



## **ANALYSIS OF PRICE STABILITY OF RICE AND CO-MOVEMENT IN URBAN MARKETS IN NIGER STATE, NIGERIA**

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### **ABSTRACT**

The aim of the study was to examine the economic impact of price stability of rice in Niger State, Nigeria. The study determined the relationship between and among rice prices in the study area. One urban market and three rural markets were purposively selected from each of the three (3) agricultural zones. Secondary data on monthly rural and urban retail prices of local rice were used. The data were sourced from Niger State Agricultural Mechanization Development Authority (NAMDA). The time series data covered the period 2009 to 2018. The study utilized coefficients of variation (CVs) and correlation coefficients to determine price dispersion and behavior of local rice in selected markets of Niger State. The coefficients of variation of the prices of rice indicate that all CVs are less than 100% which showed that the prices cluster around the mean price. Also, the correlation coefficients of retail prices of rice in the urban markets of Bida and Kontagora showed high and significant correlation. It indicates a high co-movement of prices of rice between the two urban markets. No correlation between Bida and Minna. This implies that as price increases in one market, it increases in the other markets. It can be inferred from the result that there was positive correlation among the two urban markets of Bida and Kontagora (0.85). and no significant correlation between Bida and Minna, respectively. The study recommended efficient dissemination of market information on the prevailing rice prices and provision of market infrastructures such as road network.

**Keywords:** Co-movement, market, Price stability, Rural, Time series, Urban.

### **INTRODUCTION**

Rice is a dietary staple of more than half of the world's human population making it the most consumed cereal grain. Rice cultivation is well suited to countries and regions with low labour costs, as it is very labour-intensive to cultivate. High rainfall is necessary as it requires plenty of water and at times irrigation. Rice is the world's third largest cultivated crop, behind maize (corn) and wheat (<http://en.wikipedia.org/wiki/Rice> 11<sup>th</sup> May, 2017).

The Nigeria rice sector has witnessed some remarkable developments over the last few years. Both production and consumption have greatly increased during the last four years (Alhassan, 2017). This increase is driven by many factors including urbanization, changes in employment patterns, rising income levels, shift in consumers preferences and rapid population growth.

Agricultural prices information is crucial to enable farmers and traders make better decisions. This is to inform the farmers about what to grow, when to harvest, to which markets produce should be sent and whether to store crops or not (Paulo, 2017) and for traders to know which markets to frequent. The point of first sale of agricultural products constitutes a good point for determining the market price.



Recent research in low-income countries has shown that high transfer costs and marketing margins may hinder the transmission of price signals, as they may prohibit arbitrage. Oligopolistic behavior and collusion among domestic traders may retain price differences between markets at levels higher than those determined by transfer costs and hinder the full price transmission and market integration (Babiker *et al.*, 2009).

The current volatility in food prices is an issue of a truly global nature. It has complex causes and impacts, and requires a complex response. Current development on global food marketing is having dramatic implications for food security among poor people. At the same time, speculative factors and actions contribute to the price instability and volatility. Instability in the prices of cereal grains is one of the major concerns for policy makers and development practitioners world-wide. During the last five years international and domestic food prices spiked multiple times and have remained volatile. But the degree of volatility is unknown for rice in Nigeria in general, and in Niger State in particular. This development has serious consequences, especially for the poor who spend a large share of their income on food consumption.

Stability in prices of grains stimulate agricultural production and marketing efficiency yet research in this area conducted in Niger state is scanty. The study therefore attempted to: assess the extent or the level and spread of stability on local rice prices; and determine the behavior of retail prices of rice between rural and urban markets in the study area.

This effort is expected to bridge the research gap in this aspect of agricultural marketing in Niger State. Agricultural prices are significant economic variables or tools in market analysis. Accurate and reliable agricultural price information for rice in different areas at different time is necessary for any rational policy on prices of agricultural products. The relationships between and among prices of cereal crops play an important role on farmers decisions on the type and volume of agricultural production activity. Assessment of the stability of the market price for rice across spatially linked markets would help in understanding the nature of price relationship. This would be useful in contributing towards appropriate design of agricultural price policies.

## **MATERIALS AND METHODS**

### **The Study Area**

The study was conducted in Niger State. Niger State falls within latitudes 6° 30' to 11° 20' North and longitude 2° 30' to 10° 30' East. The State is located in the Southern Guinea Savannah ecological region of Nigeria. Niger State covers a land area of 76,363 km<sup>2</sup> which is about 8.27 percent of the total land area of Nigeria. Agriculture is the primary occupation of the people of the State employing over 55-60% of the total population. In rural communities of the state, agriculture and its allied activities provide jobs for more than 80% of their population. The state is one of the major producers of rice; other crops cultivated in Niger State include maize, millet, sesame, soya beans and sugar cane. The State is geographically grouped into three agricultural zones: Zone 1, Zone 2 and Zone 3 with the zones having 8, 9 and 8 Local Government Areas (LGAs), respectively. The zonal headquarters are Bida, Kuta and Kontagora, respectively. The study area experiences two distinct climatic seasons in a year, the (rainy and dry seasons) respectively. Rainfall is steady and is evenly distributed, usually between May and November, varying from 1,100mm in the North to 1,600 mm in the South, peaking in August. The dry season commences in November and the relative humidity could be as low as 14%- 40% between December and January and as high as 66%- 88% in the rainy season. The maximum temperature does not exceed 37<sup>0</sup>C, and is recorded between March and



June, while low temperatures are recorded in December to January (Niger State Agricultural Mechanization Development Authority, 2016).

**Sources of Data**

Secondary data on monthly rural and urban retail prices of local rice were used. The data were sourced from Niger State Agricultural Mechanization Development Authority (NAMDA) and National Bureau of Statistics (NBS). The data covered the period of 10 years, 2009 to 2018 for a total of 120 monthly observations.

**Data Collection for the Study**

The monthly price of rice in ₦/kg covered the period between 2009 and 2018. The markets at Gulu, Lenfa, Muwo, Tegina, Sabon wuse, Kwakuti, kaboji, Lioji and Shambo were selected as rural and those in Minna, Bida and Kontagora as urban markets.

**Data Analysis**

Coefficients of variation and Correlation were used to examine price behavior in rural and urban markets in the study area.

$$(a) C V = \frac{s}{\bar{x}} \times \frac{100}{1} \dots(1)$$

where;

C V = coefficients of variation

S = Standard deviation

$\bar{X}$  = mean of retail price of rice.

The coefficients of variation (C.V) showed the spread or dispersion of prices in different markets.

(b) The Pearson Product Moment Correlation analysis

$$r_{xy} = \frac{n\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[n(\Sigma X^2) - (\Sigma X)^2][n(\Sigma Y^2) - (\Sigma Y)^2]}} \dots(2)$$

where;

r = correlation coefficient

Y = price of rice in urban market

X = price of rice in rural market

N = total number of observations

$\Sigma$  = summation

**RESULTS AND DISCUSSION**

**Price Variability of Average Monthly Retail Prices of Rice in Urban Markets**

The Coefficient of variation and Pearson product movement correlation analysis were used to evaluate the price behavior of rice in both urban and rural markets of Niger State. The price variability of average monthly retail price of rice in urban markets is presented in Table 1. The coefficient of variation of rice in kontagora was 29.25% that of Bida was 27.05% and that of Minna was 20.82%. These are indicative of low-price variability as the coefficients of variations are all less than 100%. This shows that the prices cluster around the mean prices for the variables.



Table 1: Price variability of average monthly retail prices of rice in urban market

Table with 4 columns: Markets, Bida, Minna, Kontagora and 4 rows: Parameters, MEAN, SD, CV(%).

Source: Data Analysis, 2019

Price Variability of Average Retail Prices of Rice in Rural Markets

The price variability of average monthly retail price of rice in rural markets is presented in Table 2. It shows that the coefficient of variation (CVs) of rice in Sabo wuse, Tegina, Lioji and Shambo were 51.02%, 46.47%, 41.55% and 40.22%, respectively.

Table 2: Price variability of average monthly retail price of rice in rural markets

Table with 10 columns: Markets, Gulu, Lenfa, Muwo, S/Wuse, Tegina, Kwakuti, Kaboji, Lioji, Shambo and 4 rows: Parameters, MEAN, SD, CV(%).

Source: Data Analysis, 2019

The coefficient of variation (c.vs) of rice in Sabo wuse, Tegina, Lioji and Shambo were 51.02%, 46.47%, 41.55% and 40.22%, respectively. For Gulu, Table 3 shows the correlation coefficients of retail prices of rice in the urban markets.

Table 3: Correlation among retail prices of rice in urban markets of Bida, Minna and Kontagora

Table with 4 columns: Bida, Minna, Kontagora and 4 rows: Bida, Minna, Kontagora.

Source: Data Analysis, 2019

The high and significant correlation between Bida and Kontagora is an indication of co-movement of prices between the two urban markets. In addition, the co-movement of prices between Bida and Minna is also positive but less significant compared to that of Bida and Kontagora.



high correlation coefficient of rice in Osun State, with the coefficient of variation results as Osogbo 38.2%, Erin 36.0% and Telemu 40.3%, respectively.

Pearson Product Correlation Among Retail Prices of Rice in Rural Markets

Table 4 shows the correlation coefficients of retail prices of rice in the rural markets. It shows that the correlation coefficients of price series between Gulu and Lenfa at 0.78, Gulu and Muwo 0.78, Lenfa and Muwo 0.86 and Sabo Wuse and Tegna 0.70 are indications of high positive co-movement of prices of rice between the pairs of rural markets. The results of correlation analysis of the price series between Gulu and Kwakuti -0.02, Gulu and Lioji -0.11 and lastly, Gulu and Shambo -0.10 show negative relationship.

The high and significant correlation of price series between Gulu and Lenfa, Gulu and Muwo, Lenfa and Muwo and Sabo wuse and Tegna is an indication of positive co-movement of prices of rice between the four pair's rural markets. The correlation values of price series between Gulu and Kwakuti, Gulu and Lioji and Gulu and Shambo indicated negative correlation as compared with the four pairs of rural markets which showed positive correlation. It also implies that as price increases in Gulu market, it decreases in the other markets. This could be due to inadequate transmission of market information, long distance between markets and transportation cost and over cultivation of rice in some areas. This result agrees with that of Iheke and Osondu (2012) which reported negative coefficient of rice pricing in Abia State of Nigeria.

Table 4: Correlation among retail prices of rice in rural markets of Gulu, Lenfa, Muwo, S/wuse, Tegna, Kwakuti, Kaboji, Lioji and Shambo

Table with 10 columns (Gulu, Lenfa, Muwo, S/Wuse, Tegna, Kwakuti, Kaboji, Lioji, Shambo) and 10 rows showing correlation coefficients between these markets.

Source: Data Analysis, 2019

CONCLUSION AND RECOMMENDATIONS

The study focused on measures of price stability and co-movement of rice prices in Niger State of Nigeria. The coefficients of variation (CVs) results revealed that the means are representatives of the series of price variables. The coefficients of variation are all less than 100%. The implication is that the values cluster around the mean prices. The results from the Pearson correlation analysis indicated that the rural and urban markets price series for rice in zone I and zone III were positively and significantly correlated. This suggests positive co-movement in the prices among the markets. No significant correlation between zone I and II. The following are the recommendations drawn from the findings of the study:

- 1. There is need for efficient dissemination of market information on the prevailing rice prices in zone II of the state.



2. Provision of critical marketing infrastructures such as accessible and motorable road network that link production and market centers. This will ease and reduce transfer cost of goods.

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