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ECONOMETRIC ANALYSIS OF THE EFFECT OF MARKETING COSTS ON GRAIN PRICES IN KADUNA STATE OF NIGERIA

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ABSTRACT

This paper examines the effect of the various cost components of marketing on the price of grains as means of highlighting possible measures that could be adopted to enhance affordability of grains by majority of Nigerians who consume it as staples. The analyses were based on data collected from a cross-section of 237 maize, 153 millet and 216 sorghum traders.Data was analysed using the Ordinary Least Squares (OLS) method of multiple regression analysis. The analyses revealed that maize price was significantly affected by cost price, storage, and transportation costs while labour cost was not. Sorghum price was significantly affected by cost price,transportation and labour cost while storage cost was not. Millet price was significantly affected by cost price, storage,transportation and labour costs at the 5 per cent level. In view of the above, it can therefore be argued that any measure aimed at reducing the price of grains must of necessity encompass the efficient performance of marketing functions.

Key words: Marketing costs, Grain prices

INTRODUCTION

Food grains provide a considerable amount of the energy and protein needed in human and animal diets. They are mainly consumed by Nigerians as staples and are used in the preparation of a variety of local recipes. Besides, the grain crops form the major core of the raw material requirements of about 65% for the agro-allied industries; and about 12% for other industries in Nigeria (Wudiri and Fatoba, 1992).

The separation of the grain producing areas from consumption areas has led to the development of a marketing system to connect the two areas. At one end of the system are farmers who produce the crop and at the other end are the consumers who demand the commodity. In between them are various market participants who have organized in different ways to provide services which add utility to the commodity (Ejiga, 1988; Effiong, 1998). The food grain marketing system encourages the participation of a large number of individuals at the various types of markets and exchange points, where the marketing services of assembly, storage, transportation, and breaking of bulk are performed (Hays, 1976). These activities performed in getting grains to the ultimate end users in the form, time, and place needed add cost to the commodity and consequently plays a vital role in determining the final product price (Effiong, 1996). Similarly, Agu (1998) posited that marketing costs accounted for as much as 31.16% in grain price formation.

Going by this fact, the efficient performance of marketing functions in a competitive context could go a long way in ensuring fair grain pricing. This study focuses on the quantitative determination of the magnitude by which marketing costs influence grain prices as a means of providing an insight into the possible measures that could be adopted to enhance affordability of grains as a step towards achieving food security for Nigerians.The study will test the hypothesis that grain price (maize, sorghum and millet) is not affected significantly by the cost of performing some marketing functions such as cost [rice, storage cost, transportation and labour costs at the 5 per cent level

METHODOLOGY

Data used for the study were collected from a cross-section of randomly selected grain distributors composed of 237 maize, 153 millet and 216 sorghum traders. The cluster sampling method was used to divide Kaduna State into 2 parts i.e. Northern and Southern parts. The purposive sampling method was used to select four Local Gogernment Areas from each of the 2 areas namely Giwa, Makarfi, Soba and Sabon Gari in the northern part and Kaduna, Jaba,Jamaa and Zangon kataf in the southern part. Stratified sampling method was used to divide respondents into distinct groups i.e. producers, wholesalers and retailers. Individual member of each group or strata was randomly selected. Data collection was facilitated through the use of questionnaire and personal interviews. Supplementary information was obtained from textbooks, journals, theses, seminar, and conference papers relevant to this study.

Models Specification: It is postulated in this study that the prices of maize, millet, and sorghum are ceteris paribus influenced by the cost of performing some marketing functions such as cost price, storage cost, transportation, and labour costs per 100kg bag of grain. In this analysis, only costs relating to exchange functions of buying and selling and the physical functions of storage, transportation, and labour were investigated and analysed.

The above functional relationship can be stated respectively for maize, sorghum, and millet grains.

$P_c = f(X_1, X_2, X_3, X_{4,ei})$ ---------- (1)

$P_s = f(X_1, X_2, X_3, X_{4,ei})$ ---------- (2)

$P_m = f(X_1, X_2, X_3, X_{4,ei})$ ---------- (3)

Where:

P_c = Price of Maize(N)

P_s = Price of Sorghum(N)

P_m = Price of Millet(N)

X_1= Cost of Grain(N)

X_2= Cost of Storage(N)

X_3= Cost of Transportation(N)

X_4= Labour Cost(N)

Ei= Error term

To facilitate empirical estimation of the impact of marketing cost components on grain prices, a multiple regression model with the prices of maize, sorghum, and millet as dependent variables and costs as independent variables were estimated using the Ordinary Least Square (OLS) method of regression analysis. All the assumptions underlying the OLS method is assumed to hold in this study. The *a priori* expectation is that all the marketing cost components would be positively related with grain price, *ceteris paribus*

From equation (1) to (3), the following econometric models were specified thus:

$P_c = \alpha o + ß_1X_1\ ß_2X_2\ ß_3X_3\ ß_4X_4 + ei$ ----------(4)

$P_s = \alpha o + ß_1X_1\ ß_2X_2\ ß_3X_3\ ß_4X_4 + ei$ ----------(5)

$P_m = \alpha o + ß_1X_1\ ß_2X_2\ ß_3X_3\ ß_4X_4 + ei$ ----------(6)

Where:

αo = Constant Term

$\beta 1$-$\beta 4$ = Unknown marketing cost function coefficient to be estimated

ei = Error Term

RESULTS AND DISCUSSION

The estimated coefficients of marketing cost functions specified in equations (4) through (6) yielded the following equations.

$P_c = .591.38 + 0.67\ X_1 + 18.43\ X_2 - 0.429X_3 + 0.476\ X_4$ ------ (7)
(36.714) (47.435)** (7.267)** (-2.344)** (0.568)
$R^2 = 0.98$ F-Ratio = 2936.5

$P_s = 325.12 + 0.803\ X_1 + 4.222\ X_2 + 3.402\ X_3 + 4.707\ X_4$ ------(8)
(10.306) (27.153)** (0.911) (9.046)** (2.722)**
$R^2 = 0.95$ F-Ratio = 958.095

$P_m = 169.20 + 0.819\ X_1 + 34.395X_2 + 1.840X_3 + 3.334\ X_4$ --------(9)
(3.339) (17.310)** (5.399)** (4.533)** (2.232)**
$R^2 = 0.93$ F-Ratio = 484.41

Figures in Parentheses are T-ratios
** t-ratios significant at the 5% level.

The results in equation (7) showed that the independent variables i.e cost price, storage cost, transportation as well as labour costs explained 98% of the variation in the price of maize (dependent variable) and the R^2 is highly significant. The estimated coefficients of the cost of marketing functions show that cost price (X_1), storage cost (X_2), and labour cost (X_4) had a positive sign. This implies that the price of maize increases with increase in the cost price, storage cost, and labour cost. The cost of transportation (X_3), however, had a negative coefficient and negates our *a priori* expectation. This is unexpected as the cost of transportation is expected to rise proportionally alongside other costs as the price of grain rises. This phenomenon could be explained by the fact that prior to the collection of data for this study, transport fares which were increased as much as 150 – 200% due to fuel shortages was beginning to drop in view of the resumption of fuel supplies. Of the marketing cost coefficients in equation (7), only cost price, storage , and transportation costs were statistically significant at the 5% level. This implies that cost price, storage price, and transportation costs are the most important and reliable factors that account for variation in the price of maize. Similarly, the F-value of the equation was statistically significant at 5% level and tends to suggest that the joint influence of all the explanatory variables on the price of maize is strong. That labour cost had no significant effect on the price of maize could have been due to the fact that family members may have been used to provide constant cheap labour.

In equation (8), the analysis revealed 95% of the variation in the price of sorghum is explained by all the different cost components of marketing ($X_1 - X_4$). Similarly, all the estimated coefficients conform with our *a priori* expectation by having a positive sign. This means that the price of sorghum rises as the different cost components of marketing increase. Three cost coefficients in the equation (X_1, X_3, and X_4) are statistically significant at the 5% level, implying that they are the major factors accounting for variation in sorghum price. That storage cost (X_2) was not significant could be due to the fact that sorghum handlers did not resort to long storage before disposing their grains, hence, costs incurred in storage could not be counted as crucial in determining the price of sorghum. The F-value of the equation is equally statistically significant at the 5% level.

The estimated coefficient of the different cost components of marketing in equation (9) showed that all the explanatory variables ($X_1 - X_4$) had a positive sign and were all statistically significant at the 5% level. This implies that the price of millet increases with increase in the cost price, storage cost, transportation, and labour costs. Unlike for maize, the coefficient for transportation cost (X_3) in equation (8) and (9) were positive implying that

though transport fares were gradually dropping in view of the availability of fuel supplies, reduction of transport fares was not uniform as some vehicle operators were still hiking their fares perhaps due to the fact that fuel supplies was not evenly distributed. This phenomenon is brought about by the un-coordinated nature of the Nigerian transportation system (Walker, 1959).

By this result, in equation 7 the null hypothesis is rejected in view of the fact that a significant relationship exists between the price of maize and cost price, storage and transportation cost. We however accept the null hypothesis with respect to labour cost as no significant relationship exists between it and maize price. In equation 8 the null hypothesis is rejected with respect to cost price, transportation and labour cost as a significant relationship exists between them and sorghum price. With regards to storage cost we accept the null hypothesis. In equation 9 we reject the null hypothesis as a significant relationship exists between the price of millet and the various marketing cost components viz cost price, storage cost, transportation and labour costs. The findings agree with (Binta and Undiandeye, 2004 and Salami, 1981).

CONCLUSION AND RECOMMENDATIONS

In the light of these findings, it can be concluded that where operational efficiency in the provision of marketing services is greatly enhanced, congruent reduction in grain price could be achieved. This means that any measure aimed at reducing the price of grains, must of necessity encompass reduction in the cost price (and by implication the cost of production inputs) as well as the provision of cheap and adequate storage facilities. Moreover, the provision of cheap and adequate supply of fuel, maintenance of feeder roads, regulation of mileage rates coupled with efficient utilization of labour will go a long way in ensuring fair grain pricing that would greatly enhance its affordability by Nigerians.

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