hypothesis that the retail price does not cause changes in the wholesale price the model given in equation (3) above is thus modified as follows:

$$W_t = \theta_2 + \alpha_{2i} \sum_{i=1}^n R_{t-i} + \beta_{2i} \sum_{i=1}^n W_{t-i} + \varepsilon_{2t} \dots \dots \dots (4)$$

Where,

W_t is the wholesale price at time t and other variables are as defined in equation (C) above The analysis involving descriptive assessment of grain price levels and price spreads at different marketing stages (wholesale and retail) and market locations. The magnitude of price spread and the differences in the variability of price levels at different marketing levels and locations was used to give an initial insight into the efficiency of grain marketing.

Price correlation as a measure of market integration

The inter-relationship between price movements in two markets is defined as market integration (Engle and Granger, 1987). In order to have an overall impression of the extent to which the grains markets and retail level provide an integrated marketing system, price correlation coefficients of retail prices for each of the three grain crops in every pair of markets were calculated for the period 2000-2017. Price correlation coefficient was also used to see the strength of price linkages between different marketing levels and across markets. These correlations are the easiest way to measure co-movements of prices in spatial markets.

RESULTS AND DISCUSSION

Analysis of Marketing Margin for Foodgrains in South West Region of Nigeria

Generally, marketing margin could be defined as the difference between the price paid by the final consumer and that which was received by the producers of a given commodity. It refers to the difference in prices paid for a commodity at different stages of the marketing system. However, time, place, form and possession are important factors that are often considered in the estimation of the marketing margins. Olukosi and Isitor (1990) noted that the magnitude of the total marketing margin is a reflection of the product characteristics with particular reference to the complexity of the marketing functions that must be performed as the product passes through the marketing system.

For the three foodgrains being handled (rice, cowpeas and maize), the estimated values of the respective marketing margins are provided in Tables 1-3. These values varied from one market location to another. It also varied according to the commodities. For rice, for instance, the marketing margins ranged between 0.4872 -0.5759 (Oyo State), 0.3968-0.5928 (Ekiti State) and 0.3997-0.5026 (Ondo State). For cowpeas, the marketing margins ranged between 0.6627- 0.8271 (Oyo State), 0.2813-0.9931 (Ekiti State) and 0.6631-0.8372 (Ondo State). For maize however, for the same period, the marketing margins ranged between 0.5940-0.7381 (Oyo State), 0.3930-0.7370 (Ekiti State) and 0.2810-0.7834 (Ondo State). All things being equal, the smaller the size or the magnitude of the marketing margin for a given commodity, the more efficient the marketing system tends to be and the better for the consumers.

Table 1: Marketing Margins for Rice Markets

Market	Number of Marketers	Mean	Standard deviation
Bodija	20	0.5759	0.0027
Oje	20	0.5223	0.0024
Iloro	20	0.4872	0.0025
Ojido	20	0.3968	0.0036
Oja-Oba	20	0.5125	0.0026
Mojere	20	0.5928	0.0056
Iyalaje	20	0.4990	0.0029
Iloro	20	0.5026	0.0019
Osele	20	0.3997	0.0044
Kuto	20	0.6628	0.0038
Makun	20	0.5397	0.0059
Ayetoro	20	0.4738	0.0042

Table 2: Marketing Margins for Cowpeas Markets

Market	Number of Marketers	Mean	Standard deviation
Bodija	20	0.6627	0.0083
Oje	20	0.8271	0.0023
Iloro	20	0.7280	0.0562
Ojido	20	0.2813	0.0227
Oja-Oba	20	0.4822	0.0199
Mojere	20	0.9931	0.1982
Iyalaje	20	0.6631	0.8830
Iloro	20	0.8372	0.0562
Osele	20	0.7821	0.1179
Kuto	20	0.8832	0.0728
Makun	20	0.6161	0.1882
Ayetoro	20	0.8823	0.0662

Table 3: Marketing Margins for Maize Markets

Market	Number of Marketers	Mean	Standard deviation
Bodija	20	0.5940	0.0228
Oje	20	0.7381	0.0378
Iloro	20	0.6938	0.0483
Ojido	20	0.4001	0.4821
Oja-Oba	20	0.7370	0.0283
Mojere	20	0.3930	0.0671
Iyalaje	20	0.6902	0.8833
Iloro	20	0.7834	0.0774
Osele	20	0.2810	0.0637
Kuto	20	0.8830	0.07739
Makun	20	0.7739	0.0721
Ayetoro	20	0.5937	0.1628

Measurement of Pricing Efficiency levels of Rice Marketers

Pricing efficiency naturally measures how effectively prices reflect the costs of moving a commodity through the marketing space. It is often expected that the prices paid by the consumers should reflect all the marketing and production costs for a given commodity. Ordinarily, in a perfectly competitive economy, the consumer price should reflect all these costs. Thus, pricing efficiency refers to the improvement of the operations of buying and selling and the pricing aspects to manifest the consumer wishes. Pricing efficiency could be enhanced through grading of the products, standardizing and quality control and provision of reliable market information. The closer the pricing efficiency values to unity, the

more efficient it is. The value is inefficient when it is either less than or more than unity (Olukosi and Isitor, 1990; Adegeye and Dittoh, 1985).

For the foodgrains being investigated, the estimated pricing efficiency values were shown in Tables 4-6. There was no efficient pricing for foodgrains in all the markets in Ogun State as the efficiency value was not unity in any of the markets. For example, for the rice marketers, the pricing efficiency values ranged between 0.1793-0.4318 (Oyo State), 0.1946-0.3917 (Ekiti State) and 0.1323-0.6796 (Ondo State) Table 4. Similarly, the pricing efficiency values for cowpeas ranged between 0.2791-0.8724 (Oyo State), 0.2430-0.4783 (Ekiti) and 0.4637-0.8900 (Ondo State) Table 5. For maize, however, the pricing efficiency values ranged between 0.6108-0.9446 (Oyo State), 0.3378-0.7112 (Ekiti State) and 0.4799-0.8316 (Ondo State) Table 6. It therefore showed that since there was a general case of pricing inefficiency in all the foodgrains markets, the consumers of the commodities could not fully derive, to the fullest levels, the expected quantum of satisfaction from the purchase and consumption of these foodgrains in all the markets in the state. To increase the levels of consumer satisfaction therefore, there is the need to properly examine the various functions being performed at different stages of foodgrains marketing and check for the appropriateness (or otherwise) of the attached costs values. This is to ensure that consumers are adequately compensated for their transactions in foodgrains business.

Table 4: Estimation of the level of Pricing efficiency of Rice marketers

Market	Number of Markets	Mean	Standard deviation
Bodija	20	0.4318	0.0666
Oje	20	0.1793	0.0063
Ilori	20	0.2685	0.00769
Ojido	20	0.3917	0.00685
Oja-Oba	20	0.2107	0.0141
Mojere	20	0.1946	0.1742
Iyalaje	20	0.4527	0.0013
Iloro	20	0.6796	0.0469
Osele	20	0.1323	0.1723
Kuto	20	1.6628	0.0231
Makun	20	0.8849	0.1339
Ayetoro	20	0.9962	0.0821

Table 5: Estimation of the level of Pricing efficiency of Cowpeas marketers

Market	Number of Markets	Mean	Standard deviation
Bodija	20	0.8724	0.2129
Oje	20	0.4044	0.6270
Iloro	20	0.2791	0.5551
Ojido	20	0.3240	0.0550
Oja-Oba	20	0.2430	0.1292
Mojere	20	0.4783	0.0696
Iyalaje	20	0.5334	0.0983
Iloro	20	0.8900	0.2004
Osele	20	0.4637	0.9273
Kuto	20	0.8216	0.1292
Makun	20	0.3884	0.9982
Ayetoro	20	0.7659	1.0072

Table 6: Estimation of the level of Pricing efficiency of Maize marketers

Market	Number of Markets	Mean	Standard deviation
Bodija	20	0.7906	0.4932
Oje	20	0.9446	0.4731
Iloro	20	0.6108	0.8729
Ojido	20	0.5810	0.2695
Oja-Oba	20	0.3378	0.3722
Mojere	20	0.7112	0.2490
Iyalaje	20	1.0749	0.4765
Iloro	20	0.4799	0.3971
Osele	20	0.8316	0.4042
Kuto	20	0.8938	0.8832
Makun	20	0.9947	1.8839
Ayetoro	20	0.7710	2.8810

Determination of the casual Relationship between Foodgrains prices and Markets

For rice markets in Oyo State of Nigeria, there were strong inter-relationships between the retail and wholesale prices of the commodities. This was manifested by the values of the adjusted R^2 as indicated in Table 8. Strongest price relationship was however noted for the product in Oje market (Oyo State) with adjusted R^2 value of 71 %. Similar trends were also observed in the other three divisions with the highest R^2 value of 83 % in Kuto market (Ogun State) and the least value of 41 % in Osele market (Ondo State). High R^2 values indicated that wholesale prices of rice had appreciable effects on their retail prices. This high correlation is expected because the retailers' main source of supply for the commodity is the wholesale market, so that the marketing system for rice approximates rather closely the redistributive model.

Table 8: Regression of retail-wholesale prices for rice

Regression: $Pr = \alpha + \beta Pw$

Market	Constant	Coefficient	Adjusted R ²	T-value
Oyo State				
Bodija	13.89	3.13(0.2266)	0.67	13.81*
Oje	47.11	1.22(0.1092)	0.71	11.17*
Iloro	53.02	2.34(0.3933)	0.56	5.95*
Ekiti State				
Ojido	63.23	1.88(0.1484)	0.68	12.67*
Oja-Oba	55.45	4.10(0.2497)	0.60	16.42*
Mojere	26.44	2.55(0.1082)	0.77	23.56*
Ondo State				
Iyalaje	12.23	2.23(0.4364)	0.82	5.11*
Iloro	8.99	4.80(0.1325)	0.58	36.22*
Osele	25.12	3.57(0.1515)	0.41	23.56*
Ogun State				
Kuto	65.45	6.11(0.8754)	0.83	6.98*
Makun	73.23	1.67(0.5819)	0.77	2.87**
Ayetoro	55.42	6.23(1.3227)	0.63	4.71*

Figures in parentheses are standard errors

* = Indicates significant at 1 % level

* = Indicates significant at 5 % level

Similarly for cowpea, the values of the regression coefficients are generally high. Iloro market, in Ondo, recorded the highest regression coefficient value of 96 % while Kuto market, in Egba division, recorded the least value of 56 % (Table 9). High regression coefficient values indicated that for all the markets these values are significantly different from zero. This implies that the wholesale price of cowpeas also has an effect on the retail price of the commodity. This crop comes from areas of specialized production both in the Northern and Eastern States. Little quantities of cowpeas are also often supplied by the local farmers in the State.

Table 9: Regression results of retail-wholesale prices of cowpeas

Regression: $Pr = \alpha + \beta Pw$

Market	Constant	Coefficient	Adjusted R ²	T-value
Oyo State				
Bodija	43.86	1.05(0.1477)	0.62	7.11*
Oje	87.45	3.93(0.6528)	0.56	6.02
Iloro	73.96	3.92(0.7762)	0.64	5.05*
Ekiti State				
Ojido	69.12	9.10(0.0130)	0.91	6.99*
Oja-Oba	85.12	1.95(0.0867)	0.83	22.48*

Mojere	58.43	1.11(0.0614)	0.59	18.07*
Ondo State				
Iyalaje	112.01	3.56(0.7463)	0.75	4.77*
Iloro	45.80	3.01(0.0456)	0.96	66.06*
Osele	63.80	3.95(0.2129)	0.72	18.55*
Ogun State				
Kuto	89.75	6.96(0.8614)	0.71	8.08*
Makun	59.08	2.99(0.9373)	0.79	3.19*
Ayetoro	18.95	3.12(0.6166)	0.68	5.06*

Table 9...

Figures in parentheses are standard errors * =Indicates significant at 1 % level

For maize, the regression results showed low R^2 values ranging between 43 % in Bodija market (Oyo State) and 16 % in Kuto market (Ogun State). This is shown in Table 10 below. The implication of this is that the wholesale price of maize has no appreciable influence on its retail price. This is probably because the retailers obtain their supplies, not only from the wholesale distributors, but also from the local farmers who often take part of their maize to the central markets for sale. It should be noted that maize is unarguably the most popular food grain among the farmers in South West Nigeria because of its agro-ecological advantages.

Table 10: Regression results of retail-wholesale prices for maize

Regression: $Pr = \alpha + \beta Pw$

Market/Town	Constant	Coefficient	Adjusted R^2	T value
Oyo State				
Bodija	8.49	4.82(0.7006)	0.43	6.88*
Oje	31.67	2.56(0.3694)	0.39	6.93*
Iloro	15.56	2.90(2.5893)	0.29	1.12
Ekiti State				
Ojido	43.12	6.94(2.639)	0.23	2.63**
Oja-Oba	34.88	5.67(0.3453)	0.48	16.42*
Mojere	59.09	1.63(0.3280)	0.26	4.97*
Ondo State				
Iyalaje	8.67	4.32(0.5414)	0.31	7.98*
Iloro	4.90	1.85(0.0806)	0.22	22.96*
Osele	45.76	1.53(0.0349)	0.35	43.76*
Ogun State				
Kuto	34.76	8.65(0.1590)	0.16	54.41*
Makun	28.75	3.67(0.9787)	0.24	3.75*
Ayetoro	77.93	4.31(0.5483)	0.30	7.86*

Figures in parentheses are standard errors

*=Indicates significant at 1 % level **=Indicates significant at 5 % level.

The estimation of the foodgrains elasticities enables us to know the extent to which changes in the wholesale price of grains are manifested in the changes in the retail price. The underlining assumption here is that, in the short-run, the retail price of grains is a function of its wholesale price. The elasticities of wholesale-retail price of rice, cowpeas and maize is presented in Table 11 and it is shown that all the estimated elasticities of the selected foodgrains are below unity. This indicates that a change in the wholesale price of foodgrains resulted in less than a proportionate change in the retail price.

On the average, cowpeas have the highest elasticities, followed by rice, while maize has the lowest. Thus, a one-percentage increase in the wholesale price of foodgrains resulted in 75.77%, 59.49 % and 76.15 % increase for rice, maize and cowpeas respectively. The implication of this is that not all the increases in the wholesale price of grains are transferred to the consumers /retailers. Cowpeas recorded the highest elasticity value because the retailers of the commodity are able to pass on to the consumers a greater percentage of any increase in the wholesale prices. This is prompted by the fact that the consumers are mainly depended upon them (retailers) for those commodities

Table 11: Elasticity of retail- wholesale prices of foodgrains

Market	Rice	Maize	Cowpeas
Bodija	0.600	0.2895	0.8203
Oje	0.610	0.4044	0.9446
Iloro	0.8867	0.2791	0.6108
Ojido	0.5308	0.3240	0.8100
Oja-Oba	0.7051	0.7430	0.5378
Mojere	0.8112	0.4783	0.5468
Iyalaje	0.9556	0.9843	0.9873
Iloro	0.9758	0.5334	0.9749
Osele	0.9845	0.8900	0.7799
Kuto	0.6101	0.4637	0.8316
Makun	0.6252	0.8724	0.8203
Ayetoro	0.7976	0.8761	0.4732
Average	0.7577	0.5949	0.7615

Price Correlation as a measure of market integration

Market integration is a measure of the level of inter-relationship between price movements in two markets. To fully capture the extent to which the grains retail markets provide an integrated marketing system, simple correlation co-efficient of retail prices of each of the three grains crops in every pair of markets were calculated for the period 2000-2017. The

results are shown in Tables 12-14. Generally, high price correlation co-efficient values were obtained for the pairs of retail prices of rice and cowpea. This was indicated in Tables 12 and 13. The case of maize, as shown in Table 14, is however quite different as low price co-efficient values were obtained for the pairs of retail prices in the markets. Since the correlation co-efficient values are the manifestation of the level of flow of information and price communication between markets, the marketing system for rice and cowpeas are seen to be well integrated. Thus, the commodities that come mainly from areas of specialized production tend to have high correlation values. It has therefore been noted that rice and cowpeas feature more prominently in the inter-state trade and there is high level of competition amongst the retailers for available supplies from the wholesalers from the specialized producing areas in the northern and eastern parts of the country. The case of maize is however different as most of its supply is obtained from the retailers who sell it fresh and green from the producers or after it has been sundried.

Table 12: Bivariate correlation between prices for rice in South West Nigeria

Market	A	B	C	D	E	F	G	H	I	J	K	L						
A	1.0																	
B	.67	1.0																
C	.63	.85	1.0															
D	.86	.60	.68	1.0														
E	.78	.76	.79	.86	1.0													
F	.88	.75	.69	.77	.85	1.0												
G	.82	.67	.85	.76	.71	.73	.83	.61	1.0									
H	.75	.95	.68	.90	.55	.84	.76	.77	.75	.87	1.0							
I	.56	.70	.64	.61	.83	.75	.65	.94	.79	.78	.56	.70	1.0					
J	.91	.59	.75	.69	.74	.85	.88	.68	.76	.68	.75	.70	.65	.85	1.0			
K	.74	.94	.69	.68	.69	.74	.91	.60	.66	.85	.74	.74	.69	.78	.57	1.0		
L	.85	.66	.80	.84	.69	.69	.71	.60	.87	.91	.59	.79	.89	.60	.74	.89	.59	1.0

Table 13: Bivariate correlation between prices for cowpeas in South West Nigeria

Market	A	B	C	D	E	F	G	H	I	J	K	L						
A	1.0																	
B	.91	1.0																
C	.83	.61	1.0															
D	.71	.55	.71	1.0														
E	.65	.88	.93	.66	1.0													
F	.91	.95	.58	.49	.83	1.0												
G	.66	.77	.93	.69	.88	.73	.94	.75	1.0									
H	.78	.66	.58	.74	.57	.81	.76	.94	.69	.71	1.0							
I	.83	.78	.68	.93	.67	.83	.78	.95	.71	.87	.56	1.0						
J	.67	.63	.77	.68	.78	.65	.94	.71	.88	.96	.66	.76	.55	.89	1.0			
K	.54	.78	.53	.85	.76	.88	.95	.67	.66	.87	.84	.92	.88	.85	.67	1.0		
L	.75	.89	.78	.67	.75	.89	.77	.66	.57	.92	.87	.64	.69	.90	.78	.74	.67	1.0

Table 14: Bivariate correlation between prices for maize in South West Nigeria

Market	A	B	C	D	E	F	G	H	I	J	K	L						
A	1.0																	
B	.38	1.0																
C	.28	.48	1.0															
D	.18	.39	.25	1.0														
E	.28	.25	.39	.46	1.0													
F	.18	.15	.28	.38	.34	1.0												
G	.29	.12	.23	.38	.41	.29	.32	.38	1.0									
H	.29	.42	.39	.23	.48	.21	.46	.24	.31	.19	1.0							
I	.16	.26	.38	.25	.10	.43	.28	.31	.13	.27	.22	.26	1.0					
J	.27	.23	.20	.39	.22	.28	.30	.21	.28	.35	.32	.42	.20	.44	1.0			
K	.18	.19	.29	.21	.35	.30	.47	.37	.33	.37	.30	.39	.32	.37	.35	1.0		
L	.28	.29	.37	.48	.54	.20	.50	.31	.20	.39	.47	.39	.31	.20	.32	.26	.35	1.0

Legend on the Markets:

A	B	C	D	E	F	G	H	I	J	K	L
Bodija	Oje	Ilora	Ojido	Oja-Oba	Mojere	Iyalaje	Iloro	Osele	Kuto	Makun	Ayetoro

RECOMMENDATIONS

There is a persistent variation in the prices of foodgrains both in space and time. This variation has over-bearing effects on the level of consumer demand and retail prices of foodgrains in South West Nigeria. In this study, the researcher investigated the extent of spatial integration and price communication in food grains markets in South West Nigeria. Results have indicated that there is a strong relationship between the wholesale and retail prices of food grains. This is however not so for maize since it could also be sourced from the local farmers in the neighbourhood. High elasticity values for wholesale-retail prices again indicated that increases in wholesale prices was capable of provoking a rise in retail prices in all the divisions in the State. This is thus a matter of concern for the policymakers as they need to be interested in all matters that may mitigate the trends of household consumption of the consumers. The estimated price correlation co-efficients analysis again indicated that there was a strong relationship between the pairs of market prices of rice and cowpeas as these commodities are mainly supplied by the producers in the specialized producing areas of the country. It should be added that a huge quantity of rice being consumed within South West region of the country are imported (or smuggled) from other countries such the Republic of Benin, Thailand, Togo and China among others. Despite recent efforts by the Federal government, only sizeable quantities of rice were sourced from the local farmers until the last two years when the import restriction policy of the Federal Government started yielding dividends. The case is however different for maize which, apart from the specialized producers, could also be supplied by the nearby local farmers. It is therefore recommended that appropriate government policy frameworks be put in place to ensure that regulated (controlled) market prices for foodgrains in the region. Customs and Immigration officials and other relevant government agencies should ensure proper monitoring of activities of the marketers, particularly those dealing in importation of food items from other countries so that illegal importation of foodgrains is totally checked. With this, the market agencies will be able to properly monitor the retail prices of foodgrains and thus stabilize prices.

CONCLUSION

In conclusion, therefore, there should a stable agricultural policy that will ensure moderate wholesale prices and, by extension, retail prices of food grains so that the average household consumption level of the commodities could be sustained at high levels. Again, the government should step up on all efforts towards ensuring increased local production and supply of foodgrains. Enabling environment should also be provided for the local farmers so that they can increase the level of local production and market supply of the grains among the

residents of the state. This will force down the retail prices for grains. If this is done, the quantity of intake of foodgrains and the health standard of the residents and livestock animals in the state will improve.

SCOPE FOR FURTHER STUDIES

This study investigated the degree of integration and communication is spatially located foodgrain markets in South West region of Nigeria. Twelve markets were randomly sampled for the study across the four States (Oyo, Ogun, Ekiti and Ondo) in the region. These four states represent only 11.11 percent of the 36 States in Nigeria. Findings from this study may therefore not sufficiently represent the pattern of price variation and communication in foodgrain markets in the remaining five geo-political regions (North Central, North East, North West, South South and South East) of Nigeria. For further studies, therefore, it may be recommended that similar researches be conducted across the remaining geo-political zones and findings compared to appreciate the similarities (or otherwise) in the price integration and communication indices in foodgrain markets in Nigeria.

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