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Transactions Costs and Agricultural Household Supply Response of Maize Farmers in Osun State of Nigeria

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Abstract: This research looked into the relationship between transactions costs and agricultural household supply response among maize farmers in Osun state. Multistage random sampling technique was employed in selecting 180 respondents for the study. A structured interview schedule was used to collect data from the respondents. Data were analyzed using descriptive statistics and an estimation of Cobb-Douglas regression model. The descriptive analysis revealed mean age of respondents as 42.7 years while 93% were married. It further showed that 52.2% of the farmers depended on personal savings in financing their maize production activities while only 14.4% of them received no formal education at all. Adjusted R^2 for the regression analysis was 0.734 showing that 73.4% of the variation in quantity of maize supplied by respondents was explained by the estimated variables. Data analysis showed that significant relationships exist between transactions costs and agricultural household supply response in the study area. The study concluded that in addition to price factor, transactions costs contribute significantly to agricultural household supply decisions and consequently recommends that policies that reduce transactions costs should be formulated and implemented to serve as compliments to various price policies in ensuring adequate returns to farmers' investment and stimulate expansion in food production, thereby enhancing the level of food security in Nigeria.

Key words: Transactions costs, supply response, maize farmers, production expansion, variables, Nigeria

INTRODUCTION

Transactions costs refer to the costs of measuring the valuable attributes of the commodity exchanged and the costs of providing and ensuring the desired attributes. Concerns for food security started with the declaration of food as a basic human right in 1948. Food security as an issue became prominent in the 1970s and has been a topic of considerable attention. More than 700 million people in the developing world do not have access to sufficient food to lead healthy and productive life (Pinstrup-Andersen, 1994). The annual demand for food keeps growing (3.3%) and may not be matched by the growth in agricultural production.

Not surprisingly, per capita calorie intake remains at low levels in Sub-Saharan Africa and below the developing world average. If current trends continue, there will be approximately 300 million of malnourished people or 32% of the total population in 2010 which will convert sub-Saharan Africa to being the region with the highest number of inhabitants who are chronically malnourished. Idachaba (2004) observed that food insecurity could be caused by supply-side factors and demand-side factors. One of the supply-side causes of food insecurity as identified by him is food marketing problem. He argued that the dwindling agricultural production in Nigeria is a confirmation of the unattractiveness of agriculture as a result of low returns and compensation being paid to farmers which tend to discourage increased production.

Several researchers attempted to measure the supply responsiveness of agricultural production as estimates of supply response are needed to predict the impact of policy changes on production. However, a significant part of the literature on policy response of agriculture has focused on the short run and long-run supply of individual crops to change in output and input prices. A weakness of these studies is that they seem to have discounted the possibilities of non-price incentives exerting significant influence on the response of agricultural supply.

There has been little research examining agricultural supply response that takes into account both the farmers' production and market participation decisions. Most of previous research focuses on price and its effect on agricultural supply response. Ajetomobi *et al.* (2006) carried out a supply analysis for food crops in Oyo state but only considered own price factor. Abebe (2005) measures supply response with respect to own price and cross price of cereals in Ethiopia. Krishna (1967) looked at

agricultural price policy and economic development. Askari and Cummings (1977) looked into agricultural supply response to price. Ahmed and Narendra (1987) looked at marketing and price incentives in African and Asian countries while Mamingi (1996, 1997) measured the impact of prices and macroeconomic policies on agricultural supply. Odunuga looked at acreage response to prices in small scale food crop agriculture in Oyo state. Murova *et al.* (2001) and Leaver (2003) measured responsiveness of agricultural output for Ukrainian and Zimbabwean farmers, respectively to price but did not consider any market factors. Chhibber (1988) researched on raising agricultural output through price and non-price factors but never took into account any market factor. Goetz (1992) however, uses a selectivity model in which marketed surplus is estimated conditional on market participation.

The market participation was estimated using a reduced form equation. Key *et al.* (2000) also carried out a similar study on Mexican farmers and suggested that the issue of transactions costs creates a situation where some producers buy, others sell and others do not participate in markets. The choice of maize farmers as a focus for this study is based on the fact that maize is a major important cereal being cultivated in the rainforest and the derived Savannah zones of Nigeria. Maize has been in the diet of Nigerians for centuries. It started as a subsistence crop and has gradually become a more important crop. Maize has now risen to a commercial crop on which many agro-based industries depend for raw materials (Iken and Amusa, 2004).

It is therefore with the hope of detecting relevant market factors that could serve as incentives for agricultural households to increase their present level of maize supply in an effort to bridge the gap between production and consumption that this study was carried out. The main objective of the study is to investigate the role of transactions costs in determining maize supply response of farmers in Osun state. The specific objectives are; to analyze the socio-economic characteristics of maize farmers in the study area, identify variables associated with transactions costs in the study area, determine the magnitude and the direction to which the level of transactions costs influence changes in maize supply in the study area and estimate the elasticity of maize supply in the study area.

Hypothesis of the study:

H_o: There is no significant relationship between transactions costs and the quantity of maize supplied by respondents

MATERIALS AND METHODS

This study was carried out in Osun state of Nigeria. Literature has revealed that Oyo and Osun states produce 50% of maize produced in the Southwestern states of Nigeria. Osun state was created on 27th August, 1991. Until then it was part of the old Oyo state. Osun state has an estimated population of 3,423,535. The capital is Osogbo. The state which is made up of thirty local government council lies between longitude 4° and 6° East of the Greenwich Meridian, latitude 5° and 8° North of the equator. This means that the state lies entirely in the tropics. The state is bounded in the West by Oyo state, in the North by Kwara state, in the East by Ondo state and in the South by Ogun state.

Agriculture is the traditional occupation of the people of Osun state. The tropical nature of the climate favours the growth of a variety of food and cash crops. The main cash crops include cocoa, palm produce, kola while food crops include yam, maize, cassava, millet, rice and plantain. The vegetation consists of high forest and derived Savannah towards the North. The climate is tropical with two distinct seasons. Usually, the wet season lasts between March and October while the dry season comes between November and February. Mean annual rainfall is between 2,000 and 2,200 mm. Maximum temperature is 32.5°C while the relative humidity is 79.90%.

Population, sampling procedure and sample size: The population of the study comprises all registered maize producing farmers in Osun state of Nigeria. The state has been divided by OSSADEP into three agricultural zones and twenty five blocks. These are Osogbo (six blocks), Ife/Ijesha (twelve blocks) and Iwo (seven blocks). Two agricultural zones were selected based on the type of crops grown. These are Osogbo and Iwo zones.

Multi-stage random sampling technique was employed to sample one hundred and twenty maize farmers. In the 1st stage, four blocks were randomly selected from each of the two agricultural zones, making a total of eight blocks to be sampled. Each block comprised eight cells. The sampling procedure further involves random selection of 25% of the cells (2) in each block making a total of sixteen cells for the study. Thereafter in the 3rd stage, 40% of the farmers' groups were selected at random. Finally, 20% of the maize farmers in each group were randomly sampled for the study. A total of 180 maize farmers formed the sample of the study. A structured interview schedule was used to collect primary data from sampled maize farmers.

The Regression model: The relationship between the dependent and all independent variables was analyzed using the following equation:

$$\text{Log } Q = b_0+b_1 \text{ Log } X_1+b_2\text{Log } X_2+b_3 \text{ Log } X_3+b_4 \text{ Log } X_4+b_5 \text{ Log } X_5+b_6\text{Log } X_6+b_7\text{Log } X_7+b_8 \text{ Log } X_8+b_9\text{Log } X_9$$

Where:

Q = Quantity of maize supplied (kg)
X_1 = Area of land cultivated to maize (ha)
X_2 = Market price for maize (₦)
X_3 = Harvest cost (₦)
X_4 = Storage cost (₦)
X_5 = Cost of transport (₦)
X_6 = Assemblage cost (₦)
X_7 = Negotiation/bargaining cost (₦)
X_8 = Agents fee (₦)
X_9 = Transactions land rent (₦)

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents: The mean age for the sampled farmers was 42.7 years. This portrays that most of the maize farmers are in their active and productive age when they can put in their best for optimum productivity. The summaries of sex distribution revealed that 57.8% of the respondents are male. The result showed that 14.4% of respondents had no formal education at all. This result suggests that more than half of the respondents were literate. About 93% of the farmers were married while 3.3% were single. The mean household size for the respondents was eight. The result showed that 52.2% of the farmers depended on personal savings in financing their maize production activities. Most of them claimed, they would have loved to have access to government or bank loans but lacked required collateral. Reliance of most of them on personal savings results in inability to produce on large scale if so desired. The mean value of years of experience in maize production for the respondents was 17 years. Most of the respondents (61.6%) fall between the brackets of 11-30 years of production experience. Mean value for hectares of land cultivated was 2.1. This could be as a result of low accessibility to land and formal loans. The result obtained shows that most of the respondents are small scale farmers. According to Shaib *et al.* (1997)'s classification, Nigerian farmers fall in to three broad categories, namely, small scale with 0.10-5.99 ha, medium scale with 6-9.99 ha and large scale holdings with 10 ha upward. The finding is in agreement with Alimi and Awoyomi (1995) and Innocent (2004) which revealed that small scale farm holdings predominate in Nigeria and account for up to 81% of the total area and produce about 95% of agricultural output.

Transactions costs: Table 1 showed the descriptive statistics of transactions costs incurred by the respondents per annum. Variables found to be associated with transactions costs in the study area include; harvesting, assemblage, storage, negotiation and/or bargaining, agents' fee, transactions land rent and transportation to point of sale. Table 1 showed the minimum amount as well as maximum amount claimed by the respondents for each of the transactions costs variable. It also showed the mean value as well as measures of dispersion or spread for each of the variables. Table 2 showed that four variables out of the estimated nine were found to be statistically significant in relation to supply decisions made by agricultural households. They are price of maize, area of land cultivated to maize and agent fee which affect quantity of maize supplied positively while transactions land rent has an inverse significant relationship with quantity of maize supplied.

Contrary to a-priori expectation, agents' fee was found to be positively related to quantity supplied. This according to the respondents could be attributed to the fact that qualified agents usually charge higher fee than the quacks. The farmers however from experience, prefer the services of professional agents not minding the higher fee because such agents have positive effects on their sales. Adjusted R^2 for the Regression analysis was 0.734 showing that 73.4% of the variation in quantity of maize supplied by respondents was explained by the estimated variables.

Table 1: Distribution of respondents transactions costs

Transactions cost variables	Cost (₦) Minimum	Maximum	Mean	Standard deviation	Variance
Harvesting cost	720	51480	5143.94	3334.746	11120529
Assemblage cost	120	8580	929.20	573.199	328556.86
Storage cost	360	27440	2798.06	1857.502	3450313.3
Negotiation/bargaining cost	230	6220	761.66	434.677	188944.31
Agents fee	300	7780	956.78	546.069	298190.81
Transportation cost	960	68540	7035.38	4604.020	21196667
Transactions land rent	300	10360	1242.38	729.800	532607.42

Field survey, 2009

Table 2: Regression result (dependent variable: Q; n = 180)

Independent variables	Coefficient	t-value
Constant term	3.753	2.766
Log (P)	0.717	2.071**
Log (A)	1.051	16.526***
Log nego	0.100	0.310
Log agent	1.340	3.664***
Log harvest	-0.482	1.039
Log assemblage	-0.079	-0.570
Log storage	0.120	0.826
Log transport	0.146	0.402
Log rent	-0.927	-2.417**

R^2 = 0.734; Survey data, 2009; ***Significant at 1%, **Significant at 5%, *Significant at 10%

Elasticity of supply response: The result showed that with respect to price, area, negotiation cost, agents fee, harvesting cost, assemblage cost, storage cost, transportation cost and transactions land rent, a 10% change in each of the variables will lead to 7.2, 10.5, 1.0, 13.4, 4.8, 0.8, 1.2, 1.5 and 9.3%, respectively for respondents. In this case, agricultural households supply response is highly elastic with respect to area of land cultivated and agents fee while it is moderately elastic with price and transactions land rent.

CONCLUSION

From the study, it could be founded that maize supply responds to transactions costs in the study area in that coefficients of transactions costs were statistically significant. Market factors (transactions costs and price) as well as non-market factors (area of land) significantly affect agricultural household supply response in the study area. Contrary to the a-priori expectation, marketing agents' roles and services are important and positive in the study area.

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