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Spatial Pricing Efficiency of Rice Marketing In North Central Zone, Nigeria

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Abstract

This study examined the spatial pricing efficiency of rice marketing in North central, Nigeria. Data collection involved the use of primary and secondary data and a multi-stage random sampling procedure was used to select 200 rice marketers. The analytical techniques involved the use of descriptive statistics, the model of spatial price relationship, coefficient of variation, correlation analyses as well as Ordinary Least Square (OLS) regression model. The results on spatial pricing efficiency revealed that consumers were void of exploitative behavior of middlemen in most of the markets. There was also low variability but high and significant correlation between most of the market pairs. In addition, there were significant differences in the mean wholesale prices of rice between all the urban-rural market pairs while the regression result on the determinants of rice prices showed the estimated R^2 for Kwara and Niger States of 98.3% and 42%, respectively and finally, high cost of transportation fare posed the greatest challenge to rice marketing in the study area. Based on these results, it is recommended that local government authorities should assist in the provision of more market outlets in the area so as to increase competition within the markets.

Key words: *Spatial, efficiency, regression, market and price-spread*

Introduction

In a free market economy, the price system and competition provides the coordinating mechanism for determining the flow of resources into production and the flow of goods and services into use. It is within the marketing system that prices, allocation of resources, income distribution and capital formation are determined. Hence, an efficient marketing system accelerates the pace of economic development of any nation, especially, Nigeria (Olukosi and Isitor, 1990).

Rice (*Oryza sativa*) is a staple crop with a wide acceptability in most families in Nigeria. Though this is true, yet the recent flooding, insecurity of lives and properties due to incessant terrorist attacks, and bombing has affected the production and trading of rice especially in the northern part of Nigeria. Movement of traders has been hampered by poor infrastructural state of the road network and high cost of transportation. Also, many traders and farmers are apprehensive when engaging in marketing activities (United State Agency for International Development [USAID], 2013). All of these have increased the demand-supply gap, low income and poverty among farmers. To reduce this vicious circle of poverty, there is need for improvement in the time, place and more importantly, the form local milled rice reaches both the rural and the urban-based consumers and at the lowest cost possible. This will contribute to the income accruingto the farmers thereby improving the food security status and livelihood of the rural populace while reducing the post-harvest losses of the commodity. According to Bassey *et al.*

(2013), increasing production without a corresponding efficient marketing strategy being put in place to ensure its accessibility would not stimulate farmers to enhance production since the excess would be wasted through post harvest losses. Therefore this study is aimed at determining the spatial pricing efficiency of rice marketing in the study area;, determine the factors affecting rice price in the study area as well as the constraints facing the marketers in the study area.

Conceptual Framework

Two types of marketing efficiencies could be distinguished. These are operational and pricing efficiencies. Operational efficiency assumes that the quantum and quality of commodities and services are constant while efforts are directed at reducing their costs. The operational efficiency of a marketing system is enhanced when marketing costs are reduced at the same level of output (Mauyo *et al.*, 2007). Cost analysis is therefore, central to the notion of operational efficiency. Pricing efficiency however can be defined as the ability of a marketing system to efficiently allocate resources and coordinate the food production and marketing process in accordance with consumer directives (Kohls and Uhl, 1985). In essence, it is concerned with how effectively prices reflect the costs of moving the outputs through the marketing system. The prices that buyers pay for goods delivered by the marketing system should adequately reflect all marketing and production costs. According to Olukosi and Isitor (1990), prices will reflect all such costs in a perfectly competitive economic environment. Where pricing efficiency exists, marketing margin should reflect values being delivered. Marketing margin is the difference in prices at two different points in a marketing chain. A commonly reported marketing margin is the farm-to-retail spread, which measures the difference between the retail price and the farm level price for a commodity (Kähkönen and Leathers, 1999). The margin must cover the costs of moving the product from one stage to the next and provide a reasonable return to the marketers (Crawford, 1997). For a given market, the equality of the net margin and marketing costs could be tested via paired sample t-test. This could serve as an indicator of pricing efficiency in the market. Specifically, spatial pricing efficiency could be tested using the model of spatial price relationship developed by Hays and McCoy (1977). If the market is perfectly competitive, as the commodity moves from the i^{th} to the j^{th} market, PP_{ij} will be equal to P_i and thus the actual price spread would be equal to zero. A positive price spread would provide a potential opportunity for middlemen to realize excessive profit, while negative spreads indicate losses.

Materials and Methods

This study was conducted in Niger and Kwara States, Nigeria. The two States are in the North-central zone of the country. Niger State is located between latitudes 8°11′ N and 11° 20′ N and longitudes 4° 30′ E and 7° 20′ E. It is bordered on the north-east by Kaduna State and on the south-east by the Federal Capital Territory, Abuja.

It is also bordered on the north, west, south-west and south by Zamfara, Kebbi, Kogi and Kwara States, respectively. It shares an international border with the Republic of Benin in the north-west. The State covers an estimated land area of 86,000 square kilometers representing about 9.3% of the total land area of the country (Alhassan, 2012). According to the 2006 census, the State has a population of 3,950,249 people which is projected to be increasing at an annual population growth rate of 2.38%. The vegetation, soil and weather patterns are favorable for the production of a wide spectrum of food and cash crops of various types. The major crops grown in the State include rice, maize, millet, sorghum, yam, potato, soybean, groundnut, cashew, beniseed and cassava. The amount of rainfall is between 1100mm – 1600mm per annum with average monthly temperature ranging from 23°C to 37°C. The vegetation consists mainly of short grasses, shrubs and scattered trees. Kwara State, with a population of 2,591,555 was projected to reach 3,080,544 in 2013 with the annual growth rate of 2.5%) (World Bank, 2012). It was created on the 27th May, 1967 and covers a total land area of 332,500 square kilometers. It lies within latitude $7^0 45' N$ - $9^0 30' N$ and longitudes $2^0 30' E$ - $6^0 23' E$ (Fakayode *et al.,* 2008). It is bordered in the north by Niger State; Kogi State in the east; Oyo, Osun and Ekiti States in the south and the Republic of Benin along its north-western part. The climatic condition of the State is divided into wet and dry seasons with temperature ranging from 33^0C to 37^0C. According to Abidoye (2012), agriculture is the predominant economic activity in the State. The crops mainly grown include maize, yam, cassava, rice and tomatoes.

A multi-stage sampling technique was used to select rice marketers for the study. The first stage involved the random selection of two States out of the six States in the North-central zone. The second stage involved the random selection of five markets from each State while the third stage involved the random selection of twenty rice marketers from each market making a total of two hundred marketers in all. Primary data were obtained for a period of one year (12months) through the use of structured questionnaires to elicit information from the respondents while secondary data on retail prices of rice from 2006-2010 were sourced from Agricultural Development Project offices in Niger and Kwara States, respectively.

Method of Data Analysis

Descriptive and inferential statistics were used to identify the problems of rice marketing in the study area while spatial pricing efficiency of the marketers was analyzed using the model of spatial price relationship and Pearson product correlation analysis. Multiple regression analysis was used in the analysis of the determinants of rice prices in the study area.

The model of spatial price relationship developed by Hays and McCoy (1977) which was also adopted by Nuhu *et al.* (2009) was computed as follows:

$$PP_{ij} = P_i - (HC_{ji} + TC_{ji} + AS_{ji}) \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,
PP_{ij} = The calculated parity price of one ton of rice from the i^{th} market (State1) in relation to the j^{th} markets (₦) (State 2).
P_i = The actual wholesale price of one ton of rice at the i^{th} market (₦)
HC_{ij} = Handling costs involved in moving one ton of rice from the i^{th} to the j^{th} market (₦)
TC_{ij} = Transport cost of moving one ton of rice from the i^{th} to the j^{th} market (₦)
AS_{ij} = The charge for the assemblers service in moving one ton of rice from the i^{th} to the j^{th}
market (₦)
The actual price spread between any two markets would be:

$$PS_{ij} = PP_{ij} - P_j \quad \text{.......} (2)$$

Where,
PS_{ij} = The price spread for one ton of rice between the i^{th} and the j^{th} market (₦).
P_j = The actual wholesale price of one ton of rice in the j^{th} market (₦).
If the pricing system is spatially efficient, as rice moves from the i^{th} to the j^{th} market, PP_{ij} will be equal to P_i and thus the actual price spread would be equal to zero. Positive price spreads imply imperfections in the market, a departure from competitive conditions or, as a result of the nature of production and defects in the marketing system. It could also provide a potential opportunity for middlemen to realize excessive profit. Negative spreads however, indicate losses *i.e* difference less than transfer cost (Nunu *et al.*, 2009).

Coefficient of variation and Pearson correlation coefficient (r) was computed to access the relative dispersion and the extent to which rice prices move together among the different market pairs, respectively, in line with the method of Bassey *et al.* (2013) and Oladapo *et al.* (2007). The formulae used were:

$$\text{Coefficient of variation} = \frac{SD}{Mean}$$

Where,
SD = Standard deviation
And, correlation, r_{ij} is:

$$r_{ij} = \frac{\sum_{i-j}^{n}(P_{it} - \overline{P_{it}})(P_{jt} - \overline{P_{jt}})}{\sum_{i-j}^{n}\sqrt{(P_{it} - \overline{P_{it}})}\sum_{i-j}^{n}\sqrt{(P_{jt} - \overline{P_{jt}})^2}}$$

Where,
i = Rural markets
j = Urban markets
P_{it} and P_{jt} are the prices of rice in the rural and urban markets and i and j are measured over time t.

$\overline{P_{it}}$ and $\overline{P_{jt}}$ = means of each rice price

n = number of observations

r_{ij} = Correlation between markets I and markets j

Hypothesis testing: t-test was used to test for the hypothesis that:

H_0: There were no significant differences between wholesale prices of rural-rural, urban-urban and urban-rural market pairs in the area.

The formula for computing t-test which was used to compare the mean wholesale prices among market pairs (each taken at a time) is given as:

$$T_{cal} = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{S_1^2 + S_2^2}{n_1 + n_2}}}$$

Where,

tcal = calculated value of t distribution

$\overline{X_1}$ = mean of wholesale price for markets in Niger State (taken at a time)

$\overline{X_2}$ = mean of wholesale price for markets in Kwara State (taken at a time)

S_1 = Standard deviation of sample mean of markets in State1

S_2 = Standard deviation of sample mean of markets in State 2

n = number of observations

The determinants of rice prices in the study was achieved using a multiple regression analysis. The regression model is expressed as follows:

$$P_i = a + \beta_{i1}SC + \beta_{i2}TR + \beta_{i3}PK + \beta_{i4}LB + \beta_{i5}CC + \beta_{i6}EDU + \beta_{i7}EXP + \beta_{i8}COM + \varepsilon_i \quad (3)$$

Where,

P_i = Price of rice (₦).

a = constant

$\beta_{i1} - \beta_{i8}$ = Coefficients to be estimated

X_1 = Storage cost (₦)

X_2= Transportation cost (₦)

X_3 = Packaging cost (₦)

X_4 = Labour cost (₦)

X_5 = Capital cost (Depreciations) (₦)

X_6 = Cost of communication facility (₦)

ε_i = Error term

The *a priori* expectation is that all the marketing costs contained in the model will have a positive and significant influence on the price of rice in either of the markets. In other words, the higher the marketing costs, the higher the price of rice should be in the study area.

Results and Discussion

Spatial pricing analysis: Table 1 reveals the result of the annual price spreads of rice between Niger and Kwara States markets. The analysis revealed that most of the markets had negative price spread except in Owode market where there was positive price spread. When negative price spread occurs, it is an indication that the difference in price is less than transfer cost which implies that the markets were competitive and void of exploitative behavior of middlemen. According to Daan (2008), if two markets are trading a commodity in a particular period, these markets are integrated if the price in one market equals the simultaneous price in the other plus transfer costs. If this holds then there is no incentive to trade. But that arbitrage will occur when the price difference is greater than the transfer cost. Conversely, when positive price spread occurs, it is a pointer to the fact that the marketers made more than normal profit, the market was not competitive, and that there was prevalence of market imperfections in the market. This according to economic theory, which was buttressed also by Nuhu *et al.* (2009), gives the middlemen occasion of excessive exploitation of the potential buyers/consumers. Nuhu *et al.* (2009) noted however, that positive price spreads may not only result from exploitative practices of marketers but are likely to be as a result of the nature of production and defects in the marketing system. For instance, rural markets are assumed to lack market information on changes in supply and demand conditions in the other neighbouring markets. However, in the urban consuming centers, there is an increasing improvement in the communication system through the introduction of Global System for Mobile communication (G.S.M), internet, e-mails and other social networks. This makes for an effective arbitrage among markets, decrease uncertainties on market supplies and demands in different locations as well as decrease the risk associated with inter-market trade (Roche and McQuinn, 2003). Spatial price relationships are determined largely by transfer cost between regions and considering the transfer cost of moving rice from the feeder markets to supplying markets, transportation cost had about 74.6% share, followed by handling cost of 16.4% and lastly, assembler charges of about 8.98%. The reason for the high percentage accruing to transportation is because most of the feeder roads leading to the rural areas/villages where the bulk of the rice is produced are in a deplorable state due to several years of neglect. And as such, the few transporters who could take the risk of plying such roads always charge high fares as a premium for any mechanical fault inherent from the use of their vehicles on such roads. According to Olukosi and Isitor (1990), inaccessibility of producing rural areas to fast means of transportation results in location surpluses at the rural areas and shortages in the urban areas. In general, the farther the distance of the rural markets from the urban markets, the less the profit and the more the negative spread. This is because transfer costs are often high in relation to the prices of agricultural commodities as confirmed by Nuhu *et al.* (2009). Generally, the findings show that the markets were operating at inefficient level.

Table 1: Annual Price Spread of Rice (₦/Ton) between Niger State and Kwara State markets

Name of markets	Parity price (Ppij)	price /tonne (Pj)	Actual price spread (PPij-Pj)
Maito-Owode	1124	468	656
New market-Odo-owa	-8155	2690	-10845
Dandaudu-Malete	914	1826	-912
Badeggi-Yagba	-7500	3765	-11264
Maitumbi-Okeoyi	-9165	2471	-11637

Source: Authors' Computation

Variability in retail prices of rice in the study area: Most price data vary due to seasonality and other exogenous effects. In order to determine the relative dispersion or the degree of variability of retail prices in the study area, the Coefficient of Variation (CV) was computed for the different markets in each State. The low level of variability in the computed CV for Kwara and Niger State (Table 2) showed that retail prices of rice were relatively stable in the different markets in the two States, respectively. It was also discovered that retail prices were more volatile in Kwara State (6.6) than in Niger State (4.2) which was an indication that retail prices were relatively more stable in Niger State than in Kwara State. The implication of the findings is that relative stability in retail prices may aid the improvement of food security situation in the study area. The study by Akande and Akpokodje (2003) on rice prices and market integration in selected areas in Nigeria revealed that retail prices of local rice were more volatile than that of imported rice in Nigeria.

Table 2: Coefficient of Variation of Retail Prices of Milled Rice in the study area

Name of market	Mean	Standard Deviation	Coefficient of variation (%)
Kwara State			
Yagba	122.6	7.7	6.3
Malete	145.4	6.7	4.6
Oke-oyi	156.1	6.6	4.2
Odo-owa	165.8	10.3	6.2
Owode	164.3	8.0	4.9
Niger State			
Baddegi	140.4	11.3	8.1
Bida (New market)	148.5	13.7	9.2
Dandaudu	166.0	13.2	7.9
Maitumbi	165.7	16.4	9.9
Maito	155.8	7.3	4.7
Kwara and Niger			
Kwara	155.3	10.3	6.6
Niger	144.5	6.1	4.2

Source: Authors'computation

Correlation analysis between rice prices in selected markets in the study area: To further determine the extent to which prices in the selected markets move together, Pearson correlation analysis was applied to monthly retail price series as shown in Tables 3 for Kwara, Niger and the two States combined respectively. The analysis revealed that the retail prices of rice at the different markets in Kwara State (Table 3) were strongly correlated. That is, they moved together and were significant at $P < 0.01$ and $P < 0.05$ except in Owode market. This generally suggests a highly significant correlation between the selected markets in the State. This implies that a deficit/surplus in one market was promptly transmitted to the other market in the state. The coefficients, in order of their significance were, Oke-oyi and Odo-owa (1%); Malete and Odo-owa (5%); Malete and Oke-oyi (5%); and Malete and Patigi (5%). Considering Niger State however, strong and significant correlation existed between New Market and Baddegi (1%), Dandaudu and Maitumbi (1%), New Market and Maitumbi (5%), Maitumbi and Maito (5%) and, New Market and Dandaudu (5%). Except for New Market, weak and insignificant relationship existed between Baddegi and other markets as well as Maito and other markets with exception of Maitumbi. This can be as a result of far distance that exists between them. Finally, the Table also shows that there was a strong and significant relationship of retail prices between the two States which suggests that there were some levels of co-movement of prices in the two States.

Test of hypothesis: t-test was used to test the null hypothesis that there were no significance differences between the wholesale prices of the different market pairs. The result (Table 4) revealed that there were significant differences in the mean wholesale prices of rice between all the urban-rural markets, Maito-Oke oyi, Dandaudu-Malete and Maitumbi-Owode market pairs. Hence, the null hypothesis was rejected in favor of the alternate hypothesis that there were significant differences between the different market pairs. This revealed that there was high degree of integration and free flow of marketing information among the different market pairs. This finding corroborates the findings of Bassey *et al.*, 2013 and Nuhu *et al.,* 2009.

Trend of rice prices in the study area: Seasonality is defined as a systematic movement that repeats itself every 12 months. The rather predictable price fluctuations of this type are mostly common among agricultural products that may be stored. The most common reasons for seasonal price movement are the seasonal fluctuation of supply which results from high dependence on rain-fed agriculture (i.e effect of weather and other vagaries of nature on production cycle) as well as demand fluctuations for the product. The annual average retail prices of rice in Kwara and Niger States as presented in Figure1 showed three trend patterns. In the first phase there was a sharp decrease in price between 2006 and 2007 from an average of ₦129/kg and ₦128/kg, to an average of ₦118/kg and ₦113/kg for Niger and Kwara States, respectively. The second phase was characterized by a rising

pattern from 2007 to 2009 period with an average price of ₦180/kg and ₦170/kg in 2008, and ₦176/kg and ₦179/kg in 2009. The third phase showed decline to an average price of ₦161/kg and ₦177/kg. Generally, the overall trend suggests that there was a flow of market information between the markets in the two States such that surpluses and deficits in one State were transferred to the other State. This is possible because of the relative improvement in communication technology. The trend analysis is consistent with the opinion of Akande and Akpokodje (2003) on rice prices and market integration in selected areas in Nigeria. They observed three major phases (i.e, decreasing, increasing and decreasing patterns) in the behavior of the monthly prices of local rice in the selected areas of Nigeria.

Table 3: Correlation Matrix between Rice Prices in selected Markets in the Study Area

Kwara markets	**Yagba**	**Malete**	**Oke-oyi**	**Odo-owa**	**Owode**
Yagba	1	0.921**	0.881**	0.882**	0.702
Malete		1	0.947**	0.954**	0.807
Oke-oyi			1	0.992***	0.874
Odo-owa				1	0.811
Owode					1
Niger markets	**Baddegi**	**Bida (New market)**	**Dandaudu**	**Maitumbi**	**Maito**
Baddegi	1	0.895***	0.338	0.485	0.313
Bida (New market)		1	0.591**	0.645**	0.505
Dandaudu			1	0.876***	0.381
Maitumbi				1	0.657**
Maito					1
Kwara and Niger States				**Kwara**	**Niger**
Kwara				1	0.753***
Niger					1

Source: Market survey data, 2012 **Significant at $P \leq 0.05$; *** $P \leq 0.01$

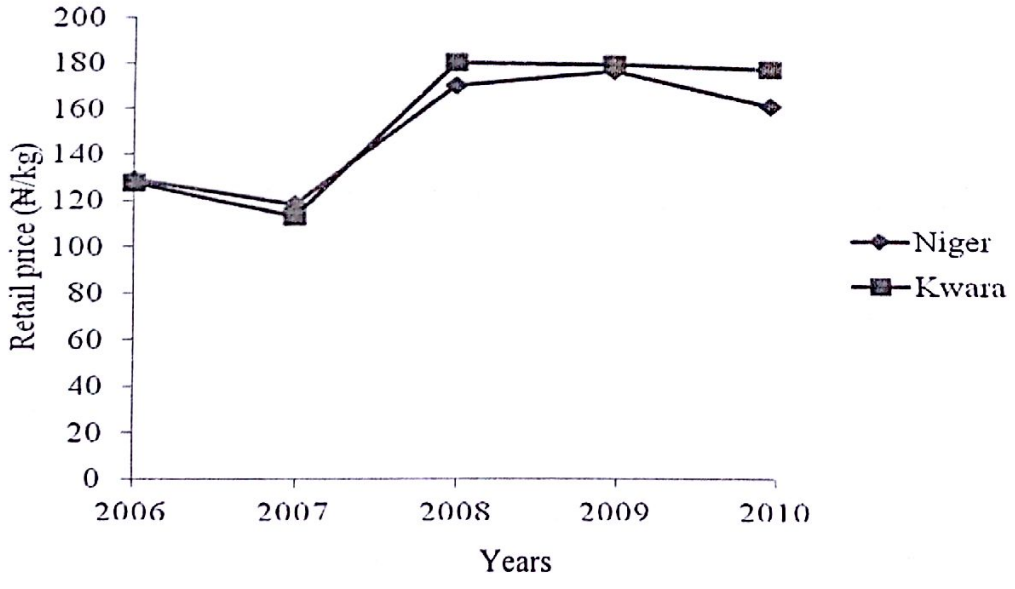

Figure 1: Trends of retail prices of rice in Kwara and Niger States

Determinants of rice prices in the study area: Table 5 shows the results of the regression analysis of the factors affecting rice price in Kwara and Niger States. Based on *a priori* economic and statistical criteria for selecting the 'lead' equation, semi-log and linear functions were chosen for Kwara and Niger States, respectively. The estimated R^2 for Kwara State shows that 98.3% of the variability observed in price was explained by the included explanatory variables while the F- ratio of 763.78 showed that the joint determination of the explanatory variables was significant at 1% level. The positive regression coefficients of all the cost components of the explanatory variables show that an increase in these variables will lead to increase in the price of rice in the State. Storage cost (X_1), packaging cost (X_4) and Communication cost (X_6) were significant at 1%, 1%, and 10% probability levels, respectively. The estimated R^2 for Niger State shows that 42% of the variability observed in price was explained by the included explanatory variables while the F- ratio of 3.628 showed that the whole model is significant at 1% level. The transportation, packaging and capital costs are significant at 1%, 1% and 5% probability level respectively. The positive regression coefficients of the cost components showed that an increase in these variables led to an increase in the price of rice in the State.

Table 4: Computed t-values of inter-market rice market pairs

Market Pairs	No.	Tabulated t-values P ≤ 0.01	P ≤ 0.05	P ≤ 0.1	Calculated t-values
Maito-Oke oyi (R-R)	20	2.86***	2.09**	1.73*	11.02
Dandaudu-Malete (R-R)	20	2.86***	2.09**	1.73*	5.31
Badegi-Odo-owa (R-R)	20	2.86^{ns}	2.09^{ns}	1.73^{ns}	0.53
New market-Yagba (U-U)	20	2.86^{ns}	2.09^{ns}	1.73*	2.01
Maitumbi-Owode (U-U)	20	2.86***	2.09**	1.73*	3.07
New market-Malete (U-R)	20	2.86***	2.09**	1.73*	3.70
Patigi-Odo owa (U-R)	20	2.86***	2.09**	1.73*	4.76
Maitumbi-Dandaudu (U-R)	20	2.86***	2.09**	1.73*	3.02

Source: Market survey data, 2012 *Significant at P ≤ 0.1; **Significant at P ≤ 0.05;
*** Significant at P ≤ 0.01 R-R: Rural-rural; U-U: Urban-urban; U-R: Urban-rural.

Table 5: Determinants of rice prices in the study area

Variables	Kwara Coefficient	Kwara T-values	Niger Coefficient	Niger T-values
Constant	130749.000	24.102***	14165.204	19.397***
Storage cost (X_1)	15221.910	62.844***	0.031	0.532
Transportation cost (X_2)	119.057	1.158	0.011	2.702**
Labour cost (X_3)	34.952	0.314	0.002	0.218
Packaging cost (X_4)	443.711	3.760 ***	0.055	3.186***
Capital cost (X_5)	19.634	0.470	0.013	2.346**
Cost of communication (X_6)	323.535	1.917*	0.22	1.030
	R^2=0.983		R^2=0.420	
	F-Ratio=763.78***		F-Ratio=3.628***	

Source: Authors'Computation *Significant at P ≤ 0.1; **Significant at P ≤ 0.05; *** Significant at P ≤ 0.01

Constraints of rice marketing in the study area: Table 6 shows rice marketing in the area was faced with constraints such as high cost of transportation, price instability, bad road, inadequate credit facilities and distance from the farm to markets. Of all these problems, high cost of transportation ranked first (28.2%). This is followed closely by deplorable road network of 24.6%. This is not surprising as bad road will cost result in hike in fare paid in moving rice commodity from farm to the various selling points. Inadequate credit facilities ranked 3rd at 19.4% because commercial lending institutions do not encourage marketers to obtain credit facilities due to high risk and uncertainties embedded in rain-fed agriculture, price instability 15.9% while Long distance from farm to market was the least identified constraint at 11.9%. This is corroborated by the study conducted by Bassey *et al.* (2013) on inter-market performance and pricing efficiency of imported rice marketing in south-south Nigeria that cost of transportation ranked first of all the problems of marketing identified in the area.

Table 6: Constraints to rice marketing in the study area

Problems	*Frequency	Percentage (%)	Rank
High transportation fare	71	28.17	1st
Bad road	62	24.60	2nd
Inadequate credit facilities	49	19.44	2nd
Price instability	40	15.87	4th
Long distance from farm to market	30	11.90	5th
Total	252	100.00	

Conclusion and Recommendations

The study examined the spatial pricing efficiency of rice marketing in North central zone of Nigeria. In conclusion, spatial pricing efficiency of rice marketing in the study area can be described as inefficient though there was low variability but high and significant correlation between most of the market pairs. In addition, there were significant differences in the mean wholesale prices of rice between all the urban-rural market pairs while the regression result indicated that most of the included explanatory variables affected rice prices in the study area though in Niger State only 42% of the observed variations were explained by the included explanatory variables and finally, high cost of transportation fare posed the greatest challenge to rice marketing in the study area. Based on these results, it is recommended that local government authorities should assist in the provision of more market outlets in the area so as to increase competition within the markets. Government should ensure improvement of the operational environment of the marketers through improved information system, rehabilitation of feeder roads as well as construction of new roads to aid easy access to rural markets thereby drastically reducing transportation costs involved in the movement of rice across spatially separated markets.

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