MARKETING CHANNEL AND MARGINS ANALYSIS OF CASSAVA TUBER AND CASSAVA PRODUCTS IN EDO STATE, NIGERIA

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ABSTRACT
The study analyzed marketing channels and margins of cassava tuber and its products in Edo State, Nigeria. The study identified various cassava products marketed in the study area, determined the marketing channel for cassava in Edo State, estimated and compared the marketing margins of the identified products; and investigated the effect of the components of the marketing margin on the variation of the marketing margin. Primary data used for the study were collected from a cross-sectional survey of 12 selected markets in Edo State through the use of a well-structured questionnaire. A multi-stage sampling procedure was used to select 419 respondents for the study. Data collected were analyzed using descriptive statistics, marketing margin analysis and step wise regression. Results of the study showed that cassava tuber and its products moved through several marketing chains comprising of cassava farmers, wholesalers, retailers, processors, distributors (middlemen) and the consumers. The major components of the marketing margin were middlemen's mark –up, transportation cost, storage cost, processing cost and market charges. The middlemen's mark-up accounted for a larger proportion of the marketing margin. Only a small proportion of the consumers money was received by the farmers in cassava product marketing. The least value was observed for starch (18.22%) while the highest was for garri (38.02%). In cassava tuber marketing, a greater percentage (72.03%) of the consumer money went to the producer. It was therefore recommended that there should be provision of good roads in order to reduce the cost of transportation of cassava tubers. Policies aimed at encouraging market participation of cassava farmers is also recommended to enhance farmers return on their products
Keywords: Cassava, Marketing Margin, Middlemen Mark-up, Edo State, Nigeria

INTRODUCTION
Cassava (*Manihot esculenta,* Crantz), is a staple food crop in many nations of the tropics. Globally Cassava is grown in an area of 18.51 million ha producing 202.65 million tonnes with a productivity of 10.95 tonnes/ha (Food and Agriculture Organization, FAO, 2005). It is grown in 102 countries in the world. African continent occupies first position covering 66.21% of cassava area producing 53.37% of world cassava as it is a staple in many of the African countries. Cassava is the chief source of dietary food energy for majority of the people living in the tropics and sub humid tropics of West and Central Africa (Tseiga & Kormawa 2002). It is grown principally for its swollen roots but its leaves are also eaten in some parts of Africa. The leaves contain a significant amount of protein, calories and other nutrients (Nweke et al. 2002). Ezedinma et al. (2007) identified eight cassava-based products types sold and consumed by both rural and urban populace in Nigeria. These include fresh roots, edible (native) starch, fermented paste, cooked *fufu* (sometimes called *santana* or six-to-six in some parts of Nigeria) *garri* (which often comes either in white or yellow form), fermented flour (locally called *lafun* or *elubo*), cassava chips or pellets and *abacha* or *ighuakpu*.

Marketing is concerned with all stages of operation, which aid the movement of commodities from the farms to the consumers. These stages include assembling of goods, transportation,

processing, grading and financing of all these activities (Akanni, 2012).The cassava marketing system covers all such products and the series of activities performed along the marketing chain to bring the products to the consumer in the form, time and place they need it. Cassava marketing system is composed of alternative product flows (marketing channels), a variety of firm (middlemen) and numerous business activities (marketing function). Product movement from the areas of production to the ultimate consumer involves costs referred to as marketing costs. These costs, however, vary with the channels through which a particular good passes through (Panda, 2011). Marketing margin for a particular commodity is the difference between what the consumer pays for the final product and the amount the producer receives for the same unit (Hays, 1975; Abbott & Makeham, 1986; Olukosi & Isitor, 1990; Arene, 2003). It can also be seen as the difference between prices received on resale and purchase price at each intermediary level (Mejeha et al, 2000). Marketing margin reflects the costs and profit of middlemen (Olukosi & Isitor, 1990; Minot & Goletti, 2001). Middlemen play very important roles in the marketing of farm products. Every middleman involved in the distribution chain earns some sort of margin for the duties performed in the distribution channel. Therefore, marketing margin gives us a measure of middlemen per unit charges, such charges may also include payment for value addition where applicable (Ekunwe & Alufohai, 2009). The benefits that accrue to the individual market participants may be incentives or disincentives to continue in the business. These benefits must be a reasonable amount to attract enough market participants that would make for efficient distribution but should also be commensurate to the marketing function such that exploitation of the actual producer is avoided. The knowledge of this, in Edo State however is yet to be fully investigated. These raises such question as: What is the marketing channel for cassava tuber and its product? Which class of middlemen are involved in the marketing of cassava tuber and its products? What functions do they perform? What are the costs involved in performing these functions? What are the marketing Margins for the different commodities? What are the components of the marketing margins? What is the effect of the components on the size of marketing margin? The specific objectives were thus to: identify the various cassava products marketed in the study area, determine the marketing channel for cassava in Edo State, estimate and compare the marketing margins for the identified products; and investigate the effect of the components of the marketing margin on the variation of in its magnitude.

METHODOLOGY
The study was conducted in Edo State, Nigeria. The State lies within the geographical co-ordinates of Longitude 05º 04` East and 06º 43` East and Latitude 05º 44`North and 07º34`. It has 18 Local Government Areas (LGAs) with the capital in Benin City with an estimated population of 3,218,332 (National Population Commission (NPC), 2006). The State is divided into three agro-ecological zones according to Edo Agricultural Development Programme (EADP) delineation, namely; Edo North (comprising Akoko Edo, Etsako Central, Etsako East, Etsako West, Owan East and Owan West LGAs), Edo Central (comprising Esan Central, Esan North East, Esan South East, Esan West and Igueben LGAs) and Edo South (Egor, Ikpoba – Okha, Oredo, Orhionmwon, Ovia North East, Ovia South East and Uhunmwonde LGAs). The study covered the three agro-ecological zones.

Primary data used for the study were collected from a cross-sectional survey of selected markets in Edo State through the use of a well-structured questionnaire. A multi-stage sampling procedure was used in selecting the respondents for the study. The first stage involved the random selection of two blocks (LGAs) from each agro-ecological zone according to ADP delineation. The selected blocks (LGAs) were Ovia South West and Ikpoba-Okha LGAs from Edo South zone, Esan West and Esan Central LGAs from Edo Central, Owan East and Estako West from Edo North zone. The second stage was the purposive selection of two major markets

from each block. The selection was based on the level of marketing activities of cassava and its processed products in the markets. The selected markets were Iguobazuwa and Udo markets from Ovia South West LGA, Santana and Oka Markets from Ikpoba Okha LGA for Edo South zone while for Edo Central zone, the selected markets were Iruekpen and Ekpoma markets from Esan West LGA, then Irrua and Ewu Markets from Esan Central LGA. Afuze and Arokho Markets from Owan East LGA, Jattu and Uchi Markets from Etsako West LGA were selected for Edo North zone.

The third stage was the random selection of 50% of marketers of Cassava Tuber and its products from the selected market from the sampling frame obtained from the pre survey making a total sample size of 420 marketers. However, only 419 copies of the questionnaire were found useful for analysis.

The marketing channel for cassava in the study area was analysed using a chart. The various cassava products marketed in the study area were analysed using descriptive statistics such as frequency counts, mean values and percentages. Descriptive statistics and marketing margin analysis were employed in estimating the marketing margins.

Marketing Margin (MM) is given as:

$$MM = Selling\ price - Purchase\ Price \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(1)$$

While the over-all marketing margin is given as consumer price less producer price (Kohls, 1985;Adegeye & Dittoh, 1985; Abbott & Makeham, 1986)

$$Producer\ share = \frac{Producer\ Price}{Consumer\ Price} \quad x \quad 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots . (2)$$

Step wise regression was used to investigate the effect of the components of the marketing margin on marketing margins using the linear functional form in line with *a priori* expectation, as also used by (Alufohai & Abiola, 2002).

The implicit function is given as:
$$Y=f(X_1, X_2, X_3,\ldots\ldots,X_n)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. \quad (4)$$

Where Y is the Marketing margin and $X_1\ldots X_n$ are costs of the marketing functions.

The regression equation can be explicitly specified as:
$$Y = \beta_0+ \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5+u \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Where Y = Marketing margin (₦);
X_1= transportation cost (₦)
X_2 = storage cost (₦)
X_3 = market charges/levies (₦)
X_4= processing cost (₦)
X_5 = middlemen's mark-up (₦)
and u_i= error term.
β_0 is a constant while $\beta_1, \beta_2, \beta_3, \beta_4$ andβ_5 are the coefficients of variables X_1, X_2, X_3, X_4 and X_5 respectively.

RESULTS AND DISCUSSION
Identified Cassava Products Marketed in the Study Area

Table 1: Cassava Products Marketed in the Study Area
Field Survey Data, 2018

The identified cassava products marketed in the study area are presented in Table 1 based on

	Processors (pooled)		Non-Processors (pooled)		Total	% of Marketer
	Freq	% of marketer	Freq	% of marketer		
Cassava tuber	-	-	72	100.0	72	17.2
Garri	61	35.5	111	64.5	172	41.1
Parboiled *fufu*	70	95.9	03	4.1	73	17.4
Edible Starch	-	-	38	100	38	9.1
Cassava flour	31	100.0	-	--	31	7.4
Ready-to-eat *fufu*	33	100.0	-	-	33	7.9
Total	195	46.8	152	53.2	419	100.0

the distribution of respondent involved in the processing and marketing of the products. The result showed that majority of the marketers (41%) were involved in *garri* marketing while about 17.4% and 17.2% were involved in the marketing of parboiled *fufu* and cassava tuber respectively. Furthermore, the results showed that about 31% of the *garri* marketers processed the *garri* they sell while 96% of *fufu* marketers process the *fufu* they sell. However, all sampled marketers for cassava flour (100.0%) and ready –to- eat *fufu* (100.0%) processed the product they market. Edible starch marketers were not involved in processing rather these marketers buy and sell already processed edible starch. G*arri*, parboiled f*ufu*, edible starch, cassava flour and ready to eat f*ufu* were identified as cassava products marketed in the study area. These findings are in consonance with those of Muhammad-Lawal *et al.*, (2013) that identified four products (*garri*, cassava flour, starch and *fufu*) from cassava processing in Kwara State, with *garri* being the most predominant product. Olasore *et al.*, (2013) also identified that 76% of the marketers in Ekiti LGA of Kwara State processed their product into *garri*.

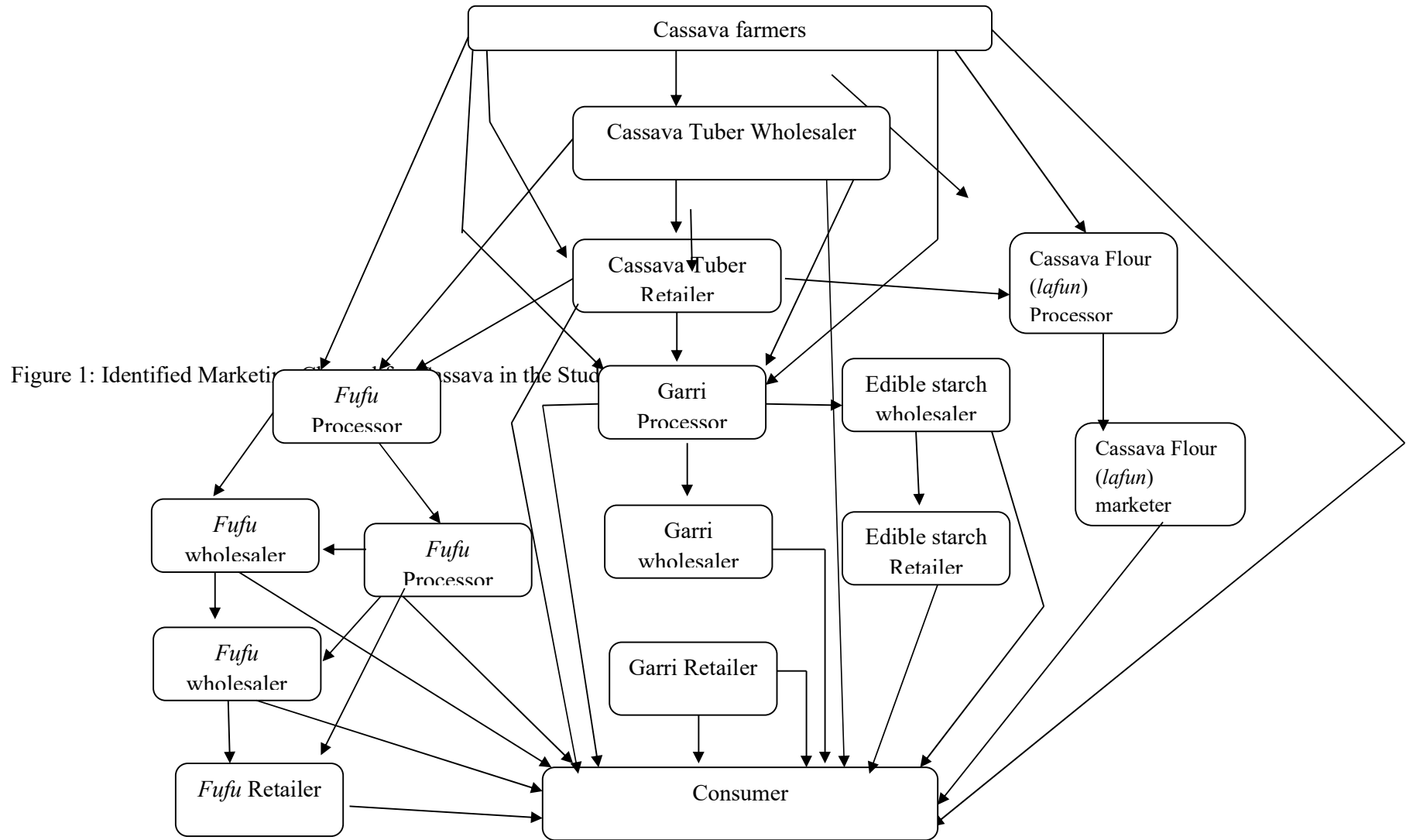**Marketing Channel for Cassava Tuber and Cassava products**

Figure 1: Identified Marketing Chain of Cassava in the Study

The marketing channel identified in cassava tuber and its products in the study area is depicted by Figure 1. It showed that cassava tuber and its products moved through several marketing chains comprising of cassava farmers, wholesalers, retailers, processors, distributors (middlemen) and the consumers. The shortest chain observed in cassava tubers markets were; the commodity moved from the farmers directly to the consumers; farmers to the wholesalers then to the consumers. The longest chain observed was *fufu* marketing chain which started from the cassava farmers to the cassava tuber wholesalers to cassava tuber retailers then to *fufu* processors and to a second group of *fufu* processor then to *fufu* wholesalers and retailers and finally to the consumer. This shows that the cassava market in Edo State is characterised with a complex and indefinite marketing channel comprising of several marketing chains.

Analysis of the Marketing Margins per Kilogramme of Cassava Tubers
Table 2: Average size of the marketing margin (per 1kg Cassava Tuber)

Item	Cassava Tuber	Garri		Parboiled *Fufu*		Edible Starch	Cassava Flour (Lafun)	Ready to Eat *Fufu*
		Non Processor	Processor	Non Processor	Processor			
	Mean(N)	Mean(N)	Mean(N)	Mean(N)	Mean(N)	Mean(N)	Mean(N)	Mean(N)
Purchase price	16.15	35.05	26.67	44.96	21.48	64.35	29.71	28.74
Selling Price	22.42	44.17	42.48	61.32	49.93	88.65	60.16	54.83
Market Margin	6.27	9.12	15.81	16.36	28.45	24.30	30.45	26.09
Marketing Margin (as % of selling price)	27.96	20.65	37.19	26.68	56.98	27.41	50.61	47.58
Overall Marketing Margin	6.27	28.02	26.33	45.17	33.78	72.50	44.01	38.65
Producer share (%)	72.03	36.56	38.02	26.34	32.35	18.22	26.84	29.45

Table 3: Identified Components of the Marketing Margin for marketers that sell already processed products (per 1kg Cassava Tuber)

Component	Cassava Tuber		*Garri*		Parboiled *Fufu*		Edible Starch	
	Mean	%	Mean	%	Mean	%	Mean	%
Transportation	3.61	57.57	1.53	16.77	5.91	36.12	3.83	15.76
Storage	-	-	0.50	5.48	-	-	0.49	2.02
Packaging	0.18	2.87	1.92	21.05	6.68	40.83	3.77	15.51
Processing	-	-	-	-	-	-	-	-
Market charges	0.46	7.34	1.47	16.12	1.05	6.42	1.67	6.87
Middlemen's mark-up	2.02	32.22	3.70	40.57	2.72	16.63	14.54	59.84
Total margin	6.27	100.00	9.12	100.00	16.36	100.00	24.30	100.00

Table 4: Identified Components of the Marketing Margin for processors (per 1Kg Cassava Tuber)

Component	*Garri*		Parboiled *Fufu*		Cassava Flour (*Lafun*)		Ready to eat *Fufu*	
	Mean	%	Mean	%	Mean	%	Mean	%
Transportation	2.89	18.28	2.55	8.97	2.38	7.81	2.46	9.43
Storage	0.28	1.77	0.25	0.88	0.02	0.06	-	-
Packaging	1.22	7.72	3.88	13.64	2.09	6.86	2.80	10.73
Processing	0.13	0.82	0.09	0.32	0.40	1.31	0.06	0.23
Market charges	0.65	4.11	1.07	3.76	1.01	3.31	0.52	1.99
Middlemen's mark-up	10.64	67.34	20.61	72.47	24.56	80.65	20.25	77.62
Total margin	15.81	100.00	28.44	100.00	30.45	100.00	26.09	100.00

The average marketing margins for marketers of cassava tuber and its identified products are presented in Table 2. The result showed that average marketing margin for cassava tuber was ₦6.27, g*arri* and parboiled f*ufu* processors, were ₦15.81 and ₦28.45 respectively while those that marketed already processed *garri* and parboiled f*ufu* had marketing margins of ₦9.12 and ₦16.36 respectively. The average marketing margins for marketers of edible starch, fermented cassava flour (*lafun*) and ready- to-eat *fufu* were ₦24.30, N30.45 and ₦26.09 respectively. Further analysis showed that for cassava products only a small proportion of the consumer's money was received by the farmer as reflected by the producer share from the overall marketing margin analysis. The least value was observed for starch (18.22%) while the highest was for *garri* (38.02%). However for cassava tuber, a greater percentage (72.03%) of the consumer money went to the producer. A possible reason may be as a result of the relatively short marketing chain observed for cassava tuber relative to the longer chains observed for its products especially edible starch and parboiled *fufu*. This suggests that as the product moves from one market intermediary to the other with various marketing functions being carried out. This result to a higher marketing margin which is observed with a small proportion of the consumer price is received by the producer and the others representing the marketing margin comprising the marketing cost and marketer mark up.

The result of the breakdown of the marketing margin to its components for cassava tubers and its products presented in Tables 3 and 4, showed that the mark-up for cassava tuber marketers accounted for 32.22% of the total margin while marketing costs accounted for 67.78% with

transportation cost (57.57%) constituting the greater proportion of the marketing margin. This indicated that transportation cost represented the major cost item for the marketers of cassava tuber. This may be as a result of the bulky nature of cassava tubers. This is in line with the results of Emokaro *et al*., (2010) who stated that transportation cost (60%) was the major cost item of cassava marketers in Benin City, Edo State.

However, the mark-up for marketers that process into *garri* and parboiled *fufu* presented in Table 4, represented 67.30% and 72.47% of the total margin while 32.70% and 27.56% represented their marketing costs respectively. This shows that the middlemen mark – up constituted the highest proportion of the marketing margin which may imply their being exploitative. For marketers who were not involved in processing their mark-up accounted for 40.57% and 16.63% while their marketing costs accounted for 59.43% and 83.37% of the total margin respectively. The result showed that the middlemen's mark –up for marketers that are involved in processing were higher than those that were not involved in processing but who marketed already processed commodities. This indicates that marketers who processed were more exploitative in their prices relative to those who did not process.

The mark –up of marketers of edible starch, fermented cassava flour (*lafun*) and ready-to-eat *fufu*, represented 59.84%, 80.66% and 77.62% of the total margins respectively, while the cost of the marketing functions accounted for 40.16%, 19.34% and 22.38% respectively, as shown in Table 3 and 4. The overall result showed that the major components of the marketers' marketing margin were middlemen's mark –up, transportation cost, storage cost, processing cost and market charges. The middlemen's mark-up accounted for a larger proportion of the marketing margin than the marketing cost and the values indicate that the middlemen were more exploitative in the marketing of fermented cassava flour (*lafun*) and ready to eat *fufu*. This also corroborates Eronmwon, Alufohai, and Ada-Okungbowa, (2014), who reported that middlemen mark up was a major component of the marketing margin of plantain marketers in Edo State.

Contribution of the components of the marketing margin to its magnitude for Cassava Tuber and its products

Table 5: Contribution of the components of the marketing margin on the magnitude of cassava tuber and its products

Product		Constant	Middlemen's Mark up	Transport cost	Storage cost	Packaging cost	Processing cost	Market charges	F Value	R^2
Cassava Tuber	Coefficient	-2.036*	1.393*	0.175	-	0.267*	-	0.093*	981.165	0.98
	t-value	-7.591	8.933	1.709		6.792		3.145		
Garri(Non processor)	Coefficient	2.972*	0.019*	0.004*	0.020*	0.021*	-	0.022*	184.53	0.90
	t-value	122.24	33.10	2.13	2.29	10.41	-	6.78		
Garri (Processor)	Coefficient	2.772*	0.032*	0.009*	0.057	0.025*	0.050	0.111*	53.608	0.86
	t-value	93.214	17.512	10.023	1.828	3.006	1.887	5.836		
Parboiled *fufu* (Processor)	Coefficient	-0.123*	0.901*	0.101*	0.114*	0.137*	0.123*	0.053	193.90	0.98
	t-value	-1.688	45.235	4.667	3.218	7.807	2.123	1.587		
Edible starch	Coefficient	-0.203	0.913*	0.118*	0.111*	0.077*	-	0.250*	176.503	0.96
	t-value	-1.386	23.137	4.960	2.331	2.673	-	5.531		
Cassava flour (*Lafun*)	Coefficient	-0.167	0.873*	0.167*	-0.088	0.176*	-	0.109	89.815	0.94
	t-value	-0.885	18.616	3.556	-0.280	5.053	-	2.167		
Ready to eat *fufu*	Coefficient	0.057	0.889*	0.097*	0.097*	0.116*	-	0.061	922.532	0.99
	t-value	0.762	46.406	3.496	3.496	6.742	-	-0.158		

*significant (p<0.05)

Results presented in Table 5 show the contributions of the various components of the marketing margin to its magnitude for the respective products. The result showed that the components of the marketing margin(transportation, storage, packaging, processing costs, middlemen's mark-up) explained about 98%, 90%, 86%, 98%, 96%, 94% and 99% of the variations in the magnitude of marketing margin of the different commodities respectively. The value of the F – statistics shows that the results were significant ($p<0.01$). This shows the overall "goodness of fit" of the model. The null hypothesis that the components of the marketing margin do not have significant effect on its magnitude is therefore rejected. For cassava tuber marketers, the result showed a positive significant relationship between the middlemen's mark-up (1.39), packaging (0.27) and marketing charges (0.09) and the magnitude of the marketing margin. This indicate that a unit increase in the middlemen's markup, packaging cost and marketing charges will respectively increase marketing margin by 1.39, 0.27 and 0.09.

It was found that all the variable in *garri* marketers (non- processors), were positive and statistically significant ($p < 0.05$). The result indicates that a unit increase in mark – up, transportation cost, storage cost, packaging cost and market charge will increase the magnitude of the marketers margin by 0.02, 0.00, 0.02, 0.02 and 0.02 respectively. The result is similar for marketers of *garri* who were involved in processing. Middlemen's mark- up, transportation, packaging and market charges were observed to be positive and significant ($p < 0.05$) and therefore a unit increase of these variables would lead to an increase in the marketing margin of the respondents. For marketers of edible starch and parboiled *fufu*, all the variable were also positive and statistically significant ($p < 0.05$), while for cassava flour and ready to eat *fufu*, middlemen's mark-up, transportation and packaging cost had positive and significant relationship ($p < 0.05$) with the marketing margin of the marketers. This implied that a unit increase in these variables increased the magnitude of the marketing margin of the respondents. This result is similar to that of Afolabi (2009), with the finding that acquisition cost, labour and storage cost had a positive significant relationship with the magnitude of the marketing margin.

CONCLUSION

The study established that a small proportion of the consumers money spent on cassava products was received by the producer and the other represented the marketing cost and marketer mark up while a higher percentage of the consumer price went to the producer in cassava tuber sales. Comparatively, the result showed variations in the marketing margins of cassava tuber and its products with major components identified to be middlemen's mark –up, transportation cost, storage cost, processing cost and market charges with the middlemen's mark-up accounting for a large proportion of the marketing margin indicating the exploitative nature of the marketers. The middlemen mark-up was also identified to have a positive and significant effect on the marketing margins of cassava tuber and the identified product marketed in the study area.

RECOMMENDATION

It is therefore recommended that:
1. There should be provision of good roads in order to reduce the cost of transportation of cassava tubers and its products as transportation cost was observed to be one of the major components of the marketing margin of the respondents.
2. Cassava farmers are advised to participate in the marketing of their product. Policies aimed at encouraging market participation of cassava farmers is recommended to enhance farmers return on their products.
3. The formation of consumer cooperatives should be encouraged to enable bulk and direct purchase from the farmers or wholesalers. This is to have a short marketing chain since it has been observed that as the product moves from one market intermediary to

the other and marketing functions are carried out, a higher marketing margin is observed with a small proportion of the consumer price is received by the producer.

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