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COMPARATIVE ANALYSIS OF FACTORS INFLUENCING QUANTITY OF MAIZE MARKETED AMONG AGRICULTURAL HOUSEHOLDS IN OYO AND OSUN STATES, NIGERIA.

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ABSTRACT: *This research is a comparative analysis with a focus on the quantity of maize marketed and factors influencing such quantity among agricultural households in Oyo and Osun States of Nigeria. Multistage random sampling technique was employed to sample two hundred and twenty (220) maize farmers from Oyo while one hundred and eighty (180) maize farmers were selected from Osun for the study. A structured interview schedule was used to collect primary data from the respondents. Data were obtained on socio-economic characteristics of respondents, production and marketing practices, prices and costs. Data collected were analyzed using descriptive statistics, an estimation of Cobb-Douglas regression model and the Chow's F- test. The result showed that in Oyo state, mean age for respondents was 45.8 years while it is 42.7 years for Osun counterparts. The summary of sex distribution revealed that 70.9 percent of the Oyo respondents are male compared with 57.8 percent of Osun respondents. In addition, 17.7percent of Oyo respondents compared with 14.4 percent of Osun respondents had no formal education at all. The summary of marital status distribution of respondents showed that more than ninety percent of the interviewed farmers from each state were married while the major source of finance for the farmers from both states was personal savings. Regression analysis revealed the R-squared (R^2) as 0.734 for Oyo while it is 0.794 for Osun. This showed that 73.4percent of the variation in quantity of maize marketed by respondents from Oyo was explained by the estimated variables while the variables explained up to 79.4 percent for Osun. The Chow's f-test that was employed to measure the statistical difference between quantity of maize marketed by Oyo and Osun States respondents revealed that there is no significant difference.*

KEYWORDS: **Maize Marketing, Food Security, Chow's f-test.**

INTRODUCTION

The food security problem has been an issue of concern for both developed and developing countries. Food security is jointly determined by availability of food and accessibility to the food. The food produced must be distributed efficiently at minimum costs in order to guarantee continuous availability of the food. Household food security refers to a household's ability to acquire food. The annual demand for food keeps growing (3.3percent) 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. With the present millennium, the world faces another food crisis that is just as dangerous but much more complex than the one it confronted thirty years ago (Shah and Strong, 2000). Food insecurity is generally associated with fluctuation in household own-food production and food prices. Household food security refers to a household's ability to acquire food. A

country and people are food secured when their food system operates in such a way as to remove the fear that there will not be enough to eat.

In Nigeria, the population growth rate is getting increasingly higher than the food production rate. Oritiz (2003) submitted that if current trends continue, there will be approximately 300 million of malnourished people or 32percent 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. According to Ndaeyo(2007), this lopsided relationship between food demand and supply had earlier compelled the Food and Agricultural organization of United Nations to opine that as the world population is increasing by approximately 1 million every four hours, we may have more than 3000 million people to feed by the year 2025. If they are to be fed adequately, the present food production level will have to be doubled and other strategies/approaches revised and/or encouraged. According to Ojo and Imoudu (2000), the significant imbalance between food production and the expanding population has resulted in an ever-increasing demand for agricultural products. It has also placed a serious stress on the marketing systems.

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. It had been 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. Each handling cost will not amount to much but the sum total of all can be significant, depending on the length of chain. This makes a greater difference in price paid between urban consumers and at the end of the chain and farm gate price at the beginning of the chain. This can lead to a greater or wider market margin between the producer and the final consumers. If the market margin is high, it may be used to argue that producers or consumers are being exploited (Ali *et al.*, 2008). 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, and to undertake the inspection needed to make sure that the terms of the contract are being observed.

There has been little work examining agricultural commodity supply that takes into account both the farmers' production and market participation decisions. Most of previous research focuses on price and its effect on agricultural commodity supply. 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 (1976) looked into agricultural supply response to price. Ahmed and Rustagi (1987) looked at marketing and price incentives in African and Asian countries while Mamingi (1996 and 1997) measured the impact of prices and macroeconomic policies on agricultural supply. Odunuga (1988) 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. Chibber (1988) worked on raising agricultural output through price and non-price factors but never took into account any market factor.
The bulk of the available research work on agricultural commodity supply that takes into account both the farmers' production and market participation decisions is mainly based on countries outside Nigeria. For this reason, policy makers may need to be careful in the application of their recommendations to development of agriculture at the grass root given a broad consensus among economists that improvements in both transport and institutional arrangements are important. The main objective of this work therefore is to determine the magnitude and the direction to which non-price factors influence changes in maize supply in the study area. Hypothesis of the study stated that there is no significant relationship between marketing costs and the quantity of maize marketed by respondents.

The focus on maize farmers derives from the fact that maize is one of the important grains in Nigeria both on the basis of the number of farmers who engaged in its cultivation, and also in its economic value. Maize is a multipurpose crop because every part of its plant has economic value. The grain, leaves, stalk, tassel and cob can all be used to produce a large variety of food and non food products (IITA, 2001). As a result of competition for maize by both man and animal, there is the need to increase the supply level of the grain. Studies in maize production in different parts of Nigeria have shown an increasing importance of the crop amidst growing utilization by food processing industries and livestock feed mills (Khawar *et al.*, 2007; Abdulrahaman and Kolawole, 2008).

It is therefore with the hope of detecting relevant factors that could serve as incentives for agricultural households to increase their present level of marketed maize in an effort to bridge the gap between production and consumption that this study was carried out.

METHODOLOGY

This study was carried out in Oyo and Osun States of Nigeria. Literature has revealed that the two States produce 50percent of maize produced in the Southwestern states of Nigeria (Ogunbodede and Olakojo, 2001). The choice of Oyo and Osun States also made it possible for the researcher to test for any statistical difference in the agricultural household supply response between the two States. The population of the study comprises all registered maize producing farmers in Oyo and Osun States of Nigeria. All agricultural zones under Oyo and Osun States Agricultural Development Projects (OYSADEP and OSSADEP) were involved.

Osun State has an estimated population of 3,423,535(National Population Commission, 2006). The capital is Osogbo. The state which is made up of 30 local government council lies between longitude 4^0 and 6^0 east of the Greenwich Meridian, latitude 5^0 and 8^0- 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 last between March and October, while the dry season comes between November and February. Mean annual rainfall is between 2,000 and 2,2000mm. Maximum temperature is 32.5^OC while the relative humidity is 79.90percent. Osun state has been divided by

OSSADEP into three agricultural zones and twenty five blocks (25) blocks. These are Osogbo (6 blocks), Ife/Ijesha (12 blocks) and Iwo (7 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 select sample from the maize farmers. In the first 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 percent of the cells (2) in each block making a total of 16 cells for the study. Thereafter in the 3rd stage, 40 percent of the farmers' groups were selected at random. Finally, 20 percent 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 from Osun state.

Oyo State is located in the South-Western part of Nigeria. It is located between latitudes $7^0 3^|$ and $9^0 12^|$ north of the equator and longitudes $2^0 47^|$ and $4^0 23^|$ east of the Meridian. It is bounded on the West by Republic of Benin, on the North by Kwara State, on the East by Osun State and on the South by Ogun State. The population of Oyo State in 2006 was 5,591,589 by National Population Commission. The state is made up of 33 local government areas. The State Capital is Ibadan. The States covers a land area of 27, 000sq.kilometres.There are two distinct seasons namely wet and dry seasons. The rainfall pattern is remarkably constant ranging between 1,211mm in the far North and 1,264mm at Ibadan in the South over the past two decades. The average annual rainfall is estimated at between 1,194mm in the North and 1,278mm in the South. Mean temperature is 27^OC. The area with high relative humidity favours the cultivation of tree crops such as cocoa, kola, citrus and oil palm as well as arable crops like maize, cassava, yam and rice. Oyo State Agricultural Development Project has divided the state into four agricultural zones and twenty-eight (28) blocks for administrative convenience. The agricultural zones are Ibadan/Ibarapa (9 blocks), Ogbomoso (5 blocks), Oyo (5 blocks) and Saki (9 blocks). Two agricultural zones were selected based on the type of crops grown. These are Ogbomoso and Ibadan/Ibarapa zones. Multi-stage random sampling technique was employed to select the farmers. In the first 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 percent of the cells (2) in each block making a total of 16 cells for the study. Thereafter in the 3rd stage, 40 percent of the farmers' groups were selected at random. Finally, 20 percent of the maize farmers in each group were randomly sampled for the study. A total of 220 maize farmers formed the sample of the study from Oyo state.

The Regression Model

The model employed for the study is specified as follows:

$\text{Log } Q = b_o + b_1 \text{ Log } P + b_2 \text{ Log } A + b_3 \text{ Log NEGO} + b_4 \text{ Log AGENTS} + b_5 \text{ Log HARVEST} + b_6 \text{ Log ASSEMBLAGE} + b_7 \text{ Log STORAGE} + b_8 \text{ Log TRANSPORT} + b_9 \text{ Log RENT}$

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

Where:

Q = Quantity of maize marketed (kg)
A = Area of land cultivated to maize (Ha)
P = Market price for maize (₦)
Harvest = Harvest Cost (₦)
Storage =Storage Cost (₦)

Transport = Cost of Transport (₦)
Assemblage = Assemblage Cost (₦)
Nego = Negotiation / Bargaining Cost (₦)
Agents = Agents Fee (₦)
Rent = Transactions land rent (₦)
b_0 = constant
b_1..... b_9 represent coefficient values of independent variables and ε = error term.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondent

The summary of age distribution of respondents is shown in Table 1. The mean age for the sampled farmers from Oyo State was 45.8 years while that for Osun State was 42.7years. This portrays that most of the maize farmers from both states are in their active and productive age when they can put in their best for optimum productivity. The result however revealed there are more aged (above 60 years old) maize farmers in Osun State than in Oyo State.

The summary of sex distribution revealed that 70.9percent of the Oyo respondents are male compared with 57.8percent of Osun respondents. More female are involved in maize farming in Osun State than Oyo. Table 1 contains the educational level distribution of respondents. The result showed that 17.7percent of Oyo respondents compared with 14.4percent of Osun respondents had no formal education at all. The result however suggests that more than half of the respondents from each of the states were literate. The summary of marital status distribution of respondents showed that ninety-three percent of the interviewed farmers from each state were married while 4.5percent from Oyo compared with 3.3percent from Osun were single. Similarly, the mean household size for both groups of respondents was 8.

Distribution of sampled farmers based on major source of finance showed that 63.6percent of Oyo respondents compared with 52.2percent of Osun respondents depended on personal savings in financing their maize enterprise activities while only 3.7percent from Oyo against 4.4percent from Osun claimed to depend on bank loans. The remaining respondents indicated total financial dependence on friends and/or relatives. Most of the respondents from both states 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 table further summarized the distribution of sampled farmers according to years of experience in maize-related venture. The mean value was 16.8 years for Oyo respondents and 17 years for Osun respondents. The result portrays a picture that as we have experienced farmers in the business, new ones are still joining the venture. Table 1 groups the respondent farmers according to farm size. Mean value was 2.2 hectares for Oyo respondents and 2.1 hectares for Osun respondents.

The result revealed that 49 percent of the Oyo maize farmers compared with 55.6percent of Osun maize farmers cultivated less than two hectares of maize, 40 percent of Oyo respondent against 33.3percent of Osun respondents cultivated between 2 and 5 hectares while about 11 percent from each group cultivated above 5 hectares of maize.

This could be as a result of low accessibility to land and formal loans. The result obtained shows that most of the respondents from both states are small scale farmers. According to Aliyu and Shaib's (1997) classification, Nigerian farmers fall in to three broad categories, namely, small scale with 0.10 to 5.99 hectares, medium scale with 6 to 9.99 hectares and large scale holdings with 10 hectares upward. The finding is in agreement with Alimi and Awoyomi (1995) as well as Azih (2004).

Their findings revealed that small scale farm holdings predominate in Nigeria, and account for up to 81percent of the total area and produce about 95percent of agricultural output. Table1 revealed distribution of respondents based on average annual income. It suggests that most of the respondents from the two states are low income earners.

Cost of Marketing Maize

Table 2 showed the descriptive statistics of marketing costs incurred by the respondents per annum for the two states. Variables found to be associated with marketing 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 2 compared the costs distribution of respondents as obtained from the data collected. It showed the minimum amount as well as maximum amount claimed by the respondents for each of the marketing costs variable. It also showed the mean value as well as quantity of maize marketed by respondents.

Table I: Socio-Economic Distribution of Respondents

Age	**Frequency (Oyo)**	**%age (Oyo)**	**Frequency (Osun)**	**%age (Osun)**
20 –29	13	5.9	10	5.5
30 -39	30	13.6	21	11.6
40 – 49	111	50.5	74	41.1
50 -59	59	26.8	40	22.2
60 and above	07	3.2	35	19.6
Total	**220**	**100**	**180**	**100**
Level of Education	**Frequency**	**%age**	**Frequency**	**%age**
No Formal Education	39	17.7	26	14.4
Primary Education	57	25.9	47	26.1
Secondary Education	39	17.7	58	32.2
Tertiary Education	65	29.5	44	24.4
Adult Education	18	8.2	2	1.1
Islamic Education	2	1.0	3	1.8
Total	**220**	**100**	**180**	**100**
Marital Status	**Frequency**	**%age**	**Frequency**	**%age**
Single	10	4.5	06	3.3
Married	203	92.3	167	92.8
Widow(er)	7	3.2	7	3.9
Total	**220**	**100**	**180**	**100**
Household Size	**Frequency**	**%age**	**Frequency**	**%age**
≤5	52	23.6	36	20.0
6 - 10	161	73.6	135	75.0
11 – 15	03	1.4	04	2.2
16 – 20	04	1.8	05	2.8
Total	**220**	**100**	**180**	**100**
Major Source of Finance	**Frequency**	**%age**	**Frequency**	**%age**
Personal Savings	140	63.6	94	52.2
Friends and Relatives	8	3.6	6	3.3
LG/STATE/FADAMA	2	0.9	5	2.7
LOAN	62	28.2	67	37.2
Cooperative loan	8	3.7	8	4.4
Bank loan				
Total	**220**	**100**	**180**	**100**
Year of experience	**Frequency**	**%age**	**Frequency**	**%age**
1 – 10	55	25.0	49	27.2
11 – 20	95	43.2	69	38.3
21 – 30	46	20.9	42	23.3
31 – 40	24	10.9	20	11.1
Land Size (Ha)	**Frequency**	**%age**	**Frequency**	**%age**
< 2 hectares	108	49.0	100	55.6
2 – 5 hectares	88	40.0	60	33.3
>5 hectares	24	11.0	20	11.1
Total	**220**	**100**	**180**	**100**
Annual Income (#)	**Frequency**	**%age**	**Frequency**	**%age**
<100,000	108	49.0	100	55.6
100,000 – 200,000	88	40.0	60	33.3
> 200,000	24	11.0	20	11.1
Total	**220**	**100**	**180**	**100**

Source: Field Survey, 2011

Table 2: Distribution of Respondents Marketing Cost Variables

Variables	Minimum (Oyo)	Maximum (Oyo)	Mean (Oyo)	Minimum (osun)	Maximum (Osun)	Mean (Osun)
Harvesting cost (#)	1820	59480	9143.94	1725	52490	10514.98
Assemblage cost (#)	1120	9580	5029.20	1128	8580	4929.95
Storage cost (#)	1360	37440	10798.06	1367	31540	12000.90
Negotiation/Bargaining cost (#)	2230	6330	3761.66	1980	7520	4016.95
Agents fee (#)	3500	9780	6956.78	2800	7897	5696.98
Transportation cost (#)	9260	88540	37035.38	10000	76750	35470.85
Transactions land rent (#)	3000	12360	7242.38	4000	13680	7892.90
Price per kilogram (#)	45	65	49.69	40	65	48.97
Quantity of maize marketed (Kg)	4440	55000	30958.44	4400	50000	29548.28

Source: Field Survey, 2011

Result of the Regression Analysis

The Cobb-Douglas functional form linearized by log transformation was specified as: Log Q = b_0 + $b_1$logP + $b_2$logA + b_3LogNEGO + $b_4$logAGENT + $b_5$logHARVEST + $b_6$logASSEMBLAGE + $b_7$logSTORAGE + $b_8$logTRANSPORT + $b_9$logRENT

The results obtained are summarized below:-

Table 3: Regression Results

Dependent Variable: Q; n =220 for Oyo, n = 180 for Osun

Independent Variable	Coefficient		t-value	
	Oyo	Osun	Oyo	Osun
Constant term	3.439	3.753	2.333	2.766
Log (P)	0.778	0.717	2.217**	2.071**
Log (A)	1.038	1.051	18.352***	16.526***
Log NEGO	0.088	0.100	0.236	0.310
Log AGENT	0.394	1.340	1.048	3.664***
Log HARVEST	0.921	-0.482	2.181**	1.039
Log ASSEMBLAGE	0.428	-0.079	1.615	-0.570
Log STORAGE	-0.760	0.120	-3.412***	0.826
Log TRANSPORT	-0.492	0.146	-1.358	0.402
Log RENT	-0.401	-0.927	-1.715*	-2.417**

	Oyo	Osun
R^2	0.734	0.794
Adjusted R^2	0.701	0.783
F – Statistic	58.108(0.0000)***	72.767 (0.0000)***
RSS	54.308	30.475

*** Significant at 1percent
** Significant at 5percent
* Significant at 10percent

Source: Survey Data, 2011

As could be seen from Table 3, regression analysis revealed the R-squared (R^2) as 0.734 for Oyo while it is 0.794 for Osun. This showed that 73.4percent of the variation in quantity of maize marketed by respondents from Oyo was explained by the estimated variables while the variables explained up to 79.4 percent for Osun. The F-value was 58.108 for Oyo and 72.767 for Osun. The values were significant at 1percent for both states. This means that the null hypothesis 1 should be rejected and the alternative hypothesis accepted. As such, there is a significant relationship between quantity of maize marketed and the explanatory variables in both Oyo and Osun states.

From the regression analysis of data, Table 3 revealed that for Oyo State respondents, five variables out of the estimated nine were found to be statistically significant in relation to market decisions made by agricultural households. They are: market price of maize, land area cultivated to maize and cost of harvesting maize, which have proportional relationship with quantity of maize marketed by respondents; as well as storage cost and transactions land rent which have inverse relationship with quantity of maize marketed.

Analysis for Osun respondents revealed that four variables were found to be statistically significant in relation to quantity marketed decisions made by agricultural households. They are: price of maize, area of land cultivated to maize and agent fee were significant variables influencing quantity of maize supplied positively while transactions land rent has an inverse significant relationship with quantity of maize released to the market for sale.

Price of maize and area of land cultivated to maize have direct (positive) relationship with the quantity of maize released to the market by the respondents in both states. This means that the higher the price of maize and the more the area of land cultivated to maize, the higher the quantity of maize respondents are willing to sell. The result is in line with the a-priori expectations of the study and it corresponds with findings from empirical results of other related studies reviewed in the course of this study. These include Stifel et al (2003), Abebe (2005) and Murova et al., .Leaver (2003) however found that Zimbabwean tobacco farmers are relatively unresponsive to output prices. The coefficient values revealed that 0.778 and 0.717 unit increase (or decrease) in price of maize for Oyo and Osun respondents respectively will result in 1 unit increase (or decrease) in quantity of maize the respondents are willing to sell; while1.038(Oyo) and 1.051(Osun) unit changes in land hectrage will result in 1 unit change in quantity of maize released for sale.

Agents' fee was revealed to have a direct relationship with quantity of maize released to the market by respondents only in Osun state, suggesting that the higher the fees charged by marketing agents the more maize the respondents are willing to sell. This is at variance with the a-priori expectation of the study, as well as Stifel et al., (2003) finding that transactions costs and agricultural productivity were significantly inversely related in Madagascar. The finding of this study could be explained that in Osun state market, the better the marketing agent is, the more quantity the producers are willing to market. This suggests that with an efficient marketing agent, the producers will be able to sell at a better price and make better profit. Thus the effect of higher fees paid to efficient marketing agents is canceled by better profits made and thus the producer is willing to release more of his output to the market. The regression coefficient revealed that 1.340 unit changes in agents' fee will result in 1 unit change in quantity of maize sold by respondents in Osun state.

According to the respondents, teaming up to employ effective agent(s) is even more desirable, as it results to better profit at the long run. This issue of team marketing is supported by various economics theories. There is the potential to increase the effectiveness of marketing because by bulking the produce the average marketing costs are lowered. The bargaining power of the cluster is higher and access to information is better and cheaper. Furthermore, it will decrease uncertainty caused by the disguised information and there is less risk of opportunistic behaviour by the buyer (Dijkstra et al., 2001). In the cluster, the firms can expand and integrate the organization of the marketing of maize. The extra costs that this would incur are less than the costs of the same transaction by means of an exchange on the spot market. In addition, teaming up to employ marketing agents (s) may increase efficiency. Schmitz and Nadvi (1999) advocated that clustering enhances collective efficiency. Joint action will substantially decrease the average costs of harvest, post-harvest and transport of maize.

The quantity of maize released to market was found to have an inverse (negative) relationship with cost of harvest and storage only in Oyo state. This finding corresponds with a- priori expectation of the study and also with the findings of Minot (1999) and Stifel et al., (2003) that marketing costs decrease maize quantity sold. The regression coefficient for storage cost was – 0.760, indicating that a 0.760 unit increase in storage cost will lead to 1 unit decrease in maize quantity released for sale while for harvest cost it was found to be 0.921 .

Quantity of maize offered to the market was also found to have an inverse significant relationship with transactions land rent in both Oyo and Osun states. Transactions land rent includes all the toll and local government fees paid by suppliers. The finding corresponds with the study's a-priori expectation. The regression result indicated that 0.401and 0.927 units' increase in transactions land rent (in Oyo and Osun respectively) will result in 1 unit decrease in quantity of maize offered for sale. Contrary to empirical results from Hobbs (1997), transportation and negotiation costs were found to be statistically insignificant to quantity of maize sold by agricultural households in the study area.

Elasticity of Supply

For a functional form involving the logs of both dependent and independent variables such as Cobb-Douglas function which was employed for this study, the elasticity is simply the coefficient of the log of the independent variable i.e $^{dy}/_{dxi}$

Table 4 revealed the elasticity of supply with respect to each of the estimated variables in the study.

Table 4: Elasticity of supply with Respect to Estimated Variables

Estimated variable	Elasticity of Supply	
	OYO	OSUN
P	0.78	0.72
A	1.04	1.05
Nego	0.09	0.10
Agent	0.39	1.34
Harvest	0.92	0.48
Assemblage	0.43	0.08
Storage	0.76	0.12
Transportation	0.49	0.15
Transactions Land Rent	0.40	0.93

Source: Survey Data, 2011.

Table 4 revealed the price elasticity of supply for maize as 0.78 (Oyo) compared with 0.72 of Osun counterparts, meaning that a 10percent increase in price of maize will lead to a 7.8 and 7.2 percent increase in quantity of maize released to the market respectively. This finding compares with the finding of Bond (1983) who estimated supply elasticities of sub-saharan Africa, and reported that price elasticities range from 0.1 to 0.5 in the short run and from 0.6-1.8 on the long run.

Following the same line of discussion, the result showed that with respect to Area of land cultivated, Negotiation Cost, Agents fee, Harvesting Cost, Assemblage cost, Storage cost, Transportation cost and Transactions land rent, a 10percent change in each of the variables will lead to 10.4percent, 0.89percent, 3.9percent, 9.2percent, 4.3percent, 7.6percent, 4.9percent and 4percent change in quantity of maize marketed by Oyo respondents respectively as compared with 10.5percent, 1.0percent, 13.4percent, 4.8percent, 0.8percent, 1.2percent, 1.5percent and 9.3percent respectively for Osun respondents.

In this case agricultural households maize supply is highly elastic with respect to land area cultivated, moderately elastic to market price, harvesting cost and storage cost for Oyo State respondents. While for their Osun State counterparts, maize supply is highly elastic with respect to area of land cultivated and agents fee, it is however moderately elastic with price and transactions land rent.

In comparison therefore both groups of respondents' maize supply are elastic with respects to land area cultivated and price while their responsiveness to transactions costs variables differ. This shows that maize farmers in different locations may not react the same way to variations in marketing costs. The reasons could be as a result of differences in distances to the market, market institutions, organization, structure, conduct and performance that may vary from one location to another.

The Chow's Forecast Test

The Chow's f-test was employed to determine the statistical relationship in quantity of maize released to the market by agricultural households in Oyo and Osun States.

The hypothesis tested was:

Ho: $\beta_1 = \beta_2$

H_A: $\beta_1 \neq \beta_2$

Where β represents the vector of estimated parameters

Chow's F was calculated as:

$$F = \frac{(RSS - (RSS_1 + RSS_2)]/k}{(RSS_1 + RSS_2)\ (n - 2k)}$$

Where

RSS = Residual sum of squares for pooled data

RSS_1 = Residual sum of squares for Oyo respondents

RSS_2 = Residual sum of squares for Osun respondents

K = number of estimated parameters

n = number of observations ($n = n_1 + n_2$)

From survey data:

RSS = 89.942

RSS_1 = 54.308

RSS_2 = 30.475

K = 10
n = 220 + 180 = 400
substituting these in to Chow's F formula:

$$F = \frac{[89.942 - (54.308 + 30.475)]/10}{(54.308 + 30.475)(400 - 2(10))}$$

$$= \frac{(89.942 - 84.783)/10}{(84.783)(380)}$$

$$= \frac{0.516}{32217.54}$$

$$= 0.00002$$

$F_t = F_{0.05}(V_1, V_2)$
Where $V_1 = K$ and $V_2 = n - 2k$
Therefore $F_t = F_{0.05}(10,380)$
$F_t = 2.09$
Decision rule: If $Fc < F_t$ accept Ho
If $Fc > F_t$ reject Ho
In this case: $Fc = 0.00002$
$F_t = 2.09$
$F_c < F_t$
Therefore we accept H_o: $\beta_1 = \beta_2$ i.e

There is no significant difference in factors influencing quantity of maize released to the market by agricultural household in Oyo and Osun States. In other words, agricultural households in Oyo and Osun States respond the same way to estimated variables in relation to quantity of maize offered to market. There is no inter-state or spatial difference in maize sales decision of agricultural households with reference to estimated market variables in the study area. From the result obtained above, it could be deduced that the chow's F test measures aggregation. From Table 4, if sales decisions with reference to estimated variables are critically and individually studied, the differences are there. The statistical equality obtained for agricultural households' response to estimated variables among the two states by the chow's forecast test could therefore be attributed to aggregation of data.

CONCLUSION

The study concluded that:

1. There is no inter-state or spatial difference in factors influencing quantity of maize marketed by agricultural households in the study area.
2. Marketing costs in the study area influence decision of agricultural households on how much maize to market in that the coefficients of marketing costs were found to be statistically significant.
3. Market price and area of land cultivated positively influence quantity of maize marketed in the study area.
4. Contrary to a-priori expectation and the belief held by most people, marketing agents' roles and services are found to positively influence maize quantity released to market by agricultural households in the study area.

POLICY IMPLICATIONS AND RECOMMENDATIONS

(1) Based on the finding that both price and structural factors (with particular reference to land area) significantly influence quantity of maize offered for sale by agricultural households in the study area, the policy implications of this is that to serve as compliments to various price policies being made and implemented by the government, there is the need to improve land scheme, credit scheme (rural finance), pricing and distribution of inputs. Policies that reduce marketing costs will consequently complement price policies in affecting willingness to participate in the market.

(2) Based on the finding of this study that quantity of maize offered for sale by agricultural households is influenced by marketing cost variables identified in the study area not exactly in similar or same magnitude and direction as those presented in most foreign literatures reviewed, a strong case can be made that agricultural marketing research needs to focus greater attention on the marketing situations as affecting our local environment. This is because most findings made outside Nigeria are not likely to fit into our own peculiar setting. There is therefore no point applying foreign theories that have not been locally tested and proved to solve local economic problems and challenges. Such approach will only make any country a 'developing' and never a 'developed' country. Nigerian researchers should therefore be empowered to rise up to the challenge and, instead of the idea of theory and technology transfer, carry out local research to make findings which could result in to development of local tools useful in solving local economic problems and appropriate for policy formulations.

(3). Based on the finding that most agricultural households depended on their meager personal savings in financing production and marketing activities, this study recommends that 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.

(4) The produce could also be sold in bulk by the local cooperative body, thereby lowering the average marketing costs. Clustering the harvest and post-harvest handling and the marketing may increase efficiency. Even if the members of local cooperative groups do not present higher technical efficiency, their revenue from maize is higher, resulting in a higher allocative efficiency. Teaming up will increase equity and increase the bargaining power of the farmers. Farmers as a group are less at risk from opportunistic behaviour by the buyer, who would otherwise dictate the contract. Hence farmers become able under the auspices of the local cooperatives to bargain and haggle for the sales contract. 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.

(5) Better roads could reduce marketing costs, effective policy interventions can come in the form of improving road quantity (i.e. building new roads and maintaining existing ones). This should be jointly implemented by the three tiers of government

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