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THE ECONOMICS OF PIG MARKETING IN KADUNA STATE, NIGERIA

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ABSTRACT

The study examined the economics of pig marketing in Kaduna State, Nigeria. A multi-stage sampling technique was used to collect data from one hundred pig marketers. Primary data were generated using structured questionnaires and personal observations for 2015 production year. Data were analysed using gross margin, marketing efficiency and factor analysis. The study revealed a mean gross margin per pig of N 3,194.03, N2,118.45 and N4,857.31 for rural assemblers, wholesalers and retailers respectively and mean marketing efficiency of 16.01%,11.07% and 21.84% for rural assemblers, wholesalers and retailers respectively. ANOVA and Dunnett' test confirmed that there was a significant difference between the marketing margins of the three major participants at 1% level. The explanatory factor analysis of constraints showed that infrastructural and market/government policy affected pig marketers. The study recommends that government should provide market infrastructure and funding of marketing information dissemination through the media and improve restructure the industry.

Keywords: Pig, marketers, gross margin, marketing efficiency, rural assemblers, wholesalers, retailers

INTRODUCTION

Pig marketing in Nigeria is entirely in the hands of traditional middlemen. Government involvement is limited to the areas of disease surveillance and provision of public market infrastructure in a few major towns, with no major direct participation or regulatory measures. Thus, the Nigerian pig marketing system is essentially indigenous, with strong cultural control (Ajala and Adesehinwa, 2008). It is through an efficient marketing system that goods and services can get to the consumers in the right form, place, time and price. Odii and Ibih (2002) opined that in a competitive economy, agricultural development cannot occur without improved marketing. This is because agricultural development is concerned with all economic activities involved in marketing and distribution of agricultural products. Agricultural marketing can be viewed from both the micro and macro perspectives. The micro view point is concerned with the individual participants in marketing, be it the farmer or the business firm. The marketing process

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involves many other functions in the distribution chain. These include the physical functions (production, processing, assembling, grading, packaging/grading, transportation, storage/preservation), exchange, facilitating and institutional functions (Olukosi, *et al.* 2007) The performance of a market isinfluenced by two major factors: (i) the structural characteristics of the market, and (ii) the competitive behaviour of actors/participants in the marketing chain. Understanding how these factors work independently and together can provide a basis for identifying opportunities to be exploited and constraints that need to be removed (Williams *et al*, 2006).

Statement of the Problem

Pig marketing is a complex business activity that requires the physical movement of live pigs from producers to the final urban consumers at the right place, form, time and price. Pigs have been recommended as good alternative source of cheap, high quality animal protein that suits escalating human population. They have relatively low cost of production and their growth rate is fast (Osaro, 1995).

The FAO, (1992) reported that animal protein consumption in Nigeria is below the United Nation (UN) and FAO recommended optimal daily requirement of 20 grams for developing countries as against the 75 grams for normal growth and development. The declining consumption of animal protein due to its high price can be remedied by the production and marketing of pigs. In Kaduna State, to perform this marketing function, specialized manpower is involved in the distribution chain. There is lack of adequate information on these skilled manpower performances in the market. In view of this, the study analysed the micro view of marketing of pigs in Kaduna State with the following objectives: to examine the performance of market participants of pig marketing in the study area.

The null hypothesis tested was that the gross margin of market participants is not significant. The structure, conduct and performance (SCP) approach postulates that as market structure deviates from the paradigm of a perfect competition, the degree of competitive conduct will decline and there will be a consequent decrease in output (supply) and allocative efficiency, and an increase in prices. This implies that the performance of markets can be assessed based on the level of competition and efficiency in those markets (Williams et al, 2006).

Market Performance

This concept is related to structure and conduct. It is defined as the strategic end result of market adjustment engaged in by buyers and sellers. Hence it is the appraisal of the extent to which the interactions of buyers and sellers in a market stimulate results that are consistent with social purposes. The parameters used in assessing market performance in this study are: (i) the marketing margin: level of profits ; (ii) market efficiency and (iii)marketing costs. (Ejiga 1979, Adegeye and Dittoh 1985 and Olukosi *et al* 2007).

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METHODOLOGY

Study Area

Kaduna State occupies about 46,016 square kilometers which represents about 5% of the land area of the 923,768 square kilometers of Nigeria. The State is made up of twenty three (23) Local Government Areas. The state lies between latitude 11° 32' and 09° 02' north of the Equator and longitude 80° 50' and 06° 15' east of the Greenwich meridian (Kaduna State Statistics Year Book, 1996).

Sampling Technique

A multi-stage sampling procedure was adopted. The first stage was the purposive selection of four Local Government Areas (LGAs) known for their prominence in pig production namely: Jema'a, Zango-Kataf Kaura and Kachia. The second stage was the purposive selection of five villages in each of these LGAs. The third stage involved the proportional random selection of 10% marketers from each village obtained from the extension list of Samaru Zone of the Kaduna State Agricultural Development Project. A total of one hundred (100) pig marketers were selected from the sampled villages.Primary data were collected for the study through the use of a structured questionnaire and administered through oral interviews. The primary data for the study were collected based on the 2015 production season.

Data Analysis Models

Gross margin, market margin and market efficiency models were used to achieve objective i and factor analysis model was used to analyse objective ii. ANOVA and Dunnett's test were employed to test the hypothesis.

Gross Margin Model

The model was used to compute the gross margin for both pig producers and marketers. The model is expressed algebraically as:

$$GM = \sum GFI - \sum TVC \qquad ------1$$

$$GM = \sum_{t=1}^{n} PiQi - \sum_{t=m}^{m} PjQj \qquad -----2$$

Where: $\Sigma =$ Summation sign

Pi = Price of unit of ith output

Qi = Quantity of ith output

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Pj = Price of unit of jth input

Qj = Quantity of jth input

n = Number of output

m = Number of inputs

Marketing Margin (MM)

The performance of market participants like the rural assemblers, wholesalers, retailers and commission agents was computed using the marketing margin. Tomek and Robinson (1981) and Olukosi *et al.* (2007), defined marketing margin as the difference in price of a given commodity at different stages of time, form, place and possession to the ultimate consumer. Marketing margin can be computed using the following formula:

 $Marketing Margin = \frac{Selling price - Supply price}{Selling price} \ge 100$

Ajala and Adesehinwa (2007), used this model to compute the marketing margins as an indicator for the performance of the various market participants.

Marketing Efficiency (ME) Marketing Efficiency refers to the maximization of the ratio of output to input in marketing. The study will adopt Olukosi *et al* (2007) formula for measuring marketing efficiency. The formula for measuring marketing efficiency is as follows:

Marketing Efficiency $= \frac{Value \ added \ by \ marketing}{Cost \ of \ marketing \ service} \ge 100$

RESULTS AND DISCUSSIONS

Market Performance of Participants

Market performance is the appraisal of the extent to which the interactions of buyers and sellers in a market stimulate results that are consistent with social purposes Olukosi, *et al.* (2007). The market participants identified by the study were the rural assemblers, wholesalers, retailers, commission agents and brokers.

Rural Assemblers

The result in table 1 show the performance of the rural assemblers in the study area. The mean gross farm income (GFI) received by the rural assemblers was N79, 272.73 while the mean total

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variable Cost incurred (TVC) was $\frac{1}{1}67,697.80$. The average gross margin (GM) per annum that accrued was $\frac{1}{1}1,574.93$ with a marketing margin (MM) of 16.65%. It had a minimum GM of $\frac{1}{2}$, 700.00 and a maximum of $\frac{1}{1}47$, 100.00. It also had a minimum marketing margin of 7.50% and 35.71%. The gross margin per pig was $\frac{1}{3}3,194.03$. This implies that rural assemblers were able to off - set their costs, thereby making some profit as shown by the gross margin and the marketing margin from their sales. This agrees with Ajala and Adesehinwa (2007) who reported higher sales prices for rural assemblers than producer prices. The mean marketing efficiency was 16.01% .This implies that rural assemblers were inefficient. This agrees with findings of Aidoo, *et al.*(2012) in their Estimation of Margins and Efficiency in the Ghanaian Yam Marketing Chain, that marketing efficiency figure below 100% is indicative of inefficiency; more is spent on value addition compared to the margin received after value addition.

Wholesalers

The result revealed that the mean gross farm income (GFI) for wholesalers was N241,1337.93 with an average TVC of N83,896.60. The gross margin (GM) received on the average was N9,343.40 with a marketing margin (MM) averaging 17.50%. The minimum GM was N2,000.00 and the maximum was N84,200.00 with a MM minimum and maximum of 3.23% and 100.00% respectively. The gross margin per pig was N2,118.45. This implies that in the marketing chain, the wholesalers are the giant actors. This is manifested in the amount spent and the volume of marketing they perform. They require large sums of capital; hence they go for bank loans. They also take the highest risk in the chain. The marketing efficiency (ME) of wholesalers was 11.07%. This was lower than the rural assemblers. They were also operating at an inefficiency level as ME was very low.

Retailers

The result on Table 1 show that retailers received an average gross farm income of N59, 929.64 per annum with a minimum of N23, 500.00 and a maximum of N97, 000.00. The total variable cost was N44, 448.67. The mean gross margin was N11, 485.67 with a minimum of - N22, 220.00 and a maximum of N 73,000.00. The average marketing margin (MM) was 23.43% with a minimum of - 62.35% and a maximum of 100.00%. The gross margin per pig was N4, 857.31 for retailers. This means that at every stage of the marketing chain, value was added and this required funding and risk bearing. A relatively high marketing margin implies that creating of form, time, price and place utilities led to a high marketing margin. Similarly, the marketing efficiency (ME) of retailers was 21.84%. It was relatively the highest among the three major market participants. It equally meant that there was inefficiency in their performance as it was less than 100% (Aidoo, *et al.* 2012).

TABLE 1: Market Performance of Participants in the Study Area

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COST/TR Mean Std	. Dev Min	Max		
A.RURAL ASSEMBLER	S			
Total Variable Cost	67,697.80	23,520.79	37,250.00	136,200.00
Total Variable Cost/Pig	19,991.58	3,234.35	15,133.33	26,100.00
Total Revenue	79,272.73	30,771.00	45,000.00	164,000.00
Total Revenue/Pig	23,185.61	3,234.35	17,000.00	31,666.67
Gross Margin 11,5	74.93 8,882	.67 2,7	00.00 11,5	574.93
Gross Margin /Pig	3,194.03	1,641.63	700.00	9,420.00
Marketing Margin	16.65	5.44	7.50 3	35.71
Marketing Efficiency	16.01	8.04	3.63	50.70
B.WHOLESALERS				
Total Variable Cost	83,896.60	132,100.02	50.00 567,4	20.00
Total Variable Cost /Pig	19,817.68	4,106.81	12,098.89	29,633.33
Total Revenue 241,	137.93 136,566	5.50 79,0	00.00 620,0	00.00
Total Revenue /Pig	21,936.12	4,387.84	13,888.89	33,833.33
Gross Margin	9,343.40	17,064.45	-2,000.00	84,200.00
Gross Margin /Pig	2,118.45	1,330.75	33.33 4,9	985.71
Marketing Margin	17.50 16.85	3.23	100.00	
Marketing Efficiency	11.07	6.94	0.13	27.81
C. RETAILERS				
Total Variable Cost	44,448.67	21,926.80	9.00	80,500.00
Total Variable Cost /Pig	22,754.36	3,269.89	16,500.00	28,500.00
Total Revenue	59,929.64	21,107.47	23,500.00	97,000.00
Total Revenue /Pig	27,611.67	5,174.21	16,015.00	37,000.00
Gross Margin	11,985.67	14,820.01	-22,220.00	73,000.00
Gross Margin /Pig	4,857.31	4,074.52	-11,110.00	10,350.00
Marketing Margin	23.43	22.98	-62.35	100.00
Marketing Efficiency	21.84	16.66	- 40.98	48.55

Comparisons of Gross Margin of Market Participants

The result of the analysis of variance (ANOVA) between and within groups of marketers is presented in Table 2. The result showed that there was a significant difference between the gross

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margins of the different groups of marketers at 1% level. This result was a one – way ANOVA and it is an omnibus test statistic and cannot tell which specific groups were statistically different from each other. To determine which specific group differed from the other, a post hoc test was employed using Dunnett' test.

The results of Post Hoc test using Dunnett's test for multiple comparisons of the three major market participants (Rural Assemblers, Wholesalers and Retailers) in pig marketing in the study area is shown in Table 3. It showed that comparing the mean gross margin of rural assemblers against wholesalers and retailers revealed that rural assemblers earned N1,075.58 per pig more than the wholesalers who earned - N2,277.41 less than retailers and significant at 1% level. This implies that producers probably sold to the rural assemblers at good and competitive prices while on the other hand retailers received more profit from the marketing chain than them. The comparison of the average gross margin of wholesalers against rural assemblers and retailers revealed that wholesalers earned - N1, 075.58 and - N3, 352.99 per pig less than rural assemblers and retailers bought their stock from both producers and rural assemblers at different price regimes. Therefore they were not able to recover all their variable and other costs incurred like the rural assemblers and retailers

The result also showed the comparison of retailers against rural assemblers and wholesalers. It indicated that the retailers earned \aleph 2,277.41 and \aleph 3,352.99 per pig more than rural assemblers and wholesalers respectively and this was significant at 1% level. This probably implies that retailers bought from producers, rural assemblers and wholesalers as such their price pattern was varied and the structure of their market was both pure competition and oligopoly. In line with the market structure, they probably paid reasonable prices that enabled them sell with some good margin more than the rural assemblers and wholesalers. Retailers also added the final utility of form as the final product to consumers. This agrees with Ajala and Adesehinwa (2007) who reported that most of the gross returns to retailers/butchers come from meat sales but a substantial portion (17%) is received from by-products such as head, legs and offals.

The result of the Dunnett's test compares one group' gross margin mean with other groups. It showed that the mean difference of their gross margins (rural assemblers versus wholesalers and retailers, wholesalers versus rural assemblers and retailers and retailers versus rural assemblers and retailers) was significant at 1% level. Therefore the null hypothesis was rejected and the alternative hypothesis accepted that there is a significant difference between the gross margins of the marketers (Table 3).

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TABLE 2: THE RESULT OF ANALYSIS OF VARIANCE (ANOVA) OF Gross Margin									
Group	Sum of Squares	df	Mean Square	F	Sig				
Between Groups	1586059.311	2	79302529.655	22.789	.000***				
Within Groups	330581441.625	95	3479804.649						
Total	489186500.935	97							

t-Value *** Sig. at 1%

Table3: Comparisons of Gross Margin of Market Participants

Type of Marketer	Me	an n	Std Dev.	Sig	
<u>A</u>	Wholesalers	1,075.58***	352.8386	.010	
Rural Assemblers	vs Retailers	- 2,277.41***	563.9096	.001	
Wholesalers' vs	Rural Assemblers	-1,075.58***	352.8386	.010	
	Retailers	-3,352.99***	565.6776	.000	
Retailers' vs	Rural Assemblers	2,277.41***	563.9096	.001	
	Wholesalers	3,352.99***	565.6776	.000	

t-value *** Sig. at 1%

CONCLUSION

The result of market participants revealed that rural assemblers earned a mean gross margin of $\mathbb{N}11$, 574.00 and a marketing margin of 16.65%. Wholesalers earned a gross margin of \mathbb{N} 9,343.40 and a marketing margin of 17.50%, while retailers earned \mathbb{N} 11,985.67 and a marketing margin of 23.43%. The marketing efficiency showed that all participants were inefficient. The ANOVA showed that there was a significant difference in the gross margin of market participants at 1% level. From the findings of the study, it is recommended that more market centres be erected to allow for good competition in areas with comparative advantage. Government should provide credit facilities to marketers in order to assist them increase the

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volume of trade andprovide market infrastructure that would facilitate the development of this sector.

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