

ANALYSIS OF INCOME DETERMINANTS FROM FRESH AND PROCESSED FISH MARKETING IN ANAMBRA STATE, NIGERIA

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Abstract

This study presents empirical evidence to show the socioeconomic determinants of income from fresh and processed fish marketing in Anambra state of Nigeria. A multi-stage random sampling technique was used to select one hundred and twenty fish marketers (60 fresh and 60 processed) in the state in 2010 marketing session. The income derived from fresh fish marketing were affected by educational level, trade union/organisation and marketing experience whereas educational level, household size, gender, transportation cost and marketing experience affected income derived from fresh processed fish. Only educational level, marketing experience and processing cost had significantly affected the two marketing groups equally. When the two groups were pooled, educational level, processing cost and transportation cost were significantly affected income at 1% probability level. The results of the test of equality between the two groups revealed that estimated relationships differed significantly, as the chow test showed that $F - \text{calculated}$ (34.64) is greater than the $F - \text{tabulated}$ (6.47). This study showed that fresh fish is more profitable than processed fish because of higher income derived from it. There are need to ensure marketers access to education, credit and good rural road networks to reduce marketing cost.

Keywords: Determinants, income, fresh, processed, fish, marketing.

INTRODUCTION

Protein is a common phenomenon in the health status of many Nigerians as it is responsible for wide spread under nutrition and malnutrition among ages (FAO, 2006) Nigerian protein consumption, particularly animal protein is 7% per day compared to the average of 20% as recommended by food and agricultural organization for the developing countries. The low consumption of animal protein particularly beef, chicken, milk and egg would be associated with scarcity and high costs (Sani et al 1990).

However, fish consumption is gaining wide prominence particularly in developing countries where 40% or more of their protein comes from fish (Amaefub et al 2010). This is because fish is more affordable, palatable and readily available than other sources of animal

protein, less tough, more digestible and its acceptability cut across religion, ethnics and cultural boundaries (Ekeocha et al 2010) (FAO (2006) estimated the total demand for fish in Nigeria at 2.1 million tones at 11.5kg per capita consumption whereas the domestic production is 452,460 metric tons. Fish contain high level of essential sulphur containing amino acids with low; cholesterol and fat content, thus often recommended in the diets of high blood pressure, diabetic and obesity patients, (Nwosu, et al 2000).

Apart from nutrition, fish contribute to millimum development goal (MDG) through providing employment opportunities and generation of revenue for local and national government from licences and taxation. Moreso, fish is a source of livestock feeds and fish oil is used in pharmaceuticals/ companies (Eyo, 2007).

In Nigeria, fishery production industries can be categorized into commercial and artisanal fishing. The commercial and industrial fishing compose of coastal trawling and fauna fishing. The artisanal is divided into coastal canoe fishery, brackish water fishery, fresh water fishery and fish farming or aquaculture. Generally, artisanal productions from coastal and brackish inter in rivers and lakes dominate the activities in Nigeria fishery industries (Ukpabio, 2010).

In most developing countries, fish harvesting in the wild is dominated by small holder fisher men and women characterized by low resource utilization, low level of fish catch/harvesting, low returns to labour and low level of capital investment (Sana et al 1990).

In Nigeria, a negligible proportion of the fish caught are marketed fresh, while greater quantity is preserved through Ice, smoking and sun-drying by mainly women at artisanal level. The preservation of fish helps to increase utilization in menu, reduced wastes of bulk catches and increased protein availability (Ukpabuo, 2010). Agbabiaka, et al (2010) noted that iced fish processing had been variously and widely investigated and could be hampered especially by small fish farmers residing in rural areas where there is non existence or incessant power outage coupled by high cost of fuel.

However, with increasing global market for fish and fishery product particularly in developing countries, where more than 40% animal protein consumption is through fish

(Amaefula et al 2010). It becomes imperative to examine the factors that affect the two categories of fish marketing to enhance better understanding of how best to make fish marketing more effective.

Methodology

Anambra state is the study area and located in longitude 6°36' - 7°21'. No of, Greenwich meridian and latitude 5°38' - 6°47'E of the equator. Anambra state is bounded in the south by Imo state, in the east by Enugu state, in the North by Kogi state, and in the West by Delta state Anambra state has 21 local government areas with Awka as capital. It has population figure of 4.184 million people (NPC 2006) with land area of 4415.54km². Anambra state is divided into four zones; Anambra, Onitsha, Awka and Aguata. Anambra state is intercepted by numerous streams and tributaries flowing into River Niger. The state has mean temperature of 28-38°c and rainfall

of 1500-2500mm. Two out of the four agricultural zones were purposively selected on the basis of high intensity of fish production and marketing. They are Onitsha and Anambra agricultural zones. Two markets were drawn from each zone (Otu Onitsha and Onitsha main markets from Onitsha, Omor Nkwo and Eke Otuocha markets from Anambra zone). Fifteen fresh fish and processed fish marketers each were selected from each of the four markets. This brought to a total of 120 respondents for the study.

Well structured questionnaire and Oral interview were used to derive information from the farmers on socio economic characteristic; age of the household head, educational level, marketing experience, and house hold size. Four functional forms of ordinary least square regression were fitted; linear semilog, exponential and double log functions. The functions are implicitly expressed as:-

$$Y = f(x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7) \quad (1)$$

Linear function:-

$$Y = b_0 + b_1 \ x_1 + b_2 \ x_2 + b_3 \ x_3 + b_4 \ x_4 + b_5 \ x_5 + b_6 \ x_6 + b_7 \ x_7 + b_8 \ x_8 + e \quad (2)$$

Semi log:-

$$Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + b_6 \ln x_6 + b_7 \ln x_7 + b_8 \ln x_8 + e. \quad (3)$$

Double log function:-

$$\ln Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + b_6 \ln x_6 + b_7 \ln x_7 + b_8 \ln x_8 + e \quad (4)$$

Exponential function:-

$$\ln Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + b_8 x_8 + e \quad (5)$$

Where: Y = Revenues from fish marketing; x₁ = age (yrs) (x₂) = Gender (x₃) household size (un number); x₂ = educational level (years); x₅ = marketing experience (yrs); x₆ = processing cost (₦), x₇ = Transportation cost (₦); x₈ = Availability of storage facilities and equipment (availability = 1 non availability = 0); X₉ = Membership of trade union (membership =1 none member = 0); X₁₀ = cost of processing (₦); e = Error term

The chow's test was used to determine and compare the difference in the income from fresh and processed fish in the study area.

Koutsoyiannis (1977) stated the model as

$$\text{Chow's } F^* = \frac{\sum_{e_3} \left[2 + \sum_{2}^{2e} \frac{cl}{2} \right]}{k_1 + k_2}$$

To verify the difference in the estimated relationship, chow's test was used to test for the stability of the difference functions chow's f – statistics is computed as

$$F^{**} = \frac{\sum_0^2 + \sum_{et}^2}{\frac{\sum_{e4}^2}{k_4}}$$

Where $k_1 = n_1$ $m_2 k_2 = n_1 + n_2$ m and $k_4 = n_1 + m_2$

N_1 = sample size for the first regression

N_2 = sample size for the 2nd

M_2 = No of independent variables plus intercept

\sum_{e1}^2 = residual sum of sample from first regression

\sum_{e2}^2 = Residual sum of square from second regression

\sum_{c4}^2 = residual sum of square regression for the dummy variable

Results and Discussions

Among the functional forms of the regression analysis fitted into the data for the fresh fish marketers; semi log was chosen as lead equation. This is because the functional form had highest; level of R^2 , f - value and no of significant variables of the estimated equation estimates. The values of $R^2 = 0.827$ which implies that about 82.7% of variation in their income was explained by the independent variables included in the model. The coefficients of marketing experience and membership of union/organisation were positive and highly significant at 1.0% level of probability.

The implication is that marketers that are members of trade union and with many number of years of marketing experience, the more the income that would accrue to them. Marketing experience was found to be positively related to income of fish marketing, indicating that as marketing experience increases then income is increased. This is in consonance with apriori expectation. The number of years spent in business according to Iheke, (2010) may give an indication of the practical knowledge acquired, he/she can overcome certain problems associated with the business. This results in more income accruing to the marketer. Membership, of union/organization was positively related to income of the fish marketers. Members of marketing organisation has access to agricultural information, training, credit and other marketing inputs as well as more enhanced ability to adopt innovation (Eze and Akpa, 2010). This will enhance the marketer's income. This finding is in consistent to studies by Okike, (2000); Igwe and Madu (2010). Educational level had direct

relationship to the income of the fresh fish marketer. This is in conformity to a prior expectation that education creates favourable mental attitude for acceptance of new practices especially of information and management intensive practices Onyenweaku et al (2010). The implication is that the educated marketers are in better position for better investment and rational decision for increased income compared to uneducated ones.

For the processed fish marketers, double was chosen as lead equation based on econometric and statistical and criteria. Household size had positive coefficient and significant at 5% probability level. This implies that processed fish marketers with large household sizes experienced increased level of income. Nwaru, (2004) reported that large house hold sizes are expected to enhance labour availability especially where the household members are of labour age. The marketer saves the money which could have been paid to hired labour and plows such money into the business as well as to enhance family income by using family labour for hired labour. Igwe and Imadu, (2010) concur to this finding. The coefficient of age of the household head was significant at 1%, which implies that the older the marketer the more income he/she gets. Okoye, et al (2010) reported that old marketer has stronger social network and has established credibility within the network. This enhances among others more turn over in sales, consequently more income. Gender was found to be positive and significant at 10% probability level the direct relationship between the independent and dependent variable could be related to the fact that women has more sales bargaining power than men counterpart. More so,

women face lower transaction costs since women tend to have more credibility than male folk (Okoye et al 2010). Transportation cost was positive and significant at 10%. Transportation cost is largely influenced by pump fuel price and the nature of the road, which adversely affect marketers profit structure.

To determine and compare the income from fresh and processed fish marketers. Data from fresh fish and processed fish marketers were pooled and the significant difference between the two regression analyses were determined using chow test.

The functional forms linear, semi log, double log and transcendental log were tried on the pooled data to determine and compare the determinants of income among fresh and processed fish. Double log was chosen as lead equation based on the highest; R² value, F value and number of significant variables of the estimated parameter. The coefficient of education, purchasing cost and transportation cost were positive and significant at 1% probability level respectively. Several studies (Ilawole, 2005; Igwe and Imadu, 2010; Ukpabio, 2010) revealed that higher transportation cost coupled with high purchasing cost result to high selling price by both fresh and processed fish.

More so, marketing experience was significant at 5% and had direct relationship with

income level. There is significant different in the marketing experience of the marketers of both fish, as the processed fish marketers are more experienced fish marketers compared to fresh fish marketers. The result of the chow's test revealed that the F – calculated is greater than the F – tabulated (i.e 34.041 > 6.47), indicating that there is difference between the income generated from fresh and processed fish marketing in the study area.

Conclusion/Recommendations

The result of this study indicate that important factors that directly related to income acquired by fresh fish marketers were education, trade union and marketing experience and educational level, while for the processed fish marketers were educational level, house hold size, gender and marketing experience. F* calculated is greater than the F – tabulated (34.641 >6.47), implying difference between income derived from fresh and processed fish marketers.

Based on the findings, the followings were recommended; repairing the rural roads to checkmate high cost of transportation, the need to expose the marketers to all forms of education to improve on their marketing skills for high income. More so, experienced and new marketers should be encouraged through provision of credits and other forms of incentive.

Table 1: Regression analysis result at factor affecting revenue from fresh fish market.

Variation	Linear	Exponential	Semi log	Double log
Constant	9.8456 (-5.00)***	-9.3266 (4.3314)***	6.4471 0.3711 ^{xxx}	4.5411 (1.1772) ^{xxx}
Age (x ₁)	0.872 (-180)	0.065 (-294)	0.724 (1.912) ^{xxx}	012 (0.054) ^{xxx}
Gender	2.712 (0.770)	0112 (0.007)	-2141 (0.447)	1.021 (0.414)
Educational Level (X ₂)	187 (-1.213)	-146 (-.364)	-491*** (107)	.371 (-112)
Household size (X ₃)	309 (312)	.061 (.278)	.372 (.004)	.216 (1.008)
Marketing exp (X ₄)	427 ^x (0.65)	.441 (.163)	.742 ^{xxx} (-118)	-.541 (1.08)
Purchasing cost (X ₅)	205 (-.612)	.588 ^x (-.190)	.412 (-.302)	.556 (.004)
Transport cost (X ₆)	.076 (-.109)	0.98 (.009)	-107 (.374)	.0628 (.515)
Storage facilities (X ₇)	.317 (-.171)	427 (-181)	.097 (0.728)	.061 (-.317)
Membership (X ₈)	0.778 (118)	0.617 (374)	-726*** (0.052)	-772 ^{xx} (-.333)
R ²	.774	-668	-893	-641
R ² – adjusted	.634	541	-779	-724
F – value	.627	584	-8271	-644

Source: Field Survey, 2010

***Significant at 1%, **significant at 5%, * significant at 10%, value in brackets are t-ratos

Table 2: Regression analysis result at factors that affect revenue from processed fish variables

Variation	Linear	Exponential	Semi log	Double log
Constant	-16.234 (-1.72)	12.316 (8.171)	6.244 (2.174)	4.730 (-820)
Age (x ₁)	0.314 (-1.102)	0.642 (0.710)	0.341 (0.71)	.0774 ^{xx} (-63)
Gender (x ₂)	-.612 (1.02 ^x)	0.511 (0.771)	1.111 (0.01)	0.004 ^x (0.072)
Educational level (X ₃)	-446 (1.061)	607 ^x (-.046)	-181 ^x (-0.023)	058 ^{xxx} (0.111)
Household size (X ₄)	.218 (1.702)	-103 (.395)	.147 (-317)	.0550 ^{xx} (120)
Marketing experience (X ₅)	.019 ^{xx} (-0.377)	-370 (-277)	-123 (.803)	.082 (5.016)
Purchasing cost (X ₆)	.076 (.446)	-.037 (-.303)	.062 (.616)	-.139 (1.702)
Transportation cost (X ₇)	.164 (1.904)	2.142 ^{xx} (0.317)	.053 (.0221)	.215* (-.031)
Storage facilities (X ₈)	.018 (.007)	0.773 (.215)	.034 (1.101)	3.021 (1.121)
Membership (X ₉)	.014 (.077)	-.047 (-616)	.199 (2.3410)	1.321 (.077)
R ²	.188	154	268	.372
R ² – adjusted	-.213	-.34	.234	.2.98
F – value	1.417	2.410	1.970	4.160

Source: Field Survey, 2010

***Significant at 1%, **significant at 5%, * significant at 10%, value in brackets are t-ratios

Table 3: Regression analysis result at factors that affect revenue of marketer in both fresh and processed fish

Variation	Linear	Exponential	Semi log	Double log
Constant	-3.120 (0.006)	0.171 (0.017)	-12.002 (0.019)	6.047 (1.141)
Age (x ₁)	0.004 ^{**} (0.10)	0.065 (-.041)	-.075 (1.04)	2.712 ^{xxx} (0.661)
Gender (x ₂)	.019 (-14)	1.23* (0.45)	-0.13 (1.24)	-0.671 (3.201)
Educational level (X ₃)	.082 ^x (-.673)	.118 (.009)	2.321 (.933)	1.671 (0.321)
Household size (X ₄)	0.143 1.346	.027 -.105	.604 1.241	-0.751 0.123
Marketing experience (X ₅)	7.20* (.664)	.054 (.013)	1.741 (0.131)	1.89 ^{xxx} (0.725)
Purchasing cost (X ₆)	-.073 (.126)	.745 ^{xx} (1.484)	.442 (2.519)	0.635 ^{xxx} (0.145)
Transportation cost (X ₇)	-035 (1.108)	-.06 (.704)	1.051 (0.115)	0.172 ^{xx} (1.10)
Storage facilities (X ₈)	014 ^{xx} (-1.22)	7.120 (.869)	-0.104 (.541)	0.101 (317)
Membership (X ₉)	0.240 (3.17)	4.210 ^x (0.789)	-4.021 (0.312)	(0.324) 0.014
R ²	134	.214	317	
R ² – adjusted	.217	.172	.410	
F – value	3.310	2.142	5.172	

Source: Field Survey, 2010

***Significant at 1%, **significant at 5%, * significant at 10%, value in brackets are t-ratios

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