



COMPARATIVE ANALYSIS OF SMOKED AND FROZEN FISH MARKETING IN BENIN METROPOLIS, EDO STATE, NIGERIA

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ABSTRACT

This study was carried out to compare the marketing of smoked and frozen fish in Benin Metropolis, Edo State. The specific objectives were to describe the socio-economic characteristics of smoked and frozen fish marketers, estimate and compare the marketing margin of smoked and frozen fish, and evaluate and compare the profitability of smoked and frozen fish marketing. A multi-stage sampling method was used to select one hundred and twenty (120) smoked and frozen fish marketers in the study area. Primary data were collected through a well-structured questionnaire. The data were analyzed using descriptive statistics, gross margin analysis, marketing margin analysis, and *t*-student statistic. Results showed that most (100%) of the smoked and frozen fish marketers were female with a mean age of 40 years having one education or the other. Majority of the smoked fish marketers (67%) and frozen fish marketers (78%) were involved in the marketing of the three identified species of fish (Mackerel (Scomber), Hake (Meluza), and Horse Mackerel (Sese)) present in the market. The marketing margin analysis indicated that smoked fish has a higher marketing margin (₦111.06) than frozen fish (₦70.88). Similarly, profitability of smoked fish was found to be slightly higher than that of frozen fish with profits of ₦95.99 and ₦58.49 respectively. However, there was no significant difference in their profitability when tested at 0.05% level of significance.

Keywords: Smoked and frozen fish, Fish market, Marketing margins, Gross margin, Marketing functions.

INTRODUCTION

Fish is one of the species of all sea foods and one of the best sources of proteins, vitamins and minerals. It contains essential nutrients required for supplementing both infant and adult diets (Abdullahi, Salawu, Sorungbe, and Ola-Salawu, 2001). Fish also contains most of the important essential amino acids, particularly, lysine, methionine and tryptophan that are lacking in plant proteins, low in cholesterol and saturated fats. It is also an important source of vitamins and minerals which are important for good living (Abolagba and Melle, 2008; Murray and Burt, 2001). Apart from its food value, fish has been reported to possess medicinal values, such as, in the amelioration of asthma, arthritis, coronary heart diseases, goiter and cancer (United State Department of Agriculture, 2010). Fish is regarded a healthier meat option due to the high content of long chain polyunsaturated fatty acids (LCPUFAs), which are associated with improving health and preventing diseases of old age (Orji *et al.*, 2014). Fish can also contribute appreciable amounts of dietary calcium, iron and zinc, nutrients that tend to be low in people's diets. Fish is among the best source of dietary selenium (Adebo and Toluwase 2014). Consumption of fish on a regular basis does not only regulates blood sugar levels in the body, but it also lowers visceral fat, thereby lowering the risk of diabetes. Singer *et al.* (2013) recommended that the high level of potassium present in fish helps in maintaining normal blood pressure in addition to lowering the risk of health complications associated with the condition.

In Nigeria, fish is eaten fresh, preserved or processed (smoked or frozen) and form a much-cherished delicacy that cuts across socio-economic, age, religions and seducational barriers (Adebayo-Tayo *et al.*, 2008). Akise *et al.*, (2013) cited Adebowale *et al.*, (2008) that the demand for fish consumption is on the increase in Nigeria due to health benefits of eating fish. Fish can be eaten in a variety of dishes and soups, and since they are well-known throughout the world, they have become an essential culinary aspect of many cultural cuisines.

A fish market is a market place used for marketing of fish and fish products. Fish marketing includes processes such as assembling the raw commodities, grading, packaging, transportation, preparation for use, storage, shifting and sharing risks, change in ownership, pricing and exchange, wholesaling and retailing (Gaedeke *et al.*, 2003). As the fish, like any other production, moves closer and closer to the ultimate consumer, the selling price increases since the margins of the various intermediaries and functionaries are added to it (Reardon *et al.*, 2003). According to Cournot (2009), the role of marketing as an incentive to fish production and productivity cannot be over emphasized.

The marketing of agricultural commodities in Nigeria involves various markets or exchange points, Moses (2002). The number of exchange points depends on the nature of the point of production and that of consumption. If the marketing process is efficient, it will go a long way in providing sufficient food to the populace through the process of market mechanism. According to Kotler, (2009) the influence of

market mechanism on price to a great extent determines the amount of food which peoples can afford. Abbott, (2007), reported that in marketing, fish passes through various market participants and exchange pounds before they reach the final consumer. These market intermediaries are the whole sellers and retailers, both play important role in the marketing system. Furthermore, due to the cumbersome nature of fish distribution channel, the local fish seller is faced with the problem of profit maximization.

Several techniques have been used to preserve fish quality and to increase their shelf life. They are designed to inhibit or reduce the metabolic changes that lead to fish spoilage by controlling specific parameters of the fish and or its environment. A number of processing techniques is in operation in Nigeria. These include smoking, freezing, chilling, salting, canning, and drying. However, there exist (Eyo, 2011) two major techniques of preservation, and they are smoking and freezing. Smoking is where a high degree of temperature of around 130°C is raised to circulate past through the fish while freezing is where the temperature is between -20°C and -50°C retain physical properties and nutritive values as good as fresh fish.

Marketing is the tap root of the success or failure of any business enterprise. It is value-adding activity that provides place, time and form utilities (Mafimisebi *et al*, 2002). The final delivered price of agricultural products such as smoked and frozen fish depends on the cost of the marketing functions performed in getting the product across to the consumers from the producers. There exists marketing margins which do not reflect the actual monetary worth of the marketing functions performed by various intermediaries. The aim of the smoked and frozen fish marketers is to make profit and the returns from the marketing must be satisfactory enough for the marketer to remain in the business. However various setbacks have constituted impediment to the fish distribution and

marketing. They include shortage of supply, price fluctuations due to drying up of source, poor distribution and length of chain, spoilage in transit, lack of electricity supply, and so forth (Tomek and Robinson, 2001). Furthermore, due to the cumbersome nature of fish distribution channel, the local fish seller earns very little return from their activities. Therefore, this study attempts to answer the following questions:

- (i) What is the socio-economic characteristics of smoked and frozen fish marketers?
- (ii) What are the market margins?
- (iii) What are the costs and returns of smoked and frozen fish marketing?

The objectives of the study

The main objective of the study was to carry out a comparative analysis of smoked and frozen fish marketing in Benin metropolis, Edo State, Nigeria. The specific objectives were to:

- (i) describe the socio-economic characteristics of smoked and frozen fish marketers.
- (ii) estimate and compare the marketing margin of smoked and frozen fish.
- (iii) evaluate and compare the profitability of smoked and frozen fish marketing.

RESEARCH METHODOLOGY

Area and scope of the study

The study was conducted in Benin metropolis, Edo State, Nigeria. Benin is a metropolitan city and the capital of Edo State in South-south geopolitical zone of Nigeria. It falls within Edo South Senatorial district of Edo State. Benin metropolis is made up of three local government areas namely; Oredo, Egor, and Ikpoba-Okha respectively (Osamede, 2013).

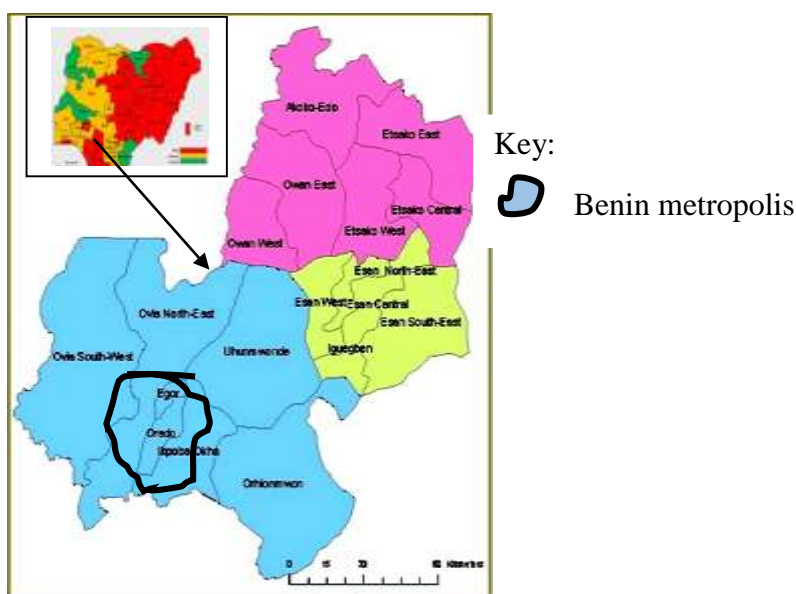


Fig. 1: Map of Edo State showing Benin metropolis (Source: Osamede, 2013)

Benin metropolis is located in the rain forest vegetation belt of Nigeria. Its geographical coordinates are 6° 20' 0" North, 5° 38' 0" East and at an average elevation of about 88 metres. It has an estimated population of 1,676, 000 (World Statistical Data, 2019) and it stretches over an estimated land area of 963.3km² along main highways from Lagos to Asaba, Sapele on the East and South-south axes respectively (Ogbeifun, 2014).

Type and source of data

Data for the study was obtained mainly through the primary source. The primary data were collected with the aid of a structured questionnaire which was administered to smoked and frozen fish marketers.

Sampling procedure and sampling size

A multi-stage sampling procedure was used to select the respondents for the study. The first stage involved the simple random selection of two (02) Local Government Areas (LGAs) from the study areas.

The second stage involved the purposive selection of three (03) major markets with high concentration of marketers of smoked and frozen fish from each LGAs. The major markets were purposively selected based on the level of frozen and smoked fish marketing in the market.

The third stage involved the random selection of ten (10) frozen fish marketers and ten (10) smoked fish marketers making a total of sixty (60) smoked fish marketers and (60) frozen fish marketers, which generated a sample size of One hundred and twenty (120) smoked and frozen fish marketers.

Analytical Techniques

Descriptive statistics which were mean, average, frequency distribution and percentage were used to analyze the socio-economic characteristics of fish marketers. The Gross margin was determined using

$$\text{Gross margin} = TR - TVC$$

where

TR = Total Revenue and

TVC = Total Variable Cost.

The difference between purchase price and selling price was analyzed by using the formular

$$MM = SP - PP$$

While Marketing margin, MM was compared using the model below:

$$MM = \frac{SP - PP}{SP} \times 100$$

where

MM = Marketing margin

SP = Selling price, and

PP = Purchase price.

The Level of Significance, between the profits of smoke and frozen fish marketers were compared using the student t -test, which is given as;

$$t = \frac{\bar{X}_F - \bar{X}_S}{\frac{S_F}{\sqrt{n}} + \frac{S_S}{\sqrt{n}}} = \frac{\bar{X}_F - \bar{X}_S}{\frac{S_F + S_S}{\sqrt{n}}}$$

where

\bar{X}_S : mean of smoked fish marketers' profits

\bar{X}_F : mean of frozen fish marketers' profit

S_F : estimated standard deviation of frozen fish marketers' profit

S_S : estimated standard deviation of smoked fish marketers' profit

\sqrt{n} : number of respondent/sample size

RESULTS AND DISCUSSION

Socio-economic characteristics of smoked and frozen fish marketers

Age of respondents

The socio-economic characteristic of smoked and frozen fish marketers is presented in Table 3.1. The result indicates that majority of the smoked fish marketers, that is 31.67% were between the age brackets of 31 and 40 years while 43.33% of the frozen fish marketers were between the age brackets of 41 and 50 years with the mean age of 40 years for the total respondent. This shows that the fish marketers are relatively young and are able to carry out their marketing functions. The findings are in agreement with Gaya, *et al.* (2006) who observed that those involved in economic activities like fish marketers are in their economic active age.

Sex of respondents

The result in Table 3.1 showed that all of the marketers were female (100%) for both the smoked and frozen fish marketers. This implies gender biasedness. The finding collaborates that of Lawal and Idega (2004), who stated that female's role was more in the marketing of fish than the males. This might be a reflection of the small-scale production level of most fish marketers, which provides avenue for the active engagement of women marketers.

Marital status of respondent

The marital status of the fish marketers in Table 3.1 showed that 56.67% and 73.33% of smoked and frozen fish marketers respectively were married, while 23.33% and 8.33% of the smoked and frozen fish marketers were single respectively. However, 8.33% and 11.67% of the smoked and frozen fish marketers were divorced respectively, while 11.67% and 6.67% of smoked and frozen marketers were widowed respectively. This shows that majority of the smoke and frozen fish marketers were married. This may imply that the business of both frozen and smoked fish marketing is viable and generates enough income to sustain their family. Also, the implication of the finding is that marriage remains a valued culture in the study area.

Educational level of respondents

The result as in Table 3.1 also indicated that 35% and 41.67% of the smoked and frozen fish marketers respectively had primary school education while 50.33% and 46.67% of the smoked and frozen fish marketers had secondary school education respectively. The result further showed that 1.67% and 6.67% of smoked fish marketers had adult and tertiary

education, while 5% and 6.67% had tertiary and adult education respectively. This shows that the business is dominated by marketers who had one form of education or the other. This finding substantiated the findings of Lawal and Idega (2004), who observed that the level of education attained by the marketers, to a large extent determines the strategies, which he or she may use to solve his or her marketing problem and to adopt new innovation without difficulties that will increase his or her profit as soon as they became available to him or her.

Marketing Experience of respondents

The result presented in Table 3.1 also showed that 43.33% of the frozen fish marketers had been in the fish marketing business between 10 and 20 years while 45% of the smoked fish marketers had been in the business for less than 10 years. 15% and 18.33% of frozen and smoked fish marketers had been involved in the business for about 21 to 30 years with an average of 13 years marketing experience. This showed that the marketers were experienced in fish marketing business. This finding is in agreement with that of Ali *et al.* (2008) with the findings that marketing experience is important in

determining the profit levels of marketers, the more the experience, the more the marketers understand the marketing system, condition, and price trends.

Sources of business capital for the respondents

Furthermore, Table 3.1 indicates that 35.09% of the smoked and 44.07% of the frozen fish marketers had their business capital from family members, while 26.32% of the smoked and 23.33% of the frozen fish marketers sourced their business capital through other means such as selling on commission bases. 17.54% and 16.95% of smoked and frozen fish marketers got their business capital through informal contribution groups (Esusu) and 14.04% and 11.86% of the smoked and frozen fish marketers respectively got loan from Cooperative Society while only 1.75% of smoked fish marketers received loan from bank and none of frozen fish marketers got assistance from the bank. This might be as a result of none availability of security that could attract loan from the bank. This finding is in line with Ojo, *et al* (2014) though in marketing of palm oil in Kogi State, that the palm oil marketers found it difficult to secure loan from commercial banks because of lack of security.

Table 1: Socio-economic characteristics of smoked and frozen fish marketers

Variables	Description	Smoked fish		Frozen fish		Mean
		Freq	%	Freq	%	
Age (years)	20 and below	4	6.67	-	-	40.00
	21 – 30	12	20.00	10	16.67	
	31 – 40	19	31.67	16	26.67	
	41 – 50	15	25.00	26	43.33	
	>50	10	16.67	8	13.33	
	Total	60	100.00	60	100.00	
Sex	Male	0	0	0	0	
	Female	60	100	60	100	
	Total	60	100	60	100	
Marital status	Single	14	23.33	5	8.33	
	Married	34	56.67	44	73.33	
	Divorced	5	8.33	7	11.67	
	Widow(er)	7	11.67	4	6.67	
	Total	60	100.00	60	100.00	
Educational level	No formal education	2	3.33	-	-	
	Primary education	21	35.00	25	41.67	
	Secondary education	32	50.33	28	46.67	
	Adult education	1	1.67	4	6.67	
	Tertiary education	4	6.67	3	5.00	
	Total	60	100.00	60	100.00	
Marketing experience (years)	<10	27	45.00	24	40.00	13.00
	10-20	21	35.00	26	43.33	
	21-30	11	18.33	9	15.00	
	>30	1	1.67	1	1.67	
	Total	60	100.00	60	100.00	
Source of business capital	Bank	1	1.75	-	-	
	Cooperative	8	14.04	7	11.86	
	Esusu	10	17.54	10	16.95	
	Friends	3	5.26	2	3.39	
	Family members	20	35.09	26	44.07	
	Others	15	26.32	14	23.73	
Total	57	100.00	59	100.00		

Species (Types) of fish sold by smoked and frozen fish marketers

The species (types) of fish marketed by both the frozen and smoked fish marketers are presented in Table 3.2. The result identified three species of fish and they were Mackerel (Scomber), Hake (Meluza), and Horse Mackerel (Şeşe). 11.67% and 16.67% of smoked and frozen fish marketers were involved in the marketing of both Horse Mackerel (Şeşe) and Mackerel (Scomber) respectively. While only 2% of smoked fish marketers were involved in the marketing of both

Horse Mackerel (Şeşe) and Hake (Meluza) and 18.33% of smoked fish marketers and 3.33% of frozen fish marketers sell Mackerel (Scomber) and Hake (Meluza) respectively. The majority of marketers (66.67% and 78.33%) of smoked and frozen fish respectively were involved in the marketing of all the identified species of fish indicating that majority of the smoked and frozen fish marketers showed interest in marketing all species of fish.

Table 2: Species of fish sold by smoked and frozen fish marketers

Species of fish sold		Smoked fish		Frozen fish	
		Freq	%	Freq	%
Horse Mackerel (Şeşe)		-	-	-	-
Mackerel (Scomber)		-	-	1	1.67
Hake (Meluza)		1	1.67	-	-
All of the above		40	66.67	47	78.33
Horse Mackerel (Şeşe) and Mackerel (Scomber)		7	11.67	10	16.67
Horse Mackerel (Şeşe) and Hake (Meluza)		1	1.67	-	-
Mackerel (Scomber) and Hake (Meluza)		11	18.33	2	3.33
Total		60	100.00	60	100.00

Marketing margin analysis of smoked and frozen fish

The average marketing margin of smoked and frozen fish marketers is presented in Table 3.3. The results showed that the average marketing margin for smoked and frozen fish were ₦111.06 and ₦70.88 respectively. This shows that the marketing margin for smoked fish was higher than that of frozen. The existence of high market margin can be detrimental to producers in the form of low prices and to the consumers in the form of high retail prices. This is evident in the high middlemen's markup as indicated in Table 3.4, as the

middlemen markup accounted for about 86.41% and 82.52% of the marketing margin of smoked and frozen fish marketing respectively. This implies that the marketers were exploitative in their prices. This finding supports the results of Tijani, *et al* (2014) who also opined that high marketing margin though for smoked and fresh fish was an indication of exploitative nature of smoked and fresh fish marketing and could prove hurtful and harmful.

Table 3: Marketing margin analysis of smoked and frozen fish

	Smoked Fish	Frozen Fish
Purchase Price (₦)	473.68	460.86
Selling Price (₦)	584.74	531.26
Market Margin (₦)	111.06	70.88
Marketing margin (as a % of selling price)	18.99	13.34

Table 4: Components of marketing margins for smoked and frozen fish marketers

Components	Smoked Fish		Frozen Fish	
	Mean (N)	%	Mean (N)	%
Transport	2.02	1.82	1.97	2.78
Storage	1.16	1.04	0.96	1.35
Grading	0.00	0	0.00	0
Packaging	2.79	2.51	2.44	3.44
Processing	1.86	1.67	0.00	0
Rent	1.79	1.61	1.82	2.56
Security	1.13	1.02	0.84	1.19
Loading and off loading	1.05	0.94	0.87	1.23
Tax/Ticket	3.29	2.96	3.49	4.92
Middlemen's markup	95.97	86.41	58.49	82.52
Total margin	111.06	100	70.88	100

Profitability analysis of smoked and frozen fish marketing (per kg)

The results of the profitability analysis of the smoked and frozen fish marketing are presented in Table 3.5. The results show that cost of the purchase of smoked fish was ₦473.68, accounting for about 96.92% of the total variable cost, while purchase cost per 1kg of frozen fish was ₦460.88 which accounted for 97.38% of its total variable cost. This implies that purchased cost accounted for the largest percentage of the marketing cost of the respondent. Transportation cost for the smoked and frozen fish marketers accounted for 0.41% and 0.42% respectively. Also, tax and ticket for the smoked and frozen fish marketers accounted for 0.67% and 0.74% respectively. Packaging cost for 1kg of fish was ₦2.79 and ₦2.44 for smoked and frozen fish marketers respectively. Smoked fish processing cost accounted for 0.38%. The total

variable cost of frozen fish marketers was ₦473.27 while smoked fish marketers had ₦488.75 as total variable cost. The total income per 1kg of fish for smoked fish marketers was ₦584.74 while that of frozen fish marketers was ₦531.76. Gross margin was ₦95.99 for smoked fish marketers and ₦58.49 for frozen fish marketers per 1kg of fish. This indicates that the marketing of both fish, smoked and frozen are profitable in the study area. However, profit from smoked fish was observed to be slightly higher than that of frozen fish marketing. The result of the test of significant difference between the profit of smoked and frozen fish marketing is presented in Table 3.6. The result showed that on average, profit of smoked and frozen fish marketers was ₦37.5. The table also indicated that the calculated *t*-value was -1.117. Hence the difference in profit at 0.05% level of significance is negligible.

Table 5: Profitability analysis of frozen and smoked fish marketing (per kg of fish)

	Smoked Fish		Frozen Fish	
	Mean (N)	% TVC	Mean (N)	%TVC
Total Income	584.74		531.76	
Purchase Cost	473.68	96.92	460.88	97.38
Transport Cost	2.02	0.41	1.97	0.42
Storage Cost	1.16	0.24	0.96	0.28
Grading Cost	0.00	0	0.00	0
Packaging Cost	2.79	0.57	2.44	0.52
Processing Cost	1.86	0.38	0.00	0
Rent	1.79	0.37	1.82	0.38
Security	1.18	0.23	0.84	0.18
Loading and off loading	1.05	0.21	1.23	0.26
Tax/Ticket	3.29	0.67	3.49	0.74
Total Variable Cost	488.75	100	473.27	100
Profit (Gross margin)	95.99		58.49	

Table 6: t-test analysis of difference in profits between smoked and frozen fish

Type of fish	N	Mean	Difference	t-value	Prob. Level	Decision
Smoked	60	95.99				Not significant
Frozen	60	58.49	37.5	-1.117	0.266	

CONCLUSION

The study therefore established that the profitability of smoked fish marketers was slightly higher than that of frozen fish marketers in the study area with ₦95.99 and ₦58.49 per 1kg of fish respectively. The marketing of both smoked fish and frozen fish are profitable. However, there was no significant difference in their profitability when tested at 0.05% level of significance.

The markets were characterized by high middlemen markup for both frozen and smoked fish (86.41% and 82.52% respectively) indicating that the fish marketers were exploitative.

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