Agricultural Journal 6 (3): 110-114, 2011
ISSN: 1816-9155

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

J.A. Oladejo, J.O. Ajetomobi and Y.L. Fabiyi
Department of Agricultural Economics, Ladoke Akintola University of Technology,
Ogbomoso, Oyo State, Nigeria

Abstract: This research is an attempt to determine the magnitude and the direction to which the level of transactions costs influence changes in maize supply in Iwo agricultural zone of Osun state. Multistage random sampling technique was employed in selecting 95 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 whilel 4.4% of them received no formal education. Adjusted R^2 for the regression analysis was 0.748 showing that 74.8% 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.

Key words: Food marketing, food security, supply response, regression analysis, techniques, transactions cost

INTRODUCTION

Concerns for food security started with the declaration of food as a basic human right in 1948. Nigeria, as a developing country has expanding population both in the urban and rural areas. The population growth rate is 3.5% per annum while the food production rate is 2.5% per annum (Ajibefun, 1988). Food security as an issue became prominent in the 1970's and has been a topic of considerable attention. About >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 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. Food security is jointly determined by availability of food and accessibility to the food. Availability of food is a function of food production, stock holding and food marketing (Von Braun *et al*., 1992). Certainly by raising agricultural productivity (i.e., increase the land area planted and increase yield per hectare) food availability could be increased. However, availability is not enough. The food produced must be distributed efficiently at minimum costs in-order to guarantee continuous availability of the food.

This is the subject of food marketing. Olayemi (1982) observed that food marketing is a very important but rather neglected aspect of agricultural consideration on how to distribute the food produced efficiently and in a manner that will enhance increased productivity. In other words, food marketing by farmers and their families, mostly in the immediate post-harvest period usually involves a lot of costs and in Nigeria, these costs are so high that lowering the costs through efficient marketing system may be as important as increasing agricultural production. Subsequently, Ladele and Ayoola (1997) in their study on food marketing and its role in food security

Corresponding Author: J.A. Oladejo, Department of Agricultural Economics, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria

in Nigeria concluded that an efficient food marketing system would reduce post-harvest losses, ensure adequate returns to farmers' investment and stimulate expansion in food production thereby enhancing the level of food security in Nigeria. 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 (North, 1990). These costs are associated with the costs of providing for some goods or service through the market rather than having it provided from within the firm. In order to carry out a market transaction, it is necessary to discover who it is that one wishes to deal with to conduct negotiations leading up to a bargain to draw up the contract to undertake the inspection needed to make sure that the terms of the contract are being observed and so on. Transactions costs are generally grouped into proportional and fixed transactions costs.

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. Leaver (2003) and Murova *et al.* (2001) measured responsiveness of agricultural output for Zimbabwean and Ukrainian farmers, respectively to price but did not consider any market factors. Mamingi (1996, 1997) measured the impact of prices and macroeconomic policies on agricultural supply while Odunuga looked at acreage response to prices in small scale food crop agriculture in Oyo state. Chhibber (1988) researched on raising agricultural output through price and non-price factors but never took into account any market factor. Ahmed and Narendra (1987) looked at marketing and price incentives in African and Asian countries while Askari and Cummings (1977) looked into agricultural supply response to price. Krishna (1967) also looked at agricultural price policy and economic development. However, Goetz (1992) 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 Iwo agricultural zone of 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_0: There is no significant relationship between transactions costs and the quantity of maize supplied by respondents.

MATERIALS AND METHODS

Study area: This study was carried out in Iwo agricultural zone area of Osun state. The area shares boundaries with the Osun state capital, Osogbo and Ibadan, Oyo state capital. The area is situated at the North-East of Osun state and is geographically located at latitude 7°58' North of the equator and longitude 4°28' East of the Greenwich Meridian. The zone consists of six agricultural blocks, namely: Ayedire, Irewole isokan, Ejigbo, Ola-Oluwa and Iwo. Agricultural activities being practiced in the area of crop production include yam, maize, cassava, millet,

soybean, cowpea and vegetables. 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 Iwo agricultural zone area of Osun state. The state has been divided by OSSADEP into 3 agricultural zones and 25 blocks. These are Osogbo (7 blocks) ife/Ijesha (12 blocks) and Iwo (6 blocks). Iwo zone was purposively selected based on the type of crops grown.

Multi-stage random sampling technique was employed to select 95 maize farmers in the study area. In the first stage, 3 blocks (50%) were randomly selected from the existing 6 blocks. Each block comprised eight cells. The sampling procedure further involves random selection of 50% of the cells 4 in each block making a total of 12 cells for the study. Thereafter, in the 3rd stage, 20 % of the farmers' groups were selected at random. Finally, 10% of the maize farmers in each group were randomly sampled for the study. A total of 95 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 this equation. This is linearized exponential equation using log transformation for the linearization:

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

while;

$$b_1>0,\ b_2>0,\ b_3<0,\ b_4<0,\ b_5<0,\ b_6<0,\ b_7<0,\ b_8<0,\ b_9<0$$

Where:

Q = Quantity of maize supplied (kg)
X_1 = Area of land cultivated to maize (ha)
X_2 = Market price for maize (N)
X_3 = Harvest cost (N)
X_4 = Storage cost (N)
X_5 = Cost of transport (N)
X_6 = Assemblage cost (N)
X_7 = Negotiation/Bargaining cost (N)
X_8 = Agents fee (N)
X_9 = Transactions land rent (N)
b_0 = Constant
$b_1 \ldots b_9$ = Coefficient values of independent variables
ϵ = Error term

The a priori expectations were based mainly on economic theory (the law of supply) and empirical findings from literature reviewed. It was expected that transactions cost and quantity of maize supplied would be inversely related. The error term is conceived as both involving measurement error in the dependent variable (but not in the independent variables) and being a resultant of all the various causes of the dependent variable that have not been explicitly brought into the equation.

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 but that more than half of them were literate. About 93% of the farmers were married while 3.3% were single. The mean household size for the respondents was 8. 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 (52.2%) 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 Aliyu and Shaib's classification, Nigerian farmers fall into 3 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 and Azih 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.

Regression analysis: The results obtained are shown in Table 2. Which shows that 4 variables out of the estimated 9 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 0.748 showing that 74.8% of the variation in quantity of maize supplied by respondents was explained by the estimated variables.

Table1: Distribution of respondents transactions costs

	Cost (N)				
Transactions costs variables	Min.	Max.	Mean	Standard deviation	Variance
Harvesting cost	720	51480	5143.94	3334.746	111205.290
Assemblage cost	120	8580	929.20	573.199	328556.860
Storage cost	360	27440	2798.06	1857.502	3450313.300
Negotiation/ Bargaining cost	230	6220	761.66	434.677	188944.310
Agents fee	300	7780	956.78	546.069	298190.810
Transportation cost	960	68540	7035.38	4604.020	211966.670
Transactions and rent	300	10360	1242.38	729.800	532607.421

Field Survey (2009)

Table 2: Regression result (dependent variable: Q; n = 95)

Independent variables	Coefficient	t-value
Constant term	2.540	1.109
Log (P)	1.143	1.978*
Log (A)	1.038	10.991***
Log NEGO	0.457	0.844
Log AGENT	1.298	2.133**
Log HARVEST	-0.422	-0.708
Log ASSEMBLAGE	-0.231	-1.020
Log STORAGE	0.306	1.067
Log TRANSPORT	-0.378	-0.068
Log RENT	-1.186	-2.140**
Adjusted R^2	0.748	
F	27.982	0.000***

***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 11.4, 10.4, 4.6, 13.0, 4.2, 2.3, 3.1, 3.8 and 11.9% change, respectively in quantity of maize supplied by respondents. In this case, agricultural households supply response is highly elastic with respect to price of maize, area of land, agents' fee and transactions land rent.

CONCLUSION

From the study it could be concluded that:

- Maize supply responds to transactions costs in the study area
- Maize supply responds positively to market price and area of land cultivated in the study area
- Contrary to the a-priori expectation, marketing agents' roles and services are important and positive in the study area

RECOMMENDATIONS

Based on the finding of this study that agricultural households respond to transactions costs in making maize supply decisions in the study area, the following recommendations are made policies that reduce transactions costs will complement price policies in affecting supply response. The effects of institutional deficiencies on the functioning of markets should be addressed. Proper market institutions promote competition and induce a more efficient market organization. Put differently proper market institutions reduce transactions costs. Lower fees changed by local government authorities as well as toll fee collected from supplier will reduce transactions land rent. The quality of road infrastructure should be improved as this is expected to reduce transport costs significantly.

Agricultural households should strengthen themselves financially by forming cooperative groups whereby members could have access to loans at a very low rate and farm inputs could be purchased in bulk to be shared among members at a reduced cost. The produce could also be sold in bulk thereby lowering the average transactions costs. Local farmers' cooperative groups could act as catalyst to complement the market and correct for market failures. The team action enhances trade through decreasing uncertainty and creating benefits from

reduced transactions costs. It gives the farmers new incentives to produce and increase the trade frequency and has the potential to promote as well as sustain economic development in the farming areas by increasing agricultural households' income and generating producer and consumer linkages to the benefit of the community.

REFERENCES

Abebe, H.G., 2005. The supply responsiveness of peasant agriculture in Ethiopia: Some macroeconometric results from cereal production. Center Discussion Paper.

Ahmed, R. and R. Narendra, 1987. Marketing and Price Incentives in African and Asian Countries: A Comparison. In: Agricultural Marketing Strategy and Pricing Policy, Dieter, E. (Ed.). World Bank, Washington DC., pp: 104-118.

Ajetomobi, J.O., A.O. Ajao and L.O. Olarinde, 2006. Supply analysis for food crops in an oil deregulated economy. Int. J. Applied Agric. Apic. Res., 3: 144-145.

Ajibefun, I.A., 1988. An investigation of technical inefficiency of production of farmers under the national directorate of employment in Ondo State, Nigeria. Applied Trop. Agric., 3: 15-21.

Askari, H. and J.T. Cummings, 1977. Estimating agricultural supply response with the nerlove model: A survey. Int. Econ. Rev., 18: 257-292.

Chhibber, A., 1988. Raising agricultural output: Price and non-price factors. Finance Dev., 25: 44-47.

Goetz, S.J., 1992. A selectivity model of household food marketing behaviour in Sub-Saharan Africa. Am. J. Agric. Econ., 74: 444-452.

Idachaba, F.S., 2004. Food security in Nigeria: Challenges under democratic dispensation. Proceeding of the 9th Agricultural and Rural Management Training Institute (ARMTI) Annual Lecture, March 24, Ilorin, pp: 1-23.

Iken, J.E. and N.A. Amusa, 2004. Maize research and production in Nigeria. Afr. J. Biotechnol., 3: 302-307.

Key, N., E. Sadoulet and A. Janvry, 2000. Transaction costs and agricultural household supply response. Am. J. Agric. Econ., 82: 245-259.

Krishna, R., 1967. Agricultural Price Policy and Economic Development. In: Agricultural Development and Economic Growth, Sourthworth, H.M. and B.F. Johnson (Eds.). Cornel University Press Ithaca, New York.

Ladele, A.A. and G.B. Ayoola, 1997. Food marketing and its role in food security in Nigeria. Proceedings of the National Workshop on Nigeria's Position at the World Food Summit, Jul. 31-Aug. 2, NARP, Abuja, pp: 88-113.

Leaver, R., 2003. Measuring the supply response function of tobacco in Zimbabwe. Proceedings of the 41st Annual Conference of the Agricultural Economic Association of South Africa (AEASA), Oct. 2-3, Pretoria, South Africa, pp: 1-14.

Mamingi, N., 1996. The Impact of Price and Macroeconomic Policies on Agricultural Supply and the Environment: A Synthesis. World Bank, Washington, DC. USA.

Mamingi, N., 1997. The impact of prices and macroeconomic policies on agricultural supply: A synthesis of available results. Agric. Econ., 16: 17-34.

Murova, O., K. Coble and M. Trueblood, 2001. Supply Response of Ukrainian Agriculture Agricultural Economics and Agribusiness. AAEA Selected Paper. University of Arkansas, Fayetteville.

North, D.C., 1990. Institutions, Institutional Change and Economic Performance. University of Cambridge, Cambridge, ISBN-10: 0521397340.

Olayemi, J.K., 1982. Improved marketing as a strategy for generating increased food production, a Nigeria experience. West Afr. J. Agric. Econ., 1: 21-26.

Pinstrup-Andersen, P., 1994. World Food Trends and Future Food Security. International Food Policy Research Institute, Washington, DC., pp: 1-3.

Von Braun, J., H. Bouis, S. Kumar and R. Pandya-Lorch, 1992. Improving Food Security of the Poor: Concept, Policy and Programs. International Food Policy Research Institute, Washington, USA.