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Marketing Performance of Salad Vegetables: The Case of Cabbage Marketing in Abia State, Nigeria

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Abstract

This study analyzed the performance of cabbage marketing in Abia State, Nigeria. Specifically the study sought to: describe socio-economic characteristics of cabbage marketers; identify marketing channels of cabbage; determine marketing cost components of cabbage marketers; determine marketing margins, market share and marketing efficiency of cabbage marketers; and determine socio-economic factors influencing income of cabbage marketers. Multi-stage random sampling technique was used to select 160 marketers. Data were collected with use of structured questionnaire. The data collected were analyzed descriptively using means, frequencies, percentages, pie chart and flow chart and inferentially using marketing margin analysis, marketing efficiency analysis and ordinary least square regression technique. The study showed that cabbage marketing is not efficient but very profitable. The wholesalers and retailers had: marketing margin of ₦82.9 and ₦41.1; market share of 37.41% and 15.43%; and marketing efficiency of 160.60% and 167.40% respectively. Determinants of wholesaler's income were household size, marketing experience, rent on storage, product price and transport cost, while household size, education level, other variable cost, product price and transport cost significantly influenced the retailer's income. The study recommended that cabbage farmers in northern Nigeria should be encouraged, adequately motivated and instructed by the government and extension agents to form marketing cooperatives. This would help them pool resources together and transport their produce to farther points of consumption in-order to increase their market share and realize higher profit. This would also help to reduce the excess profit made by the marketers and improve the marketing efficiency of cabbage.

Keywords: Cabbage, marketers, Marketing efficiency, Marketing margin, Marketing cost

1. Introduction

The term "salad vegetable" refers to vegetables that are either eaten raw or cooked. Because they are mostly eaten raw, none of their nutrient is lost. Salad vegetables play a significant role in human nutrition especially as excellent sources of vitamins, minerals and dietary fibre (Wargovich, 2000). Salad vegetables in diet have been strongly associated with reduced risk for some forms of cancer, heart disease, stroke and other chronic diseases (Prior and Cao, 2000). Some components of salad vegetables are strongly antioxidant and functions to modify metabolic activation, detoxification or disposition of carcinogens or even influence processes that alter the cause of tumor cell (Wargovich, 2000).

Cabbage (*Brassica oleracea*) belongs to the family *Cruciferae* and is a popular salad vegetable whose leaves are eaten raw and which among other vegetables provides the richest source of glucosenolates in the human diet (João, 2012), the glucosenolates present in cabbage have been shown

to protect humans against lung cancer, colon cancer, rectum cancer, thyroid cancer, prostate cancer, breast cancer and chemically induced cancers (Brennan *et al.*, 2005; USDA, 2005a; and WCRF, 1997). Cellulose present in cabbage in the form of roughage helps the body to achieve smooth digestion of food and get rid of waste materials (Wright, 1998). Cabbage is harvested year round in some countries, however, in Nigeria; it is seasonal and only 20% of consumers demand is achieved during off season period (USDA, 2005b).

Cabbage produced in farms reaches consumers through the marketing system. Marketing is concerned with all stages of operation, which facilitate the movement of commodities from the farms to the consumers. Kohls (1985) defined agricultural marketing as the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the final consumer. Marketing has economic value because it gives form, time and place utility to products and services (Asogwa and Okwoche, 2012). Therefore, increase in marketing activity would enhance the provision of more and better produce at low price to increased number of people which would enable marketers to generate more income and increase welfare.

Efficient marketing plays a crucial role in an economy. This role becomes more evident in areas where there are high rate of urbanization (Olukosi and Isitor, 1990). Market role should be sustained to ensure growth in the economy and improvement in the standard of living of the people. It would be useless to increase the output of food and equally futile to set up optimum standard of nutrition unless channels could be found to move the food from producer to the consumer at a price which represents a fair remuneration to the producer and within the consumer's ability to pay (FAO, 1999).

Most salad vegetables including cabbage which are marketed in southern parts of Nigeria are usually produced in the rural areas of northern Nigeria particularly in: Plateau, Zaria, Kano, Nasarawa and Benue States. The transportation of cabbage from the rural areas of northern Nigeria to the southern parts of Nigeria poses a problem to its marketing. The major cause of this problem is the long distance from production points to points of consumption, which results from the bad condition of roads leading to high transportation fare in the business. Adugna (2009) noted that as high as 30% losses in vegetables are recorded during transportation from point of production to point of consumption.

Marketers of cabbage experience lots of problem in trying to meet demand for the vegetable due to fluctuation in supply. Cabbage is a perishable agricultural produce and cannot be stored over a long period of time. In Nigeria, the consumption of salad vegetables including cabbage had been on the increase and is estimated at about 22 to 47.55kg per person in a year but its transportation cost along with its handling cost has made the price to increase more than it is supposed to and made some consumers to relent in consumption (Nya *et al.*, 2010). In the face of inefficient marketing in Nigeria due to high transportation cost, inadequate communication system as well as storage facilities and poor pricing (FAO, 1997). It is relevant to know the performance of the cabbage market.

Due to the special characteristics of cabbage which include: perishability, standardization requirement and seasonality, its marketing is complex and challenging. Cabbage has long been regarded as a minor crop in Nigeria and thus, has attracted little marketing research attention, in comparison to other major food crops and cash crops. A fact highlighted by the lack of studies in the literature on its marketing in Nigeria, even though many studies: Adeniji *et al.*, (2012); Anyaegbunam and Nto (2011); Asogwa and Okwoche (2012); Bashir and Yakaka (2013); Carambas (2005); Ibitoye (2014); Ikeekwe and Chukwuji (2005); Isibor and Ugwumba (2014); Kassim (2012); Maimouna and Jing (2013); Ojogho *et al*., (2012); Osarenren and Ojor (2014); Thompson and Agbugba (2013) and Tiamiyu *et al.*, (2013) had researched on marketing of different agricultural produce in various states of Nigeria. In order to bridge the research gap this study specifically sought to: (i) describe socio-economic characteristics of cabbage marketers in Abia State; (ii) identify marketing channels of cabbage in the study area; (iii) determine marketing cost components of cabbage marketing in the study area; (iv) determine marketing margins, market share and marketing efficiency of cabbage marketers in the study area and (v) determine socio-economic factors influencing net returns to cabbage marketers in the study area.

2. Materials and Methods

2.1 Study Area

The study was carried out in Abia State, Nigeria. Abia State was carved out from Imo State on 27th August 1991 by General Ibrahim Babangida led administration. Abia State has a land area of 7,677.20 square kilometers, with a total population of 2,833,999 persons, made up of 1,434,193 males and 1,399,806 females (NPC, 2006). The State is located between latitudes $5^0\ 47^1$ N and $6^0\ 12^1$ North of the Equator and between longitudes $7^0\ 23^1$ E and $8^0\ 02^1$ East of the Greenwich Meridian (NRCRI, 2003).

Abia State is bounded on the north and northeast by the States of Anambra, Enugu and Ebonyi. To the west is Imo State, to the south is Rivers State, to the east and southeast are Cross River State and Akwa Ibom State respectively. Administratively, the state is made up of seventeen (17) local Government Areas (LGAs), clustered in three Agricultural zones (Aba, Ohafia and Umuahia).

Abia State is notable for production of cash crops like oil palm, Cocoa and Cashew. Food crops grown in the state include cassava, yam, cocoyam, rice, cowpeas, vegetables, melon and maize. Livestock keeping in the state produce poultry, pigs, goats, sheep and rabbits. Fisheries, bee and snail keeping are also practiced within the state. The commonest farming system in the State agricultural zones is mixed farming with most farmers operating on scales that classify them as smallholders.

2.2 Sampling technique and data collection

Multi-stage random sampling technique involving four stages was adopted for the study. In the first stage, two agricultural zones; Aba and Umuahia were randomly selected from the three agricultural zones in the state. In stage two, two LGAs were randomly selected from each of the two agricultural zones. The selected LGAs are Osisioma Ngwa LGA and Aba South LGA from Aba agricultural zone, and Umuahia North LGA and Isiala Ngwa North LGA from Umuahia agricultural zone. In the third stage, two communities were randomly selected from each of the four LGAs to give eight communities. In the fourth stage, two markets were randomly selected from a list of markets where cabbage was sold in relatively large quantities situated in the communities. In the fourth stage, ten cabbage marketers (five wholesalers and five retailers) were randomly selected from the sixteen markets. This gave a total sample size of 160 marketers (80 wholesalers and 80 retailers). The marketers were segregated into wholesalers and retailers based on volume of produce handled per month. The study recognized the fact that the commodity was produced in the north; hence, no producer of cabbage was sampled.

Primary data used for this study were obtained through the use of one set of structured and pre-tested questionnaire administered to the marketers (wholesalers and retailers). Data was gathered from the respondents at monthly intervals for one year from April 2014 – March 2015.

2.3 Analytical Technique and Model Specification

Descriptive statistics such as frequencies, means and percentages were used to analyze the socio-economic characteristics of cabbage marketers. Flow chart and pie chart were used to identify marketing channels and marketing cost components of cabbage marketing in the study area respectively.

In the estimation of marketing margin the method used by Adegeye and Dittoh (1995); Adeniji *et al.,* (2012); Bashir and Yakaka (2013); Carambas (2005); Isibor and Ugwumba (2014); Kassim (2012); Maimouna and Jing (2013); Ojogho *et al*., (2012) and Olukosi and Isitor (1990) was adopted. These authors deducted the purchase prices from the selling prices to obtain the marketing margins. Hence average price of both the wholesalers and retailers were used in the computation of market margins.

The selling price and the purchase price were obtained using the average of the prices given by each respondent. The prices were summed and divided by number of observation to obtain the grand mean.

Marketing margin (M.M) refers to the difference in price paid to the first seller and that paid by the final buyer (Adegeye and Dittoh, 1995).

M.M.W = W.P-P.P

M.M.R = R.P-W.P

Where M.M.W = Marketing margin of wholesalers

M.M.R = Marketing margin of retailers

W.P = Wholesalers price

P.P = Producers price

R.P = Retailers price (or consumers price)

The Marketing Efficiency (ME) was calculated following Shepherd Futrel Model indicated as:

ME = Output of Marketing/ Input of Marketing× 100

Following Olukosi and Isitor (1990) output of Marketing was proxied by Net Returns from Marketing Activities and input of Marketing was proxied by cost of Marketing Activities.

The net marketing margin accruing to the wholesaler or the retailer of cabbage is the difference between the gross marketing margin and the marketing costs. Marketing cost is the sum of transport cost, storage cost, labour cost and other costs associated with moving the commodity from the point of purchase to the customer or final consumer (Aidoo *et al.,* 2012).

The percentage (%) market share of a participant in the market system refers to the share of the market expressed as percentage (%) received by the participant in the marketing process. It was calculated using the formula below.

Market share = (selling price – purchase price)/Final retail price × 100

Ordinary least square (OLS) multiple regression technique was used to analyze socio-economic factors influencing income of Cabbage marketers (wholesalers and retailers). The model

used is as specified below.

$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, E)$

Where,

Y = net returns from cabbage marketing (Naira)
X_1 = Age (in years)
X_2 = Household size (number)
X_3 = Educational level (years)
X_4 = Marketing experience (years)
X_5 = Handling cost (Naira)
X_6 = Storage cost (Naira)
X_7 = Product price (Naira)
X_8 = Transportation cost (Naira)
E = Error term

Four functional forms of the model (linear, exponential, double logarithmic and semi-logarithmic) were fitted with the data. The lead equation was selected based on statistical and econometric criteria including number of significant variables, magnitude of the F- ratio and R^2 and conformity of signs of the variables to *a priori* expectations.

3. Results and discussion

3.1 Socio-economic characteristics of Cabbage marketers

The distribution of the marketers according to socio-economic characteristics as presented in Table 1 shows that 57.50% of the wholesalers and 77.50% of the retailers were females. This indicates that cabbage marketing in the study area was dominated by females. This result supports Thompson and Agbugba (2013) finding that agricultural marketing in Abia State is predominantly carried out by women. Table 1 also shows that 40% and 27.50% of the wholesalers and retailers of cabbage are within the age range of 31 and 41 years respectively, while 42.50% of the wholesalers and retailers fell within the range of 41 and 50 years. The mean age of the wholesalers was 42.5 and that of the retailers was 45.25, implying that a typical marketer of cabbage in the area was in the economically active age group. This means that the marketers were young and energetic and if adequately motivated with needed marketing facilities could make meaningful impact in cabbage marketing. In terms of marital status, Table 1 shows that 78.75% of the wholesalers and 67.50% of the retailers were married. According to Nwaru (2000), family stability create conducive environment for good citizenship training, development of personal integrity and entrepreneurship, which are very important for efficient use of resources for maximum returns.

Table 1 further shows that 62.50% of the wholesalers and retailers had secondary school education respectively. 20.00% of the wholesalers and 35.5% of the retailers had primary school education and a marginal percentage (17.50% of the wholesalers and 2.50% of the retailers) had tertiary education. The result indicates that the marketers are literate, an advantage which according to FAO (2006), could translate to higher business acumen in terms of level of profit. With respect to household size, Table 1 show that the mean household size of the wholesalers and retailers were 7 and 6 members respectively. Large household size could limit net returns from marketing due to diversion of potential investment fund resulting from increase in household consumption expenses. (Ijioma and Osondu, 2015). In terms of marketing experience, it is shown in Table 1 that the wholesalers and retailers had the same mean of 8 years. According to Osondu and Ijioma (2014) experience gained over years could count more for increased efficiency and net returns than education.

3.2 Marketing Channel for Cabbage

Marketing channel for cabbage refers to the participants, players or organizations which facilitate the transfer of title of cabbage as it moves from the producer or farmer to the final consumer. Three marketing channels for cabbage were identified in the area. Channel comparison was made based on the volume of the vegetable product that passed through each channel. The channels are as follows:

Channel 1: Producers → Local Assemblers → Wholesalers → Retailers → Consumer = 46%
Channel 2: Producers → Wholesalers → Retailers → Consumers = 30%
Channel 3: Producers → Local Assemblers → Retailers → Consumer = 7%

The major participants in the distribution channel were the producers, local assemblers, wholesalers and retailers. As shown in Figure 1, about 93% of total volume of supplied cabbage was passed through the wholesalers. About 56% of the supplied volume of cabbage passed indirectly from producers to wholesalers, while about 37% passed directly from producers to wholesalers. Only about 7% of the produce was not handled by the wholesalers. This indicates that the wholesalers were formidable participants along the marketing channel of cabbage in the area. The retailers bought about 58% of the total volume of supplied cabbage from the wholesalers and 7% from local assemblers who were able to transport the produce to the study area. The retailers sold about 55% of the supplied volume of cabbage to consumers, while the wholesalers sold about 28% of the supplied volume of cabbage to consumers. Only about 83% of the volume of cabbage handled by wholesalers and retailers actually get to the final consumers. While, 17% of the initial supplied volume of cabbage are lost during handling and transportation.

Table 1. Distribution of wholesalers and retailers of cabbage according to socio- economic characteristics

Variables	Wholesalers		Retailers	
	Frequency	%	Frequency	%
Gender				
Male	34	42.50	18	22.50
Female	46	57.50	62	77.50
Age				
21-30	10	12.50	12	15.00
31-40	32	40.00	22	27.50
41-50	34	42.50	34	42.50
51-60	4	5.00	12	15.00
Mean	42.5		45.25	
Marital Status				
Single	11	13.75	16	20.00
Married	63	78.75	54	67.50
Widowed	6	7.50	10	12.50
Level of Education				
Primary school education	16	20.00	28	35.00
Secondary school education	50	62.50	50	62.50
Tertiary Inst. Education	14	17.50	2	2.50
Household size				
1-5	32	40.00	38	47.50
6-10	40	50.00	28	35.00
10-15	8	10.00	14	17.50
Mean	7.25		6.35	
Marketing experience				
2-4	20	25.00	15	18.75
5-7	20	25.00	29	36.25
8-10	22	27.50	19	23.75
11-13	10	12.50	12	15.00
14-16	8	10.00	5	6.25
Mean	8.63		7.62	
Total	80	100	80	100

Source: *Field Survey, 2014*.

3.3 Marketing cost components of Cabbage marketing

The marketing cost component of cabbage wholesalers is presented in Figure 2. The figure shows that transportation cost constitutes the highest marketing cost in cabbage supply chain in the study area (60%). This is not surprising, considering the long distance travelled by most of the wholesalers to purchase the product and huge transport cost involved in transporting the product from Northern Nigeria to Abia State. Loading and offloading cost represents 12% of total marketing cost. This includes the money paid to those labourers who help to load the product into Lorries or carts at purchase points and offload them at selling points. The cost spent on telephone communication by the wholesalers in order to get market information on product availability and price was 8% of the total marketing cost. Additional cost (6%) was incurred as a result of deterioration of the product or spoilage during handling. Cost of storage and taxes were 5% and 4% of the total marketing cost respectively. Other cost/hidden expenses accounted for 5% of the total marketing cost. The huge transport cost could lead to a high farm gate - retail price spread.

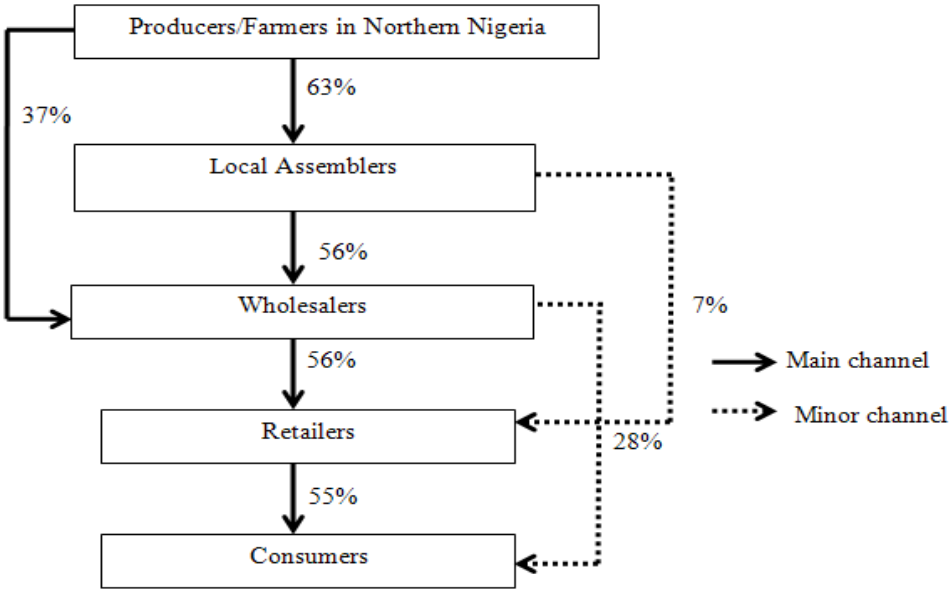

Figure 1. Marketing channel for Cabbage in Abia State, showing the number of marketers in the flow.
Note: The percentages shown in figure 1 only represents total volume of Cabbage passed through each channel from producer to consumer and did not account for products lost during handling.
Source: *Field survey, 2014*

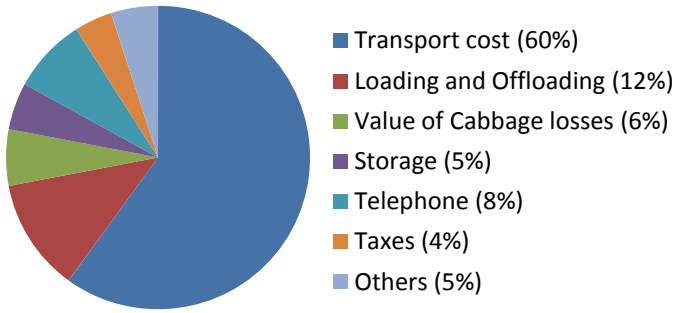

Figure 2. Composition of Wholesalers Marketing Cost of Cabbage in Abia State, Nigeria

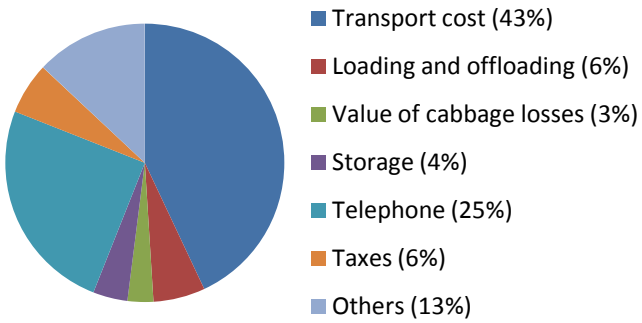

Figure 3. Composition of Retailers Marketing Cost of Cabbage in Abia State, Nigeria

The marketing cost component of the retailers is presented in Figure 3. The figure shows that transportation cost also constitutes the highest marketing cost in cabbage retail marketing in the study area (43%). Telephone cost was 25% and cost of loading and offloading was 6%. This implies that a fair percentage of the total marketing cost incurred by the retailers was as a result of market information sourcing using Global system for mobile communication (GSM) phones. Since its introduction into Nigeria in 2001 GSM phones has become an integral component to marketing activities. Marketing costs arising from taxes (6%), value of cabbage losses (3%) and storage (4%) were negligible. Other costs accounted for 13% of retailers total cost of marketing.

3.4 Marketing margins and efficiency of wholesalers and retailers of Cabbage

Table 2 shows the market margins and efficiency of wholesalers and retailers of cabbage. The table reveals that the average selling price of cabbage by producers, wholesalers, and retailers per kg were ₦104.5, ₦187.4 and ₦221.6 respectively, while, their marketing margins were ₦104.5, ₦82.9 and ₦41.1 respectively. The table further showed that the percentage market share of the producers, wholesalers and retailers of cabbage were 47.16%, 37.41% and 15.43% respectively.This implies that an average producer of cabbage sold in the study area earns 0.47 Naira for every 1 Naira retail price paid by the final consumer in the marketing process. This amount may be assumed to imply that the producers received the highest remuneration from cabbage marketed in the study area. This assumption may not be true for two obvious reasons: the producers production cost was not accounted for in the analysis and cabbage wholesalers also procured the produce from local assemblers who would take some part of the producer's market share. The wholesalers had a market share of 37.41% which is relatively high. This implies that an average wholesaler of cabbage in the area earns 0.37 Naira for every 1 Naira paid by the final consumer. The place utility provided by wholesalers by transporting the produce from the Northern parts of the country could be the cause of their high market share compared to those of the other participants.

Marketing efficiency is defined as the ratio between net marketing returns and marketing costs expressed as a percentage. According to Ozougwu (2002), marketing efficiency ratio ranges from zero (0) to infinity. A ratio of 100% shows that the market is perfectly efficient because price increment is just high enough to cover the cost of marketing cabbage. It indicates a break-even point because the value addition (marketing cost) is equal to the net margin obtained as a result of the value addition. Marketing efficiency figure below 100% is indicative of inefficiency; more is spent on value addition compared to the margin received after value addition. Marketing efficiency value that is greater than 100% indicates excess profit for the marketers (Scarborogh and Kydd, 1992). Based on this, the wholesalers and retailers with marketing efficiencies of 160.60% and 167.40% respectively made excess profit, though the retailers had higher marketing efficiency than the wholesalers, suggesting that the retailers could have found better means of reducing marketing cost and making more profit from a unit of the commodity relative to market cost. However, both the wholesale and retail markets were considered inefficient. This finding compares favourably with Anyaegbunam and Nto (2011) who reported higher efficiency among sweet potato retailers than wholesalers in south eastern Nigeria.

Table 2. Average market margin and market share of the producers, wholesalers and retailers of cabbage sold .

Market Variables (₦)	*Producers	Wholesalers	Retailers
A. Average selling price per kg	104.5	187.4	221.6
B. Average purchase price per kg	-	104.5	187.4
C. Gross marketing Margin (A-B)	104.5	82.9	34.2
Average Marketing Costs:			
Transportation	-	19.08	5.50
Loading and Offloading	-	3.82	0.77
Value of Cabbage losses	-	1.92	0.38
Storage	-	1.59	0.51
Telephone	-	2.54	3.2
Taxes	-	1.27	0.77
Other marketing costs	-	1.59	1.66
D. Total Marketing costs	-	31.81	12.79
Net marketing margin (C-D)	-	51.09	21.41
Market share (%)	47.16	37.41	15.43
Market efficiency (%) (C-D/D)	-	160.60	167.40

*= The producers estimates were computed using some wholesalers data

Table 3. Estimates of factors influencing income of cabbage wholesalers in Abia State.

Independent	Functional	Forms		
Variables	Linear	Exponential	Double log[+]	Semi-log
Constant	15688.861	9.206***	3.509***	-107562.180***
	(1.4650)	(16.238)	(11942)	
Age (X_1)	-118.752	-0.001	0.245	2316.169
	(91-0.553)	(-0.128)	(0.712)	(0.380)
Household (X_2)	-875.260***	-0.047***	-0.203***	-3196.770**
	(-2.663)	(-2.717)	(-2.554)	(-2.270)
Education level (X_3)	414.234	0.027	0.152	1748.074
	(1.156)	(1.445)	(1.102)	(0.720)
Marketing Experience (X_4)	-256011	-0.018	0.639***	-2401.668
	(-0.563)	(-0.766)	(3.635)	(-1.322)
Handling cost (X_5)	0.121	-3.266E-6	-0.053	-277.671
	(0.189)	(-0.096)	(0.462)	(15.285)
Storage cost (X_6)	5.386***	0.000***	0.769***	18824.524***
	(9.396)	(0.000)	(11.047)	(15.285)
Product price (X_7)	1.053	3.089E-6**	1.749***	-699.216
	(1.424)	(2.051)	(2.661)	(-0.313)
Transportation cost	1.151**	5.1p8E-5*	0.053**	-137.444
	(2.284)	(1.915)	(-1.967)	(-0.167)
R^2	0.817	0.768	0.823	0.858
Adjusted R^2	0.790	0.734	0.804	0.847
F-ratio	42.890***	25.435***	46.775***	88.200***

Source: *Computations from field survey data, 2014.*

[+] lead equation

***, **, *, indicates variables that are statistically significant at 1.0%, 5.0% and 10% levels respectively values in Brackets are t = ratios.

3.5 Factors influencing Income of Cabbage Marketers

3.5.1 Factors influencing Income of Cabbage Wholesalers

The multiple regression estimates of factors influencing income of cabbage wholesaler in Abia state, Nigeria is presented in Table 3. The double log functional form which posted R^2 value of 0.823 and a goodness of fit F-value of 46.775 was selected as lead equation. Table 3 shows that five independent variables (household size, marketing experience, storage cost, product price and transport cost) exerted significant influence on wholesaler's income.

The coefficient (-0.203) of household size was negatively signed and statistically significant at 1.0% alpha level of probability. The sign of this variable is in accordance with *a priori* expectation and consolidates the findings of Ademosun (2000) and Olumu (2000) who obtained similar outcome.

The coefficient (0.639) of marketing experience was positively signed and statistically significant at 1.0% alpha level of probability. The sign of this variable is also in tandem with *a priori* expectation. The implication is that the more experienced a marketer is the more he is able to take rational decisions that will increase his income. The result consolidates Isibor and Ugwumba (2014) who obtained a similar outcome in their study on determinants of water melon marketers in Nnewi metropolis of Anambra State.

The coefficient (0.769) of storage cost was positively signed and statistically significant at 1.0% level of probability. The sign of the variable is not in consonance with *a priori* expectation. The result implies that the rent on stores increases as the holding of cabbage increase which would result to higher income when the wares are sold at premium prices when demand is high. This is an attribute of imperfect market where speculators hoard goods (in store) there by creating artificial scarcity that result in higher prices hence increased income when such goods are sold.

The coefficient (1.749) of product price was positively signed and statistically significant at 1.0% alpha level of probability. The sign of the variable is in consonance with *a priori* expectation. This implies that increase in product price would lead to increase in net marketing income of the wholesalers and vice versa.

The coefficient (-0.553) of transportation cost was negatively signed and statistically significant at 5.0% risk level. The sign is in consonance with *a priori* expectation. The negative

sign associated with the variable implies that a high transportation cost would reduce the income of the marketers.

3.5.2 Factors influencing Income of Cabbage Retailers

The exponential functional form gave the best fit with coefficient of determination (R^2) = 0.878 and a highly significant F-ratio of 57.823. Table 4 showed that household size (4.797), educational level (0.029), handling cost (-12447.953), product price (2.512E-5) and transport cost (4.680E-5) significantly influenced income earned by retailers from cabbage marketing. Specifically, household size had a positive relationship with retailer's income at 1.0% alpha level of probability. It implies that as the retailer's household size increases, income from cabbage sales also increases. The sign of the variable is at variance with *a priori* expectation. However, the explanation is not far-fetched. It could be that members of the retailer's households were mobilized and helped to sell cabbage individually at various outlets thus making increased sales and income. Another explanation could be that most of the retailers' household members were not economic dependents and contributed to the purse used to finance the retail business. This result is at variance with Kalule and Kyanjo (2013) who obtained a negative relationship between household size and cooking banana retailers' income in Kampala city of Uganda. Educational level also made positive contribution to the equation and was statistically significant at 90.0% confidence level. The implication is that as the educational level of the retailers increase, income also increases. This is in line with *a priori* expectation. This result agrees with Nwankwo (1999), who stated that the level of educational attainment is likely to affect the degree of one's business alertness and ability to seize business initiatives and advantages, hence increased income.

Handling costs had a negative effect on retailers' income and was statistically significant at 90.0% confidence level. The sign implies that the greater the handling cost in the marketing process, the reduction the income expectation there from. The result is in line with *a priori expectation* and compares favourably with Kalule and Kyanjo (2013) who obtained a similar outcome in Uganda. Product price was positively signed and statistically significant at 5.0% alpha level of probability. The sign of the variable is in consonance with *a priori* expectation and implies that increase in product price would lead to increase in net marketing income of the retailers and vice versa. Transportation cost also had a positive and statistically significant effect on income at 10.0% alpha probability level. The sign of the variable is at variance with *a priori* expectation. This implies that increase in transportation cost as a result of handling more wares did not reduce income earned from cabbage marketing by the retailers.

Table 4. Estimates of factors influencing income of cabbage retailers in Abia State.

	Functional Forms			
Variables	Linear	Exponential$^+$	Double log	Semi-log
Constant	9387.774	8.820***	2.685	-111918.180***
	(0.8840)	(15.691)	(1.7430)	(-3.970)
Age (X_1)	-105.467	0.000	0.138	1744.620
	(-0.5110)	(-0.079)	(0.408)	(0.283)
Household (X_2)	-533.673	4.797***	-0.123	-2769.909*
	(-1.399)	(8.524)	(-1.372)	(-1.690)
Education level (X_3)	446.519	0.029*	0.162	1807.722
	(1.295)	(1.611)	(1.228)	(0.746)
Marketing Experience (X_4)	-157.411	-0.012	-1.102	-2127.998
	(-0.360)	(-0.524)	(1.007)	(-1.146)
Handling cost (X_5)	0.297*	-12447.953*	0.127*	674.390
	(1.604)	(-1.906)	(1.6220)	(0.472)
Storage cost (X_6)	2.739	0.003	0.672	18312.037***
	(1.226)	(0.940)	(1.403)	(11.459)
Product price (X_7)	-0.212	2.512E-5**	0.662***	-655.807
	(-0.186)	(2.416)	(4.507)	(-0.143)
Transportation cost	1.091**	4.680E-5*	0.000	-117.113
	(2.271)	(1.878)	(0.045)	(-0.143)
R^2	0.823	0.878	0.829	0.858
Adjusted R^2	0.804	0.846	0.811	0.847
F-ratio	46.714***	57.823***	50.694	68.01***

Source: *Computation from field survey data, 2014.* $^+$ lead equation

***, **, *: indicates variable that are statistically significant at 1.0%, 5.0% and 10% alpha levels respectively.

Figures in parenthesis are t-ratios

4. Conclusion and recommendations

The result of this study showed that economic marketing of salad vegetables (cabbage) in Abia State is profitable, Findings revealed that marketing system performance for retail cooking bananas businesses in Kampala city was highly inefficient suggesting that, it is a profitable venture in the study area. Based on the findings of this study, the following recommendations are made to enhance the marketing of cabbage in Abia State.

Cabbage farmers in northern Nigeria should be encouraged, adequately motivated and instructed by government and extension agents to form marketing cooperatives.

This would help them pool resources together and transport their produce to farther points of consumption in-order to increase their market share and realize higher profit. This would also reduce the excess profit made by the marketers and improve the marketing efficiency of cabbage.

Government should provide a good road network. Road maintenance agency like federal road maintenance agency (FERMA) should be directed to maintain federal roads all year road. Better road networks would result to reduction in transport cost.

Efforts should be intensified by the State government to find means of growing the crop profitably in Abia State. To this end an enabling environment should be provided to research institute to enable them develop varieties of cabbage that would give high yield. Extension agents should be encouraged to corroborate with research institutes in innovation dissemination.

This will also go a long way to reducing retail price and increase consumers satisfaction. Policy directed towards the provision of state and local government assisted mass transportation will help to reduce the transportation cost more especially at the grass roots. Able bodied unemployed youths in the area should be educated on how to take to cabbage marketing and make a living from it.

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