Market Structure, Conduct and Performance of Gari Processing Industry in South Western Nigeria

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Abstract

The purpose of this paper is to analyze the gari industry through a Structure-Conduct-Performance (SCP) framework utilizing cross- section data for the year 2009 in Southwestern Nigeria. A multi-stage sampling technique was used to select 260 gari marketers in the study area and structured questionnaire administered to them. Descriptive statistics, gross margin, gini-coefficient and production function analyses techniques were used. The profitability analysis showed that an average marketer incurred an average total variable cost of \Re 7, 640.30 per week but earned average revenue of \Re 12, 452.35 per week indicating \Re 4, 812.05 as gross margin. A Gini coefficient of 0.4256 obtained in this study indicates a high level of concentration in the gari market.

Keywords: Gari industry, Southwestern Nigeria, profitability analysis, small scale farmers, agricultural sector.

1. Introduction

Despite the contribution of agriculture to the economy of the sub-Sahara African countries, Nigerian agriculture is dominated by the small scale farmers who produce the bulk of food requirements in the country. Despite their unique and pivotal position, the small holder farmers belong to the poorest segment of the population and therefore, cannot invest much on their farms. The vicious circle of poverty among these farmers has led to the unimpressive performance of the agricultural sector (Ajibefun 2002). As a result, per capita food production has not been able to keep pace with a rapidly expanding demand for food hence countries in the region have become increasingly dependent on commercial imports and food aid (World Bank 1996). To reverse this trend, most governments in the area have been designing research programmes and policy initiatives aimed at achieving national food security. One of the many crops being considered currently in this effort is cassava both in terms of its potential to ensure adequate food supply for all and generate rural household income thereby increasing access to food. Abubakar (2003) said that the current trend in cassava production and demand showed that cassava production is increasing globally and that growing of cassava is expanding to the semi-arid areas where cassava was not cultivated 30 years



ago.

Cassava can be a powerful poverty fighter in Africa. The cash income from cassava proves more egalitarian than the other major staples because of cassava's low cash input cost (Nweke 2004). Compared with other major staples, cassava performs well across a wide ecological spectrum. It therefore benefits farmers across broader swath of ecological zones. Cassava is, likewise, less expensive to produce. It tolerates poor soil, adverse weather and pests and diseases more than other major staples (Maziya 2004). The crop puts ready money and food in the very vulnerable segments of society. Cassava stores its harvestable portion underground until needed; it is therefore a classic food security crop. These attributes combined with other socio-economic considerations are reasons for International Fund for Agricultural Development (IFAD) to recognize it as crop that lent itself to a commodity-based approach to poverty alleviation (FAO/IC 1995). The current policy direction of the Federal government of Nigeria has encouraged cassava development leading to a new orientation in the research-extension-farmers linkage. Asogwa et al. (2005) observed that the input expansion policy of government in the cassava industry through the provision of improved cassava varieties and improved processing technology led to efficient use of resources in cassava production in Nigeria.

Gari is the most popular West African staple food produced from cassava. It is consumed as processed or reconstituted with hot water to give a dough-like paste called "Eba", which is consumed with sauce. Gari is a versatile commodity because its organoleptic characteristics can be adjusted to conform to consumer specifications. The main arguments against gari include its bulky starch content which can be augmented during processing or consumption. Gari should be consumed with animal or plant protein accompaniments (Tubman 1989) or protein enriched with soybeans to boost its protein content (from 1-2 to 912%) (Sanni & Sobamiwa 1993). It is, therefore, the most developed, convenient and storable commodity from cassava. Gari may be produced at a small, medium or large scale (Sanni 1991) but in Nigeria many women carry out processing on a small scale for economic reasons. At this level, there has been a change from "Processing with little or no mechanization at subsistence level" to "Commercial small-scale processing using essential equipments", (Sanni 1991). These essential equipments are available in various parts of West Africa (Ajibefun 2002). Gari is produced following harvesting of cassava, peeling, grating, dewatering, fermentation (optional), sieving, frying and bagging. This process will give white or creamy white gari while addition of palm oil prior to dewatering will add yellow colour to gari. Yellow gari is preferred and can cost twice as much, making it less available to poorer households. Gari is commonly consumed either as a paste made with hot water and eaten with soup or by soaking in cold water with sugar, coconut, roasted peanut, fish, boiled cowpea as complements. A report by (Phillips et al. 2004) reflects that cassava (gari) is truly a national food with urban market presence. Cassava gari appears to be a "food of choice" even in the face of alternative food options in urban area (Maziya et al. 2004). It is mainly produced for domestic markets but presently some of the dry processed food products from cassava (such as gari and fufu flour) are known to be finding their ways to emigrant Nigerian communities in United States and Europe (Dipeolu et al. 2001).

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Formidable technological challenges raise from the need to feed and improve nutritional standards for a growing world population in the context of continued natural resource degradation and the conversion of farmland to non-agricultural use. The rate of productivity growth in sub-saharan africa has been in sharp decline since the late 1980s (Gill 2002). Despite the predominance of the agricultural sector in national economies, development strategy debate in the region still continues to exhibit a great deal of uncertainty about sustaining agriculture and management of natural resources in order to achieve rapid economic growth. In agriculture, sustainable development seeks to conserve land, water, plant and animal genetic resources, which are environmentally non-degrading, technically appropriate, economically viable and socially acceptable. Africa can survive if Africans draw on their own traditions, energy and creativity in sustaining the environment. However, in most of the African countries, resource management is disintegrating while governments are at the same time unable to provide effective management support. This is particular the case in Nigeria, thus creating a vacuum, which is being filled by self-help projects-like gari processing and marketing. These self-help organizations were set up by the people without government interference. In Nigeria, small-scale processors (farmers) have been given a prominent place as a tool of socio-economic development. It is more so realized that, in the agricultural sector they can provide sustainable benefit flows.

Gari market has been very unstable, with its prices experiencing volatile swings in both price and availability. The purpose of this paper is to analyze the gari industry through a Structure-Conduct-Performance (SCP) framework utilizing cross- section data for the year 2009 in Southwestern Nigeria. Therefore, a SCP framework can provide crucial insight into the gari industry for policy makers. It specifically, (1) examined the socio-economic characteristics of the gari processors in the study area; (2) determined profitability of gari processing/marketing and (3) examined the market structure and conduct for gari in the study area.

2. Theoretical Framework

The market structure conduct and performance (SCP) framework was derived from the neo-classical analysis of markets. The structure conduct and performance paradigm was developed by the Harvard school of thought and popularized during 1940- 60 with its empirical work involving the identification of correlations between industry structure and performance (Bain, 1951). This structure conduct and performance hypothesis has led to the implementation of most anti-trust legislation. This was followed by the Chicago school of thought from 1960-80. They emphasized the rationale for firms becoming big, price theory and econometric estimation (Demsetz et al. 1973; Peltzman 1976; Becker 1983). Schmalensee (1989) provides a comprehensive review of the SCP studies. During 1980-90 game theories took center stage with emphasis on strategic decision making and the Nash equilibrium concept (Triole 1988). After 1990, empirical industrial organization with the use of economic theory and econometrics led to complex empirical modeling of technological changes, merger analysis, entry-exit and identification of market power (Bresnahan 1989). The inverse relation between the degree of market concentration and degree of competition has been the underlying assumption of the market SCP hypothesis. This is because market concentration encourages firms to collude. More specifically, the standard SCP paradigm asserts that there

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is a direct relationship between the degree of market concentration and the degree of competition among firms. This hypothesis will be supported if there is a positive relationship between market concentration (measured by concentration ratio) and performance (measured by profits), regardless of efficiency (measured by market share) of the firm. Thus firms in more concentrated industries will earn higher profits than firms operating in less concentrated industries, irrespective of their efficiency.

Harriss (1993) said that the market structure consist of the characteristics of the organization of a market which seems to influence strategically the nature of competition and pricing within the market. The set-up of the market consists of the degree of concentration of buyers and sellers, integration, product differentiation and the degree of competition between buyers and sellers. According to (Afolabi 2004) majority of the sellers of agricultural products including beef used both open display and persuasive methods to draw the attention of customers. Imoudu & Afolabi, (2002) posited that market structure for agricultural products in Nigeria is not perfectly competitive due to collusive tendencies of sellers by forming associations for particular product.

3. Research Methodology

The study was conducted in Oyo and Ondo states of south-western Nigeria. Agriculture is the main traditional occupation of the people and small-scale traditional farming dominates the scenes. These states have tropical climate with its characteristic high temperature all the year round, heavy rainfall during the rainy season (April to October) and dry wind during the dry season (November to March). This favourable climate account for reason why about 75 percent of the inhabitants are farmers. They grow both cash and food crops. Apart from farming, the inhabitants also engage in other occupations like, manufacturing and commerce.

3.1 Sampling Technique

Multi- stage sampling technique was used to select the respondents. Oyo and Ondo states were purposively selected because of the prevalence of cassava growers and processors. The maps for Ondo and Oyo state are presented in figures I and II respectively. Simple random sampling technique was used to obtain twelve (12) local governments' areas each from which the list of gari processors/producers were obtained. A simple random sampling method was therefore used to select eleven (11) respondents from each of the 12 local government areas making a total sample size of two hundred and sixty – four (264). About four (4) structured questionnaires were not properly done; hence two hundred and sixty (260) respondents were available for the analysis.

3.2 Analytical Techniques

Descriptive statistics such as frequency distribution and percentages, gross margin, gini-coefficient and production function analyses techniques were used to analyse the data collected. Gini-Coefficient is used to measure inequality in income distribution among the respondents. It varies from zero (where every person in the society has the same income indicating absence of inequality, which is a condition of perfect equality) to unity (where one gets all the income and the rest receive nothing indicating a presence of complete

inequality), World Bank, (1992) Gini coefficient was used to examine the market concentration for gari in the study area. Mathematically, it is represented by equation (1) i.e.

$$G.C = 1 - \Sigma XY$$

(1)

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Where GC = Gini coefficient, X = Proportion of sellers, Y = Cumulative proportion of total sales Gross margin analysis was used to determine the profitability of gari marketing in the study area. The gross margin was represented by equation (2) i.e.

$$GM = GI - TVC$$

(2)

where G.M = Gross margin, GI = Gross sales/income, TVC = Total variable cost Some of the factors that influence the sales revenue of gari marketers were determined quantitatively using marketing function analysis with the use of the Ordinary Least Square multiple regression analysis (OLS) under the assumption that data collected fulfilled the assumptions of multiple regression model. These assumptions include absence of multicollinearity among the explanatory variables, normally distributed error term with zero mean and constant variance and non auto regression disturbance (Koutsoyiannis 1981).

Model Specification

The marketing function postulated for gari marketers in the study area is implicitly presented by equation (3) i.e. $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7 U_i)$(3) Where Y = Sales revenue of respondents (\mathbb{N}); X_1 = acquisition cost (\mathbb{N}), X_2 = transportation cost (\mathbb{N}); X_3 = marketing experiences (in years); X_4 = labour (mandays), X_5 = cost of storage (\mathbb{N}), X_6 = marketer's age, X_7 = education (years); U_i = the error term or disturbance term (which is assumed to have zero mean and constant variance). Different forms of production such as linear, semi-log and double log (Cobb-Douglas) were tried and the final choice of production function for the economic analysis was based on conventional economic statistical and econometric criteria (Koutsoyiannis, 1981).

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Gari Marketers:

Table 1 reveals that 13.5% of the respondents were less than or 29 years old while 36.5% of them were between 30 and 40 years old. Only 13.1% of these marketers were more than 50 years old while 36.97% of them were between 41 and 50 years old. Analysis shows that 87% of the respondents belong to the active segment of the population while the remaining 13% belong to the aged group. This age distribution can have positive impact on the business aggressiveness of the respondents. Table 1 also shows that both male and female gender sell gari in the study area. The females accounted for 66.2% while the remaining 34.8% of these sellers were males. The dominance of the females in the gari marketing activities particularly at the retail level may be due to small capital based required to start the business. Analysis also reveals that 52.3% of the respondents were married though 20.4% and 8.8% of them were widowed and divorced respectively. This may have a positive effect on the availability of family labour. The table also showed that 78% of the respondents were literates and this can have positive effect on the business acumen of the respondents. The table further reveals that 15.33% of the respondents were processor/sellers while 12.67% of them were wholesalers. About 31.33% of these sellers were wholesaler/retailers while the remaining 40.67% of them were retailers. The dominance of gari marketing in the study area by retailers may be due to the small

capital investment required to start the business.

4.2 Profitability Analysis

The result in Table 2 revealed that acquisition cost accounted for 15.48% of the total sales revenue while cost of transportation accounted for 6.55% of the sales revenue. The cost of labour gulped 10.41% while cost of storage accounted 14.46% of the total sales revenue. The table also showed that acquisition cost accounted for 18.42% of the total cost while cost of transportation accounted for 7.79% of the total cost. The cost of labour gulped 12.38% of the total cost while cost of storage accounted for 0.38% of the total cost. The low storage cost among the respondents may be due to the fact that most of them particularly the retailers sell their gari in open spaces, along the road where stalls are allocated to other foodstuff sellers or pay for a section of another person's shop. The table also revealed that an average marketer incurred a total variable cost of \Re 7640.30 per week but earned average revenue of \Re 12452.35 per week. This indicates that average marketer earned \aleph 4812.05 as gross margin per week suggesting that gari marketing is a profitable venture in the study area.

4.3 The Market Structure for Gari in the Study Area

The value of Gini-Coefficient greater than 0.35 are high indicating inequitable distribution of income/sales (Sanni, 1995). The Gini- Coefficient for gari marketers in the study area shown in Table 3 i.e. 0.4256 indicates high level of concentration and consequently high inefficiency in the market structure. The structure of the Gari Market in the study area is a competitive or perfect market. The market survey was characterized by many buyers and sellers. The conditions of entrance are free entry and free exit and perfect knowledge of the business is required and there is product homogeneity. Results presented in the Table, indicate that a high Gini coefficient of 0.4256 obtained implies that there is a significant inequality in the distribution of income among gari marketers. This implies that there is market concentration in the hand of few marketers because of high income level.

4.4 Market Conduct for Gari in the Study Area

All the respondents claimed that prices were determined by some factors such as the forces of demand and supply, cost of acquisition plus margin, the ability of the buyers to haggle and the quantity of gari. The ability of the buyers to haggle well in price determination indicates that there is price discrimination. There was a low degree of product differentiation in the gari market. Gari trader associations exist only at the wholesalers' level. However, they do not exclude anybody from selling gari in the market. Gari traders are not organized at the retail level because many of them are transient. All the respondents reported that they used both the open display and persuasive efforts to draw customers which confirm the finding of (Afolabi 2004).

4.5 Marketing Function Analysis

The linear, semi log and Cobb-Douglas functional forms of the production function were tried using Ordinary Least Square Technique (Table 4). The estimated functions were evaluated in terms of the statistical significance of the coefficient of multiple determinations (R^2) as indicated by F-value, the significance of the coefficients and the magnitude of standard errors. Based on these statistical and

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economic criteria, the Cobb-Douglas functional form was selected as the lead equation. The result shows that the estimated coefficient of multiple determinations (\mathbb{R}^2) indicates that the postulated regressors (i.e included variables in the model) explained 79.7% in the variation of the regressand (i.e sales revenue from Gari). All the estimated coefficients except transportation (X_2) had positive signs which indicate that increase in the quantity of these variables would lead to an increase in the sales revenue of respondents ceteris paribus. The coefficient of transportation that had negative sign implied that an increase in this variable would lead to decrease the sales revenue of respondents which may be due to high cost of transportation in the country.

5.0 Conclusion

The study revealed that 87% of the respondents belong to the active segment of the population while the remaining 13% belong to the aged group. Analysis also showed that 34.8% of the respondents were males while the remaining 66.2% of them were females. Result showed that 76.9% of the respondents were literates. The study revealed that gari market in the study area was dominated by retailer which accounted for 40.67% of the sellers though there was other categories of sellers such as processor/ sellers (15.33%), wholesalers (12.67%) and wholesaler/retailers which accounted for 31.33% of the respondents. The profitability analysis showed that an average marketer incurred an average total variable cost of \Re 7, 640.30 per week but earned an average revenue of \Re 12, 452.35 per week which indicates that an average marketer earned \Re 4, 812.05 as gross margin per week. A Gini-Coefficient of 0.4256 obtained in this study indicates a high level of concentration in the Gari market and hence high inefficiency in the market structure. Analysis of the market conduct revealed that factors such as cost of acquisition plus margin, demand and supply and quality of the Gari determined the prices set by the respondents. The result of the marketing function for Gari marketers in the study area showed that the postulated regressors explained 79.7% in the variation of the regressand. One can say without mincing words that gari marketing can serve as one of the veritable venture to alleviate poverty in the study area.

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Table 2: Costs and Returns of respondents

Items	Amount (N)	% of TC	% of Total sales
Acquisition cost	501046	18.42	15.48
Transportation cost	211978	7.79	6.55
Storage cost	468286	17. 20	14.46
Cost of labour	337090	12.38	10.41
Miscellaneous	156052	12.34	4.82
Depreciation	312026	11.46	9.64
Total Variable Cost (TVC)	1986478	72.98	61.36
Total Cost (TC)	2721823	100	
Total Revenue (TR)	3237611		
Total Variable Cost/Seller	7640.30		
Total Cost/Seller	10468.55		
Total Revenue/Seller	12452.35		
Gross Margin/Seller	4812.05		
Net Revenue/Seller	1983.8		

Source: Field survey, 2010

Table 3: Computation of Gini coefficient for Gari marketing in South Western Nigeria

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Income sales	Number	Proportion	Cummu.	Cummu.	Total	Proportion	Cummu.	XY
(N)	of seller	of	freq	proportion	sales(N)	of sales ()	proportion	
	(freq)	sellers'(X)		of sellers			of total	
							sales (Y)	
<20,000	42	0.16	42	0.16	984486. 43	0.30	0.30	0.04800
20,001-	66	0.25	108	0.41	264715.31	0.08	0.38	0.09500
30,000								
30,001-40,000	55	0.21	163	0.62	492955.67	0.15	0.53	0.11100
40,001-50,000	30	0.12	193	0.74	509336.25	0.16	0.69	0.08280
50,001-60,000	18	0.07	211	0.81	326021.72	0.10	0.79	0.05530
60,001-70,000	16	0.06	227	0.87	273321.68	0.08	0.87	0.05220
70,001-80,000	21	0.08	248	0.95	254342.31	0.09	0.96	0.07680
>80,000	12	0.05	260	1.00	132431.63	0.04	1.00	0.05000
TOTAL	260				3237611		1.00	0.5744

Source: Field survey, 2010

Mean value of sales = \$12, 452.35, Gini Coefficient = 1 – ΣXY , = 1 - 0.5744, =

0.4256



Variable	Functional Forms	3	
		Cobb-Douglas	Semi Log
	Linear		
Constant	455589.0	2.0480	385211.52
Constant	(432337.04)7	(0.532)	(563732.4)
Acquisition Cost (X ₁)	-6331.06	0.7659*	89423.65
		(0.014)	(350156.2)
	(32231.05)		
Transportation Cost (X ₂)	200846.08	-0.754*	- 421242.38
	2090+0.00	(0.098)	(143852.4)
	(612674.1)		
Marketing Experience (X.)	543651.7	0.534	353456.762
Marketing Experience (X_3)	(58773.4)	(0.840)	(27474.5)
Cost of Storage (X ₅)	287148.62	0.3612*	5324191.56
	(69649.89)	(0.113)	(43365.40)
Marketer's age (X_6)	310.768	834060.8	404634.18
	(12856.80)	(0.543)	(1781.22)
Education (vears) (X_7)	822467.56	0.027*	286112.80
Education (years) (X7)	(5327.42)	(0.018)	(3099.43)

Table 4: Estimates of the marketing function postulated for Gari marketers in the study area.

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R^2	0.694	0.797	0.567
R ⁻²	0.614	0.702	0.529
F-Value	353.63	214.75	192.45

Source: Field survey, 2010

* Significant at 5%

Figures in parenthesis are standard errors of the coefficients.

Fig. I: MAP OF ONDO STATE





Fig. II: OYO STATE MAP





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