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DETERMINANTS OF MARKET MARGINS AMONG OKRA TRADERS

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Abstract. In the tropics, okra is an important vegetable crop and its production is a viable livelihood activity; however, several factors affect its marketing and margins derivable thereof. Therefore, this study analyzed the determinants of market margins among okra traders in Owerri, Imo State, Nigeria. Primary data collected via multistage sampling were analyzed using descriptive statistics, market performance and regression analysis. The results revealed that the estimated market margin and market efficiency index were ₦1900/bag (100kg) and 0.35, respectively. Channel 4 (27%) had the highest percentage of commodity sales volume. The coefficient of multiple determination (R^2) was 0.826; hence, 83% variation in the market margin was accounted for by variables in the regression model. Moreover, coefficients of the variables including age (0.873), education (0.696), market experience (0.571), cost price (–0.598), quantity sold (0.576), marketing cost (–0.72) and income level (0.98) were significant determinants of okra market margins. They identified constraints affecting okra marketing in the study area. This study recommends the provision of incentives, policy adoption to mitigate income inequality and improve market performance; regulation of commodity prices, agent exploitation and marketing costs; adoption of modern communication tools and technologies, market channel diversification; provision of market infrastructures and interventions.

Keywords: market channels, market margin, marketing efficiency, determinants, market constraints

INTRODUCTION

Okra (*Abelmoschus esculentus* L. Moench) is an important vegetable crop. It features prominently in vegetable markets in South-eastern Nigeria (Farinde et al., 2007). The economic importance of okra cannot be overemphasized. It contains carbohydrate, proteins and vitamin C in large quantities and plays a vital role in the human diet (Kennedy et al., 2011). Worldwide production of okra is estimated at 6 million tons per year. In West Africa, it is estimated at 500,000 to 600,000 tons per year (Bamire and Oke, 2003). Proper marketing is necessary to mitigate wastage (Farinde et al., 2007). Marketing efficiency becomes an important determinant factor to the performance of the industry. Poorly developed marketing systems lead to production gains being wasted due to postharvest losses (Adesope et al., 2009). Marketing systems in most developing countries are characterized by operational inefficiencies as a result of poor postharvest handling and socioeconomic constraints reducing marketing margins and efficiency (Obasi, 2008). A market could be defined as a set of conditions and activities that facilitate a transaction whether or not the parties physically meet (Arene, 2003). Market denotes the interaction of the forces of demand and supply, irrespective of the physical location of buyers and sellers. Marketing is a function that assesses consumer needs and then satisfies them by creating an effective demand for the commodities and services required by consumers

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and providing them (Ariyo et al., 2013). Agricultural marketing involves numerous lines of activities, which, if well developed, can sustain livelihood (Arene, 2003). Agricultural marketing engages about 60% of the Nigerian population and small scale traders are reported to be prevalent (Anuebunwa, 2006). Without markets, agricultural production remains stagnant. Markets dictate how often producers will increase and/or produce their output (Toure and Wang, 2013). In market analysis, determination of marketing margins is important. The marketing margin for a particular commodity is the difference between the price the consumer pays for the final product and the amount the producer receives (Arene, 2003; Toure and Wang, 2013). It is an important tool in analyzing market performance and efficiency (Achike and Anzaku, 2010). Market performance is an assessment of how well the marketing process is carried out and how successfully its aims are accomplished (Eronmwon et al., 2014). Market structure refers to characteristics of the market believed to influence the nature of competition and the process of price formation.

Agricultural commodities produced by farmers must be assembled, stored, transported, processed and delivered in the form needed, at the time and to the places desired by consumers (Anuebunwa, 2006). The importance of agricultural marketing cannot be over emphasized. Marketing of okra is not without challenges and is characterized by the problem of perishability. The performances of commodity marketing have indicated very low marketing margins (Iheke, 2010). Often marketers are compelled to sell their product at a very low price to avoid waste or total loss, and this reduces marketing margins and efficiency. Vegetable marketing, especially for okra, generally operates within imperfectly competitive markets, characterized by many sellers of similar products and with differentiation in the services provided, behaviour of market participants and the level of marketing margins (Anuebunwa et al., 2006). Under competitive conditions, marketing margins change with shifts in the demand for and supply of marketing services. The latter depends on factor costs and technological changes and the former on consumer income and preferences. By comparing costs and prices, inference can be made about the economic efficiency of marketing, exchange and price formulation (Anuebunwa, 2006). The market performances of okra have shown very low gross margins due to bulkiness, perishable nature, magnitude of consumption expenditure, risks and uncertainties in

vegetable marketing (Anuebunwa, 2006). In market analysis, determination of marketing margins is important (Achike and Anzaku, 2010). The wholesale margin is the difference between the price at which wholesalers sell the produce and the price they pay to farmers. The retailer margin refers to the difference in price at which retailers sell to consumers and the price retailers pay wholesalers (Toure and Wang, 2013). Various economic factors affect marketing margins for vegetables, particularly okra. Increase in produce prices over time is mainly due to rising marginal costs of providing marketing services (USDA, n.d.). This study sought to primarily estimate the market performance of okra traders, as well as determine the factors that affect market margins in the area and potentially contribute to the quest to improve the welfare of the vegetable farmers. A dearth of empirical information exists on the determinants of margins in okra marketing; this study attempts to fill this knowledge gap, especially with the current trend in agricultural/commodity price fluctuation/volatility. Understanding marketing analysis provides relevant information concerning operational mechanisms of markets and thus a basis for reducing marketing inefficiencies along the market chain. Therefore, this study analyzed the determinants of market margins among okra traders in Owerri, Imo state, Nigeria. Specifically, the study assessed the channels of okra marketing, evaluated the market performance of okra traders, estimated the factors that affect market margins and identified the constraints of okra marketing in the study area.

METHODOLOGY

Study area

The study was conducted in Owerri (the capital of Imo State), Nigeria, set in the rain forest heartland of the south eastern region and is approximately 40 square miles (100 km^2) in area. It comprises of Owerri municipal council, Owerri-west and Owerri-north. The state lies within latitudes 4°45'N and 7°15'N and longitude 6°50'E and 7°25'E. It is divided into twenty-seven (27) local government areas (LGAs), namely, Owerri North, Owerri West, Owerri Municipal, Aboh-mbaise, Ahiazu-mbaise, Ehime Mbano, Ezinihitte, Ideato North, Ideato South, Ihitte/Uboma, Ikeduru, Isiala Mbano, Isu, Mbaitoli, Ngor Okpala, Njaba, Nwangele, Nkwerre, Obowo, Oguta, Ohaji/Egbema, Okigwe, Onuimo, Orlu, Orsu, Oru East and Oru West (guatemala.gt, n.d.). The

population density varies from 230–1400 people per square kilometre. The population of Imo state is predominantly rural (guatemala.gt, n.d.). The climate of Imo state is typically humid. Rainfall distribution is bimodal: it peaks in July and September and breaks in August. Annual rainfall varies from 1,990mm to 2,200mm and has a mean annual temperature above 20°C. Imo state has an average annual relative humidity of 75%, which is highest during the rainy season when it rises to about 90%. The major agriculture zones in Imo state are Owerri, Orlu and Okigwe (guatemala.gt, n.d.).

Method of data collection
Primary data for the study were collected using well-structured questionnaires.

Sampling techniques
Multi-stage sampling technique was employed for this study. The first stage involved the purposive selection of Owerri LGAs and comprised of: Owerri Municipal, Owerri West LGA and Owerri North LGA out of the 27 LGAs in the State, given the predominance of trading activities, high population, concentration of market participants and distribution of commodity markets in the study area. The second stage involved a purposive selection of six (6) major commodity markets in the study area, namely, Owerri main market, relief market, new market, Nkwo-Ukwu Ihiagwa market, Ezi-Obodo market and Obinze market, based on the concentration of vegetable marketing activities and their market size. The third stage involved the systematic random selection of okra traders using the compiled list by the local

Table 1. Sample frame

S/No	Commodity market	Sample frame	Sample size (10%)
1.	Owerri main market	170	17
2.	Relief market	202	20
3.	New market	183	18
4.	Ihiagwa market	134	13
5.	Ezi-Obodo market	123	12
6.	Obinze market	105	10
		917	90

Source: field survey, 2015.

enumerators in the selected commodity markets. In the last stage, at constant proportionality of 0.1 (10%), which is the constant ratio or fraction of variable quantity to another to which it is proportional, ninety (90) respondents were selected for the study from a sample frame of 917 market participants and validated using raosoft sample size calculator at 95% confidence level and 10% margin error. The distribution is presented in Table 1.

Analytical techniques
The following analytical tools were used for this study: descriptive statistics (frequency counts and percentages) to analyze objectives i and iv, market performance analysis (marketing margin and efficiency) to analyze objective ii and ordinary least square (OLS) regression model was used to analyze objective iii.

MODEL SPECIFICATION

Market performance
An efficient marketing system minimizes the cost of a marketing process, ensures greater returns to producers and at the same time provides final consumers with quality products at a reasonable price. To measure market performance, marketing margin and marketing efficiency analysis were employed.

Market margin analysis
The marketing performance of okra was assessed by the computation of marketing margins. Market margins are the difference between prices at different market levels in the marketing system. Marketing margins measure the share of the final selling price that is captured by a particular class of trader in the marketing chain. However, the term also refers to the difference between producer and consumer prices of an equivalent quantity and quality of a commodity. It may also be described as price differences between two points in the marketing chain. Market margin (profit) is an important measure in trade transactions, as it gives the trader a measure of how much profit it's making on merchandise sales. The size of a marketing margin indicates the amount of value (profit) added by marketing system. The total marketing margin may be subdivided into different components: all the costs of marketing services and profit margins or net returns. An analysis of marketing costs would estimate how many expenses were incurred for each marketing activity. It would also compare marketing costs incurred

by different actors in the path of distribution. The analysis of marketing margin was computed by comparing the difference between okra selling and cost prices at different trade levels. The computation employed the following formula presented in equation (1):

$$MM = P_2 - P_1 \qquad (1)$$

Where: MM – market margin between level 1 and 2 in (₦/kg); P_1 – price at market level 1 (farm gate/cost price and marketing costs), in (₦/kg); and P_2 – price at market level 2 (selling price) in (₦/kg).

Marketing efficiency

Marketing efficiency is a ratio of marketing margin to marketing costs (Sreenivasa et al., 2007). Marketing efficiency is the maximization of the output to input ratio. Marketing efficiency is the most frequently used measure of market performance. Improved marketing efficiency is a common objective of farmers, wholesalers, retailers, commodity traders. The following marketing efficiency notation was adopted in this study and presented in equation (2).

$$M.E. = Marketing \ margin \ (profit)/Cost \ of \ marketing \qquad (2)$$

Decision rule:
   If M.E. = 1, marketing is efficient
   If M.E. < 1, marketing is inefficient
   If M.E. > 1, marketing is highly efficient

Ordinary least square (OLS) regression model

The ordinary least square (OLS) regression model was used to determine the factors affecting the marketing margin of okra. OLS regression model gave the best fit and was chosen as the lead equation on the basis of the number of significant variables, magnitude of the coefficients, statistical and econometric criteria. The OLS regression was used to establish the effects of the socioeconomic characteristics of the respondents on the marketing margin of okra (Greene, 2002).

The implicit form of the model is expressed in equation (3).

$$y_i = \beta_o + \beta_i x_i + e_i \qquad (3)$$

where: y_i – marketing margin (₦/kg); x_i – vector of the predictors (independent variables); β_i – vector of the estimated parameters; β_o – intercept term; e_i – error term.

In its explicit form, the model is expressed as follows in equation (4).

$$\begin{aligned} Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \\ + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i \end{aligned} \qquad (4)$$

where: Y – marketing margin [₦ (Naira)/100kg bag]; β_0 – intercept; $\beta_1 - \beta_8$ – coefficient of parameters to be investigated; X_1 – age (years); X_2 – education (years spent in school); X_3 – gender (female = 1; male = 0); X_4 – marketing experience (years); X_5 – cost price (₦); X_6 – quantity sold (kg); X_7 – marketing cost (₦); X_8 – level of income (₦); and ε_i = error term.

RESULTS AND DISCUSSION

Marketing channels for okra
Flowchart of the marketing channels for okra
Channel 1: Producers → Consumers = 5%
Channel 2: Producers → Retailers → Consumers = 16%
Channel 3: Producers → Wholesalers → Consumers = 21%
Channel 4: Producers → Wholesalers → Retailer → Consumers = 27%
Channel 5: Producers → Commission agents → Wholesalers → Retailers → Consumers = 13%
Channel 6: Producers → Commission agents → Wholesalers → Consumer = 10%
Channel 7: Producers → Commission agents → Consumers = 8%

Flowchart above illustrates the flow of okra across the market chain. It shows the relationships that exist among the market participants by considering the volume of commodities that passed through each market channel. Channel comparison for okra was carried out based on the percentage (%) volume of okra flowing through different intermediaries. Moreover, market participants purchased okra from multiple channels. The study identified seven market channels for okra across the market chain. This result indicated that the marketing channels with the highest percentage sales volume were channel 4 (27%), channel 3 (21%) and channel 2 (16%). Thus, most of the produce was sold through channel 4. This was also the producers preferred choice of marketing channel, probably due to the fact that there was more bulk purchase of their produce and larger volumes were sold, thereby reducing their operational costs. Contrastingly, channel 1 was the least preferred, handling only 5% volume of trade transactions of the produce.

Trade transactions with wholesalers were a sure way for farmers to receive bulk purchases as compared to trading with retailers or consumers who handle or purchase smaller quantities. Moreover, it was apparent from the results that okra traders tried as much as possible to buy from producers (farmers) and wholesalers due to the fact that prices charged by these market participants were relatively low, and hence this affects the margins derivable. Also, okra traders sold their produce to multiple customers. This result corroborates with Horna and Gruère (2006) and Ojo et al. (2014) who also identified similar market channels.

Market performance

Table 2 revealed the results of market performance (marketing margin and efficiency).

The estimated market margin was ₦1900 per 100 kg bag. This is an indication that okra marketing is a relatively profitable business venture in the study area. Also, the estimated market efficiency index was 0.35, implying that the marketing of okra in the study area was inefficient. This result corroborates with Iheke (2010), who reported similar market margins and efficiency index for agricultural crops.

Factors affecting market margins

Table 3 presents the ordinary least square (OLS) regression analysis.

The OLS regression was used to establish the effects and determine the factors that affect the market margin of okra traders in the study area. The estimated coefficient of multiple determination (R^2) was 0.806, which implies that 83% of the variation in the market margin of eggplant traders was accounted for by the independent variables in the regression model. The unexplained remaining 17% may be due to the error term. Furthermore, the F-ratio (4.842) is significant at $p < 0.05$ (5%) level. This implies that the variables (x_i) in the regression model accurately predict the outcome variable (Y_i). Therefore, the regression model is well fitted to the data set, which suggests a significant and linear relationship among the variables. As a result, the interpretation of the regression result suggests the following:

Age (X_1): The coefficient of age (0.873) was statistically significant at 5% level. The implication is that most of the respondents are in their economically active age bracket and thus were able to undertake higher business risks associated with marketing. They are expected to be in the position to effectively and efficiently utilize

Table 2. Market margin and efficiency of okra traders

Variables	Cost (₦/100 kg per bag)
(A) Total sales revenue (selling price)	7,300
(B) Unit price	4,800
(C) Marketing cost	
Transportation cost	250
Market/union charges	100
Storage cost	100
Packaging & handling cost	150
(D) Total marketing cost	600
(E) Cost price	5,400
(F) Marketing margin (profit) (A-E)	1,900
(G) Marketing efficiency Index (M.E.I) (F/E)	0.35

Source: field survey, 2015.

Table 3. Determinants of market margins of okra

Variable	Coefficient	Standard error	T-ratio
Constant	3.716**	1.29	2.881
Age (X_1)	0.873**	0.329	2.653
Education (X_2)	0.696**	0.272	2.559
Gender (X_3)	0.467[n.s]	0.38	1.229
Market Experience (X_4)	0.571**	0.219	2.61
Cost price (X_5)	−0.598***	0.147	−4.07
Quantity sold (X_6)	0.576**	0.226	2.549
Market cost (X_7)	−0.72***	0.176	−4.1
Income level (X_8)	0.98**	0.375	2.613
R^2	0.826		
F-ratio	4.842		

***, ** significant at 1% ($p<0.01$) and 5% ($p<0.05$) level. [n.s] – not significant.
Source: field survey, 2015.

available resources to them. This result is consistent with Nwaiwu et al. (2012), who reported a similar outcome in their study on the determinants of net returns in garden egg marketing.

Education (X_2): The coefficient of education (0.696) was statistically significant at 5% level. This is an indication that most of the respondents attained a certain level of education. This is desirable because the level of education of a respondent not only increases their production but also their ability to understand new techniques. This factor influenced okra marketing in the study area. Iheke (2010) opined that educational attainment of a respondent will increase their versatility and equip them with other skill sets. This feature puts them in the position to be able to understand and adopt available innovations that facilitate an increase in their trading activities. Thus, education mitigates barriers in trade transactions.

Marketing experience (X_4): The coefficient of marketing experience (0.571) was statistically significant at 5% level. Hence, the number of years a respondent spends in performing any marketing function directly influences their marketing experience and thus improved efficiency in commodity marketing over a time period. This result corroborates with Onuwa et al. (2017), who reported similar results in their respective studies on determinants of market margins and the profitability of eggplant marketing.

Cost price (X_5): The coefficient of cost price per bag (–0.598) was significant at 1% level, but had an inverse relationship with market margin. This implies that as commodity prices increase quantity demand decreases. Consequently, a decline in the quantity of commodities sold affects margins derivable thereof. This result corroborates with Onuwa et al. (2017), who reported a similar result in their study on the profitability of eggplant marketing.

Quantity sold (X_6): The coefficient of quantity sold (0.576) was significant at 5% level. This implies that okra traders will earn more remunerative income as their sales volume increases. This factor is subject to the forces of demand and supply, which also is a determinant of market equilibrium. This result corroborates with the works of Ugwumba (2009) and Onuwa et al. (2017), who reported similar results in their respective studies on agro commodity marketing.

Marketing cost (X_7): The coefficient of marketing cost (–0.72) was significant at 1% level. This implies that an increase in marketing costs will affect quantity of bags sold; hence, it also increases unit cost per bag. Marketing cost is influenced by varied market function charges. This variable has an inverse relationship with market margins; hence, the higher the estimate the lower the margins derivable by okra traders. Policies aimed at reducing the marketing costs are necessary in order to increase the level of supply and profitability. A similar outcome was reported among market participants in agro commodity markets by Ayoola and Zever (2010).

Level of income (X_8): The coefficient of income level (0.98) was significant at 5% level. This implies that increase in the prevailing income level tends to increase consumption expenditure, demand and food consumption. This is attributable to increase in purchasing power and disposable incomes and corroborates with (Bopape, 2006), who reported similar outcomes.

Constraints of okra marketing

Table 4 revealed the critical constraints that affect okra marketing in the study area.

The identified constraints include: high marketing costs (83.3%), inadequate capital (77.8%), inadequate price information (72.2%) and poor market infrastructures (66.7%). Others include: price volatility (61.1%), poor access to credit (55.55%), exploitation from middlemen (53.3%), perishability of commodity (50%) and

Table 4. Distribution based on the constraints of okra marketing

Constraints	Frequency*	%
High marketing costs	75	83.3
Inadequate capital	70	77.8
Inadequate price information	65	72.2
Poor market infrastructures	60	66.7
Price volatility	55	61.1
Poor access to credit	50	55.6
Exploitation by middlemen	48	53.3
Perishability of commodity	45	50
Inadequate storage facilities	40	44.4

*Multiple responses were allowed.
Source: field survey, 2015.

inadequate storage facilities (44.4%). This result corroborates with Asa et al. (2012) who also reported similar constraints in agricultural marketing.

CONCLUSIONS

This study analyzed the determinants of market margins among okra traders in Owerri, Imo state, Nigeria. Market channel comparison was done based on the percentage (%) volume of okra flowing through different intermediaries. Moreover, this study identified seven market channels for okra. Also, okra marketing is a relatively profitable business venture; however, low levels of market efficiency persist among the respondents. In addition, the variation in the market margin of okra was accounted for by the variables in the regression model. Furthermore, they identified factors including marketing costs, inadequate capital, inadequate price information and poor market infrastructure, price volatility, poor access to credit, exploitation from middlemen, perishability of commodity were critical constraints of okra marketing among the respondents. Therefore, policy actions should be channelled towards ameliorating these constraints. Based on the foregoing, the following recommendations are made: providing incentives, e.g. micro selling schemes, contract agreements etc., which promote more participant engagement in vegetable marketing activities; adoption of policies to mitigate inequality of income and improve market performance (market margins and efficiency) among okra traders; implementation of policies that regulate commodity price volatility/fluctuations, exploitation by agents and other costs of marketing functions (transportation, packaging, etc.); adoption of modern information communication tools (ICTs) for effective dissemination of market information among market participants and sensitization of processors and consumers on the annual domestic production levels and supply sources; diversifying market channel linkages and networks to ensure adequate produce supply and effective commodity exchanges; improving access to agricultural credit and business capital for okra traders; stakeholders and appropriate agencies should provide basic infrastructures and interventions for commodity markets; and adoption of modern storage facilities that extend produce shelf life by okra traders.

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