DETERMINANTS OF CHOICE OF SOURCE OF AGRICULTURAL VALUE CHAIN FINANCE AMONG PALM OIL MARKETERS IN DELTA STATE, NIGERIA

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ABSTRACT

This study determined the effect of palm oil marketers' socioeconomic characteristics on the choice of credit channel in the value chain finance and also the constraints to accessing finance by palm oil marketers in the study area. A multi-stage random sampling procedure was used for selecting 240 palm oil marketers from 12 communities in four local government areas and two agricultural zones. Data were obtained through the use of structured questionnaire and analysed by the use of descriptive and inferential (multinomial logit) statistical tools. Findings indicate that the multinomial logit model result suggests that the choice of source of credit channel by palm oil marketers is significantly related to gender ($p>0.01$), education ($p>0.01$), income ($p>0.10$), membership of organization ($p>0.05$ and 0.10) and location of business ($p>0.01$). The major constraints identified that have significant impacts on the palm oil marketers' access to value chain finance are low level of education, Interest rate, Bureaucracy, Delay in loan disbursement, Short period of loan duration, Provision of guarantors, Awareness and Time wasted on processing of loans.

Key words: Agriculture, Value chain finance, Palm oil marketing, Multinomial logit.

1. INTRODUCTION

Agriculture continues to be a fundamental instrument for sustainable development and poverty reduction (World Bank, 2008); yet, 'financial constraints in agriculture remain pervasive, and they are costly and inequitably distributed. These factors severely limit smallholders' ability to compete (Miller and Jones, 2010). Agriculture accounts for 40 percent of GDP and 60 percent of employment, which is dominated by disorganized, aging smallholder farmers with low productivity levels.

The history of institutional credit administration in many parts of Nigeria has not been impressive when evaluated on the basis of their repayment performance. In the past, many credit agencies were scrapped for gross inefficiency, while others were heavily subsidized in order to keep them alive. The action became necessary because of high default rate among borrowers (Awoyemi and Olowa, 2010).

It is now generally accepted that agricultural development effort which aims at improving the production resources employed by farmers is not misdirected, since that sector employ's the largest body of producers and contains most of the underemployed labour resources that can be mobilized. Agriculture in less developed countries like Nigeria is characterized by the use of more traditional methods of cultivation, unwillingness to adopt innovative ideas partly due to limited access to financing valid, partly, by farmer's aversion to undertake risky ventures (Awoyemi and Olowa, 2010). Ike (2009) established the major role of credit in peasant farming as the opening of greater opportunities for acquisition of the much needed inputs. It is mainly in this way that credit can effectively function to overcome agricultural stagnation in developing countries of the world.

Lending agencies in developing countries are faced with the nagging problem of ensuring credit effectiveness in a sociological set up where government properties and financial assistance are erroneously considered as booties (Aku, 1993). Added to this ring are the inherent retrogressive government bureaucracy in processing and disbursing agricultural loans to applicants, lack of organized marketing arrangements for agricultural commodities produced with borrowed funds and traditional land tenure system, which together constitute

formidable economic impediments to successful loan administration.

Palm oil which is a major component product from oil palm *(Elaeis guineesis)* has Nigeria producing the entire products sold in the world market as at 1900 and it was considered a dominant source of foreign exchange (Eshalomi, 2009). Up until the 1960s, Nigeria was the world's largest producer of palm oil accounting for 43% of global palm oil production. Over-reliance on traditional production methods, excessive tapping of palm trees for palm wine and the civil war between 1967 and 1970, are factors that contributed to Nigeria's inability to meet up with the global rise in demand for palm oil. The Nigerian oil palm belt covers twenty-four states, including all nine states of the Niger Delta (Akwa Ibom, Abia, Rivers, Edo, Imo, Ondo, Bayelsa, Cross River and Delta). Foundation for Partnership Initiatives in the Niger Delta (PIND) (2011) reported that within the oil palm belt in Nigeria, 80% of production comes from dispersed smallholders who harvest semi-wild plants and use manual processing techniques. According to PIND (2011), several million smallholders are spread over an estimated area ranging from 1.65 million hectares to 2.4 million hectares and to a maximum of 3 million hectares.

In Nigeria, major constraints that farmers at the bottom of the agriculture value chain face are access to working capital during production season to buy inputs and hire labor and investment capital for farm equipment, buildings and storage facilities. Inability to access finance at the right time can adversely impact a farmer's quantity and quality of output and ability to diversify production to stay competitive and to increase his share in the final value of the product (UNCTAD, 2004). This impact is particularly pronounced in the case of small farmers who have limited funds due from restricted access to formal financial services. Banks are usually reluctant to finance agriculture due to commercial and systemic (or covariant, due to natural calamities, pests, diseases) risks associated with it, which could result in large scale losses. From the perspective of the banking sector demand-side constraints (e.g. repayment capacity, poor credit track record, inability to present viable project proposals, etc.) and supply-side constraints (e.g. lack of information on the borrower, high transaction costs, etc.) further widen agricultural financing gap (Subbarao, 2012). Literature shows that the failure of formal financial institutions to meet rural credit demand has resulted in innovative financing mechanism and risk coping strategies by the value chain actors (Miller and Jones, 2010).

Consequent on these inherent bottlenecks in the traditional agricultural financing, there arose a shift in the paradigm of agricultural credit administration to agricultural value chain financing. Value chain finance is an evolving term that has taken on a range of meanings and connotations. The flow of funds to and among the various links within a value chain comprises what is known as value chain finance (Miller and Jones, 2010). This means that it is any or all of the financial services, products and support services flowing to and/or through agricultural value chain to address the needs and constraints of those involved in that chain. According to Miller and Jones (2010), these needs could be to access finance, secure sales, procure products, reduce risk and/or improve efficiency within the chain.

Value chain finance comprises of both internal and external forms. The internal forms are those finance which takes place within the value chain such as when an input supplier provides credit to a farmer, or when a lead firm advances funds to a market intermediary while external value chain finance which is made possible by value chain relationships and mechanisms: for example, a bank issues a loan to farmers based on a contract with a trusted buyer or a warehouse receipt from a recognized storage facility (Miller and Jones, 2010). Agricultural value chain finance offers an opportunity to reduce cost and risk in financing, and reach out to smallholder farmers including those engaged in palm oil business.

Small scale palm oil marketers in Delta State face the challenges of inadequacy of finance to execute their businesses. Accessing finance from the formal financial institutions in the State by these

categories of enterprises has been very. Worse still is the preponderance of women in marketing chains of the palm oil business in the State. Access to credit from the formal sector has always been biased against women (Ike, 2009).

Thus, there is the need to determine the effect of socioeconomic characteristics of the marketers on the choice of source of credit channel in the value chain finance and also ascertain the main constraints to accessing value chain finance among smallholders in the area. Specifically the study sought to:

(i) Evaluate the effect of palm oil marketers' socioeconomic characteristics on the choice of credit channel in the value chain finance, and

(ii) Ascertain the various constraints to the financing of palm oil marketing in the agricultural value chain.

2. METHODOLOGY
2.1 Study Area
The study was conducted in Delta state. The State was created in 1991 and has 25 local government areas, divided into three agricultural zones of Delta north, Delta south and Delta central. It covers a landmass of about 18,050km^2 of which more than 60% is land and has a population of 4,098,391 composed of 2,074,306 males and 2,024,085 females (NPC, 2006). The State lies roughly between longitude 5°00' and 6°45' East and Latitude 5°00 and 6°30' North. Delta state is generally low-lying without remarkable hills and has a wide coastal belt inter-laced with rivulets and streams which form part of the Niger-Delta.

2.2 Sampling Procedure
A multi-stage random sampling procedure was used for selecting the respondents. First, simple random sampling method was used to select two agricultural zones. The zones selected were Delta central and Delta north agricultural zones. The second stage was the selection of two local government areas (LGAs) from each of the two sampled zones. The local government areas sampled were Aniocha south and Ika north east local government areas from Delta north

agricultural zone while for the Central zone were Ethiope east and Sapele local government areas. The third stage involved the selection of three communities from each of the sampled local government areas and this gave a total of twelve (12) communities that were sampled for the study. The fourth stage in the sampling procedure was the selection of twenty (20) palm oil marketers from each of the communities and this gave a total of 240 marketers that were selected for the study.

2.3 Data Collection
Data were collected on socioeconomic characteristics of palm oil marketers such as age, educational qualification, gender, marital status, years of experience in palm oil marketing , household size, quantity of palm oil bought and sold, different sources of fund and amount accessed, cost of fund (interest rate) amongst others. Also the various constraints faced by palm oil marketers in accessing and use of value chain finance were sought from the respondents.

2.4 Data Analysis
Descriptive and Inferential statistical tools were used for analysis. The effect of socioeconomic characteristics of palm oil marketers on choice of source of credit channel in the value chain were achieved through the use of multinomial logit regression analysis. The econometric model was used to determine the attributes of palm oil marketers availing short term loans from different credit channels available in the study area.

2.5 Model Specification
2.5.1 Multinomial Logit Regression Analysis for estimating Determinants of Choice of Source of Fund
Multinomial logit (MNL) models are used to model relationships between a polytomous response variable and a set of regressor variables. It is a simple extension of logistic regression that allows each category of an unordered response variable to be compared to an arbitrary reference category, thereby providing a number of logistic regressions. This model was used because it is the standard method for estimating unordered, multi

category dependent variables (Martey, Annin, Wiredu and Attoh 2012). It also assumes independence across the choices, that is, it does not allow correlation or substitution between them (Wooldridge, 2008). The MNL is also chosen because it is widely used in studies involving multiple choices and easier to compute than its alternative, the Multinomial probit (Karki and Bauer, 2004; Hassan and Nhemachena, 2008).

The dependent variable is a multinomial response variable motivated from an underlying latent random utility model. The outcome yi, for palm oil marketer i is one of m alternatives. Thus, $yi = j$ is set if the outcome is the jth alternative. Here, choice of credit channel j takes a value from a set containing six choices namely (1) Commercial/Microfinance Banks (2) Government microcredit programme (3) Isusu/Thrift and Loan schemes/cooperative societies (4) Relatives and friends (5) Village Money Lenders, (6) Palm oil buyer/Agents (j=1,2,3,4,5 6 respectively).

To reiterate, the values taken by j are arbitrary and unordered. For the ith palm oil marketer faced with m credit channel choice, the underlying latent utility of choice j is given as: $Uij = z'_{ij} \beta + e_{ij}$

Here, z is a vector of explanatory variables containing socioeconomic characteristics. U_{ij} is not directly observable, but it is possible to define an observable dichotomous variable y_{ij} equal to 1 if $U_{ij} > U_{ik}\ for\ all\ other\ k \neq j$, and 0 otherwise. In other words, if the marketer makes choice j in particular, then it is assumed that $U_{ij}\ is\ the$ maximum among the m utilities. The probability that marketer i chooses j^{th} credit channel ($Pr_{i,j}$) from a choice set of m alternatives may then be written as:

$$Pr_{i,} = (y_{i,} = 1) = [(\beta'_j - \beta') > e_i{}^k - e_i{}^j] \forall\ k \neq j$$

If it is assumed that the perturbations have identical and independent Weibull distributions, the difference ($e_i{}^k - e_i{}^j$) has a logistic distribution and the choice model is multinomial logit (Maddala, 1983; Glauben,

Herzfeld and Wang, 2008). The multinomial logit approach doesn't allow analyzing the probability of being allocated to a specific credit market channel.

Because of identification restrictions, only the relative probabilities can be discerned (Glauben *et al*, 2008). Here, it is assumed that the marketers who chose commercial or microfinance banks as the choice of credit channel *(j=1)* as the base outcome and make all comparisons in relation to it. This normalization implies that the estimated model reduces to five log odds ratio of the form:

$$\log(\ Pr_{i,j}/Pr_{i,j=1}) = \beta'_j z_i\ ,\ j = 2,3,4,5,6$$

Therefore, the estimated coefficient (β'_j) can be interpreted as the marginal change in the logarithm of the odds of each possible alternative over the base outcome (in the case of this study is commercial or microfinance bank as a credit channel) caused by a change in the relevant explanatory variables.

The second objective of this study which sought to ascertain the constraints to accessing value chain finance was achieved through the use of a five-point likert scale of No impact, Little impact, Uncertain, Large impact, and Very large impact. The responses to an item for each variable were multiplied by the weight attached to obtain response scores. The mean response values are as follows:

No impact = 1, Little impact = 2, Uncertain = 3, Large impact = 4 and Very large impact = 5.

Thus, $\bar{X} = \dfrac{\Sigma xf}{n}$ Where; $\bar{X}$ = mean;

Σ = sum of

x = normal value of response

f = frequency

n = number of respondents to an item

The cut-off point was determined by finding the mean of the nominal value assigned to the options. Thus $\bar{X} = \dfrac{1+2+3+4+5}{5}$ =

$\dfrac{15}{5} = 3.00$

To make inferential statements, the mean score was compared with the critical mean of 3.00. If the calculated mean is not equal to or greater than the standard critical value, the hypothesis is rejected; otherwise it is accepted (Mitchell and Agenmonmen, 1994).

3. RESULTS AND DISCUSSION
3.1 Effect of Palm oil marketers' socioeconomic characteristics on the choice of Source of credit channel in the value chain finance

The channel of palm oil distribution in the study area reveals that palm oil is processed and packaged in containers of 20 – 25 liters and drums. The wholesalers were involved in purchasing, transportation, packaging and storage of palm oil and then sell to the retailer or directly to the consumers. The palm oil marketing channel in the study area is as presented in Figure 1.

To determine the socioeconomic variables that influence palm oil marketers' choice of source of value chain finance, the multinomial logit model was applied. The determinant variables included in the model are gender, age, marital status, level of education, marketing experience, household size, income, and membership of organization as well as location of business activity. STATA software was used to estimate these parameters as well as the marginal effects. Commercial/microfinance bank was chosen as base category and used as the comparison group.

From the analysis, the chi-square value of 998.56 is significant (p>0.000) at 1% level indicating that the explanatory variables included in the model had a joint influence on the palm oil marketers' choice of alternative value chain finance channel. The multinomial logit model result is as presented in Table 1 while Table 2 is

the marginal effects of the multinomial logit model on choice of source of value chain finance by palm oil marketers.

The result indicates that the choice of source of credit channel by palm oil marketers in the area is significantly related to gender, age, education, level of income as well as membership of organization and location of the business. The coefficients of the variables are positive which implies that the probability of the respondents accessing value chain finance from any of the sources relative to the formal finance increases with the respective respondents' variable.

The result shows that female palm oil marketers (p<0.01) are more likely to avail loans from palm oil buying agents as compared to formal credit from commercial and /or microfinance banks. The importance of internal source of finance in palm oil marketing cannot be overemphasized as it is a tradition in most palm oil markets.

The result also shows that the level of education of palm oil marketers influence their choice of source of value chain finance (p<0.01) as a more educated palm oil marketer will avail value chain finance from Government microcredit scheme than her uneducated counterpart in the business. Also availing value chain finance from Village money lenders is significant at a probability level of 1 percent. The negative sign on the coefficient of village money lenders implies that a more educated palm oil marketer is less likely to avail credit from Village money lenders rather than the formal finance sources such as commercial or microfinance banks.

Result also shows that the level of income, membership of organization and business location played statistically significant (p<0.01) roles in determining the choice of source of value chain finance for palm oil marketers in the study area. Level of income of palm oil marketers determined the choice of their source of value chain finance (p<0.1) as they will at this level avail value chain finance from Government microcredit schemes than the formal commercial/microfinance banks. Palm oil marketers who are members of organizations are

more likely to avail value chain finance at the (p<0.05) from Group contribution/thrift & Cooperatives as well as Marketing agents P<0.1 rather than accessing fund from the formal commercial or microfinance banks. Again, the palm oil marketer located further away from the urban areas will avail value chain finance from relatives & friends rather than from commercial/microfinance banks (p<0.01). Similar findings were reported by Olwande and Mathenge (2010) among marketers of palm oil in the poor rural households in Kenya.

3.2 Constraints to access of value chain finance by palm oil processors and marketers

The result of the findings as presented in Table 3 indicate that there were constraints that had serious inhibitory impacts on palm oil processors and marketers from accessing value chain finance from both the formal and the informal sources, particularly the commercial and microfinance banks as well as from the Government operated credit schemes.

The major constraints that were identified in this guise were low level of education, interest rate, bureaucracy, delay in loan disbursement, short period of loan duration, provision of guarantors, awareness and time wasted on processing of loans. All these identified constraints affected access to value chain finance from the formal sources such as commercial banks and the microfinance banks as well as from the government established microcredit schemes. This result agrees with the findings of Ugwumba and Omojola (2012), Coker and Audu (2015) as well as Ike (2010), who variously established that illiteracy, delay in disbursement, high interest rate, short duration of loan tenor, cost of processing loan in terms of time, money and transport, provision of guarantors and excessive bureaucracy were issues hindering microcredit access and repayment in Nigeria. Specifically, high interest rates and short duration of loan were the major constraints to value chain finance among the informal credit sectors.

4. CONCLUSION

This study examined the effect of socioeconomic characteristics of palm oil marketers on the choice of source of credit channel in the value chain finance. Gender, education, level of income, membership of organization and location of the business affected the choice of source of credit channel utilized by palm oil marketers in accessing value chain finance.

4.1 RECOMMENDATION

It is recommended that governments at all tiers should initiate policies and programmes that will reduce interest rate charged by both the formal and informal sources of agricultural value chain finance to a single digit percentage.

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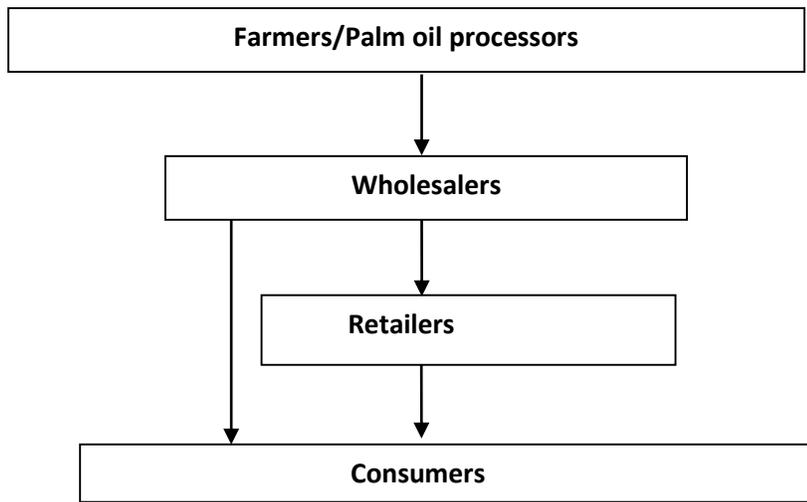
Figure 1: Identified marketing channel for palm oil in Delta state.

Table 1: Estimate of Coefficient of the Multinomial Logit on Choice of Source of Value Chain Finance by Palm Oil Marketers

Variable	Government microcredit	Isusu/thrift & Cooperative	Relatives & Friends	Village money lenders	Marketing Agents
Constant	0.581	1.143***	1.469	0.713	0.845**
	(0.492)	(0.076)	(1.543)	(0.865)	(0.322)
Gender	0.212	0.473	0.683	0.728	1.485***
	(0.724)	(0.480|)	(0.663)	(0.603)	(0.246)
Age	0.131	1.463	0.251	0.426	0.179
	(0.137)	(1.385)	(0.192)	(0.401)	(0.160)
Marital status	-0.965	1.677	-0.443	-0.348	0.789
	(0.892)	(1.341)	(1.111)	(0.367)	(0.675)
Education	4.432***	-0.419	0.053	-2.081***	0.765
	(0.093)	(0.542)	(0.197)	(0.582)	(0.591)
Household size	-0.078	-0.453	0.987	0.165	-0.945
	(0.129)	(0.521)	(0.999)	(0.241)	(0.917)
Income	1.767*	4.762	5.231	0.432	0.729
	(1.002)	(4.326)	(5.429)	(0.576)	(0.667)
Membership of org.	0.924	7.895**	0.986	0.291	0.678*
	(0.874)	(4.112)	(0.953)	(0.269)	(0.770)
Business location	0.098	1.342	1.634***	1.800	-0.098
	(0.072)	(1.298)	(0.0760)	(1.910)	(0.088)
Number of observation	240				
Base category	Commercial/microfinance bank				
Wald Chi squared	998.56				
Prob > chi2	0.0000				
Pseudo R-squared	0.567				
Log pseudolikelihood	-1946.765				

Figures in parenthesis are standard errors. *** Sig. at 0.01, **sig. at 0.05, *sig. at 0.10 level. Base category is availing loans from Commercial/Microfinance Banks

Table 2: Marginal Effects of the Multinomial Logit Model on Choice of Source of Value Chain Finance by Palm Oil Marketers

Variable	Government microcredit	Isusu/thrift & Cooperative	Relatives & Friends	Village money lenders	Marketing Agents
Constant	0.0248	-1.5142*	0.3670	0.8745	0.1867
Gender	0.4523*	0.3412	1.0431*	0.6151	1.4215
Age	0.7658	1.7653***	1.5640**	0.8120	-0.5514
Marital status	-0.0965	1.2943	0.5580	0.5718	1.6442
Education	0.9002	0.3341	0.7947	-0.4764*	1.1973
Household size	-0.6379	0.2786*	0.0456	0.7654	0.4890

Income	0.4970	-0.1925***	-0.0950	0.0164	1.9023***
Membership of org.	0.8127	-0.9816*	0.7189	-3.001***	1.02 65
Business location	1.7635**	0.9976	0.1041	1.5978	0.3223

Table 3: Impact of Identified Constraints in Accessing Value chain finance

Constraints	Expected impacts					
	1	2	3	4	5	$\bar{X}$
Education	12	20	48	100	60	3.23*
Interest rate	30	50	50	50	60	3.41*
Bureaucracy	20	30	24	58	108	3.08*
Delay in loan disbursement	10	30	28	70	102	3.93*
Short period of loan duration	28	32	50	50	80	3.51*
Provision of guarantors	20	48	0	72	100	3.77*
Awareness	16	34	50	60	80	3.64*
Time wasted on processing of loans	12	30	40	70	88	3.80*
Distance between farmers and loan disbursing authority	100	52	40	30	18	2.23
Political interference	104	58	50	16	12	2.06

* Constrain with significant impact

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