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Gender differentials in profit among oil palm processors in Abia state, Nigeria

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Abstract

The study analyzed gender differentials in profits among oil palm processors in Abia state, Nigeria with a random selection of sixty (60) males and sixty (60) females palm oil processors. The result of the cost and return analysis showed that palm oil processing was highly profitable in the study area and male processors had higher revenue (₦92,842,000) than the female processors (₦47,590,570). The result showed that there was a significant difference in the profit between male and female processors at one percent probability level. The study also observed factors such as processing techniques for male and income, fixed and variable costs for female processors exerts influences on processors profitability. The study recommended that women should be given the necessary assistance and barriers that create unequal opportunities for both men and women should be removed to enhance efficiency in processing and other related activities by the relevant government agencies.

Key words

Gender differences, oil palm, processing, profits, Nigeria

Introduction

Background information

In recent times, economic recession with its multiplier effects in the form of hunger, inequalities and unemployment is one of the challenges facing Nigeria. This situation stems from the country's over dependence on oil at the expense of the other productive and real sectors such as agriculture. According to Nicholas *et al.*, (2012), development of agriculture along the value chain provides an avenue to lift many people out of poverty since it opens opportunities for decent jobs and dignified lives for millions of people. As a result, Nigeria government has identified investment in agriculture and value chains as one of its priority areas as part of its diversification strategy. This is because it has been observed that agricultural produce especially cash crops such as oil seed is more effective at reducing poverty in most rural parts of Nigeria given their importance in household livelihood engagement and more especially when one considers the contributions of similar produce to the economy of other nations such as Malaysia.

Oil seed is an important food and cash crop in Nigeria. Its major product palm oil which is extracted from the fleshy mesocarp of the palm fruit is used for cooking. It has both health and nutritional value (it is rich in carotene which is a precursor of vitamin A) and economic benefits. Palm oil is the world largest source of edible oil, accounting for 38.5 million tonnes or 25 percent of the global edible oil and fat production (MPOC, 2007). According to Poku (2002), the

operations involved in processing of palm fruit to obtain palm oil can briefly be summarized as follows; sterilization, threshing or stripping, digestion, pressing, clarification and drying.

In recognition of its economic importance, palm oil is often referred to as a crop of multiple values (Akanbe *et al.*, 2011), hence it is a choice crop for cultivation and a livelihood option among many rural families in Nigeria. Interestingly, it is in the farming culture of millions of people in Nigeria especially the south eastern part. Besides its demand for industrial purposes, which has continued to increase the global importance of this cash crop; its production and processing constitute important sources of employment to many rural dwellers who own plantation of less than two hectares (Usoro, 1974). Iwena (2002) stated that about 85 percent of rural dwellers in Nigeria are engaged in small scale processing of oil palm fruits. To Omoti, (2001), the oil palm fruit processing is mainly dominated by rural farmers who are confronted with low returns from oil due to involvement in traditional processing methods which seriously limit the quantity and quality of oil that can be processed. This implies that innovation in modern processing techniques of palm fruit has huge market potential for processors.

Generally, in Nigeria, small scale agricultural processors constitute about 90 percent of the farming households but processing rarely provides sufficient means of survival in many rural areas due in part to processing techniques and finance among other constraints (Abalu, 1986; Adesina, 1991; Owolarafe *et al.*, 2002, Umar, 2008). In the palm produce industry, more than 80 percent of Nigeria total output are contributed by these small scale processors (Orewa *et al.*, 2009). Although contributions of women are mostly neglected in agricultural engagements, most of these small scale processors constitute women and young people with positive entrepreneurial traits.

There is no doubt that women constitute majority of the farming population in rural areas, however, their contributions in relation to men are often not objectively assessed, commensurate, appreciated and documented (Abiola and Omoagbugan, 2001), giving rise to stereotype assumption on the contributions of men and women in agricultural production (Rahman, 2005). According to Unamma *et al.*, (2004), many constraints limit gender performance, participation and profit differential in oil palm processing due to techniques adopted. They posited that women have suffered adverse effect of globalization and liberalization than their male counterparts due to convergence of social-cultural, economic and political exigencies. They further observed that women are faced with problems of inappropriate technique that would suit their physique. This empirical fact has often stimulated the idea that the percentage of men in oil palm production and processing is greater than their female counterparts. Chukwu and Nwaiwu (2012) in their study, which evaluated gender participation in oil palm processing, found that processors level of involvement and profit differs depending on the operation *per se*.

Despite the crucial role women entrepreneurs play in the economic development of their families and countries, it is however, discovered that women entrepreneurs have low business performance compared to their male counterparts (Akanji, 2006). In many developing countries including Nigeria, among the poor, rural women are the poorest and more vulnerable.

Empirical evidence suggests that women in rural areas are more adversely affected by poverty than men (Prakash, 2003). However, some studies have shown that women create more enterprises than men (Mead and Liedholm, 1998; Godoy, 2005), in spite of the difficulties they

face. However, there are little or no studies comparing profits in activities carried out by gender, particularly in the area of processing oil palm. This study aims at closing the gap in literature. The objectives are to: estimate the profit between male and female processors in the study area; and compare the differences in profits between the male and female processors.

Methodology

This study was carried out in Abia state of Nigeria. The state belongs to the south eastern geopolitical zone of Nigeria. Abia state was carved out of Imo state in 1991 when nine (9) states were created by the then Federal Government of Nigeria. The state lies between longitude 7° 23' and 8° 02' E, latitude 5° 49' and 6° 12' N. It is bordered to the east and south east by Cross River and Akwa Ibom states. Anambra and Ebonyi states are on its north and north eastern sides respectively. It covers a land mass of about 7627. 20 square km (SLO, 2004) and has a total population of 2,833,999 (NPC, 2007).

The state is made up of 17 local government areas fused into three agricultural zones namely; Aba zone, Ohafia zone and Umuahia zone. It has tropical climate with two distinct seasons of rainy and dry seasons. The main crops in the state are: yam, cassava, rice, plantain, banana, maize, and cocoyam. While cash crops are oil palm, cocoa and rubber. The oil palm tree is dominant over several other plant species in the area hence the study area is often referred to as one of the oil palm belt in Nigeria (Onweremadu, 1994).

The study adopted a multi stage sampling procedures. Firstly, six local government areas, two (2) from each agricultural zone were purposively selected, because of the intensity of oil palm farming and processing in the local government areas of Obingwa and Ugwunagbo, (Aba zone), Bende and Ohafia (Ohafia zone) and Umuahia north and Ikwuano (Umuahia zone). Two villages were randomly selected from each local government areas making a total of 12 villages.

Based on the number and proportion of male and female processors in the villages, the oil palm processors were stratified along gender lines into male and female components. Ten respondents (five male and five female) who are oil palm fruit processors were randomly selected from each of the villages making a total of 120 respondents (60 male and 60 female). Data on variable cost such as cost of seed purchased, labour, firewood, transportation and fixed cost such as building, processing equipment was collected mainly through questionnaires administered to the respondents.

Analytically, the study employed multiple regression analysis to determine the factors that influence profitability along gender lines. Gross margin ratio was adopted to analyse cost and return analysis of the processors, while in comparison of the processors profitability, Paired Z-statistics was employed. These tools were adopted based on the characteristics of the variables of interest, objectives and consistency with the works of other authors such as Nwachukwu and Oteh, 2010; Nwaru and Iwuji, 2005; Agwu and Ibeabuchi, 2011. The empirical model specification of these tools is presented below:

Gross Margin Ratio

Gross Margin = Total Revenue (TR) – Total Cost (TC)

Net Revenue = Total Revenue (TR) – Total Cost (TC)

$$\text{Benefit Cost Ratio (BCR)} = \frac{\text{Total Revenue (TR)}}{\text{Total Cost (TC)}}$$

$$\text{The Gross Margin Ratio} = \frac{\text{Total Cost (TC)}}{\text{Total Revenue (TR)}}$$

Where:

TR = Total revenue = Sales of palm oil + Sales of palm kernel + Sales of palm nut + Sales of fibre

TC = Total Cost = Total Fixed Cost (TFC) + Total Variable Cost (TVC)

The Paired Z - statistic

$$Z = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where:

X_1 = Mean of profit for male respondents

X_2 = Mean of profit for female respondents

S_1 = Standard deviation of male respondents

S_2 = Standard deviation of female respondents

n_1 = Total number of male respondents

n_2 = Total number of female respondents

The empirical model for the regression is specified as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e_i$$

Where the dependent variables Y is the profit of palm oil processors (₦) and the explanatory variables are defined below. The explanatory variables constitute important factors that are consistent with *a priori* theoretical expectations and the results from previous empirical studies on factors that exert influence on gender practices and profitability (Okoye *et al.*, 2009; Ezeh, 2006; Esiobu and Onubuogu, 2014).

X_1 = Age (years)

X_2 = Education (years)

X_3 = Household size (number of persons)

X_4 = Marital Status (years)

X_5 = Years of experience (years)

X_6 = Income (₦)

X_7 = Total fixed cost (₦)

X_8 = Total variable cost (₦)

X_9 = Processing method (modern = 1, traditional = 0)

e_i = Error term (which is assumed to have zero mean and constant)

a = Constant term

b_1, \dots, b_9 = Coefficients of the variables.

Results and discussions

Estimates of cost and returns of male and female processors in Abia State, Nigeria

The estimate of the cost and returns on investments for both the male and female processors in the study area is presented in Table 1 below.

Table 1: Cost and returns analysis palm oil processors by gender in Abia state, Nigeria

Item	Value for Male (₦)	Value for Female (₦)
Total Revenue (TR)	92,842,000	47,590,750
Total Variable Cost (TVC)	15,599,450	8,607,980
Total Fixed Cost (TFC)	16,613,000	8,263,500
Total Cost (TC) = TFC + TVC	32,212,450	16,871,480
Gross Margin	77,243,550	38,982,770
Net Revenue	60,629,550	30,719,270
Benefit Cost Ratio (BCR) (TR/TC)	2.9	2.8
Gross Ratio (TC/TR)	0.35	0.36

Source: Field Survey Data, 2015

Results in Table 1 show gross margin ratio on cost and returns on oil palm processing among male and female palm oil processors. The result for males shows the revenue of ₦92,842,000 at the total cost of ₦32,212,450. The gross margin was ₦77,243,550 while the net revenue is ₦60,629,550. Palm oil processing in Abia state was profitable because the net revenue was positive and a Benefit Cost Ratio (BCR) of more than one (2.88). This study lends credence to a study by Onyebinama (2003) who reported that when project revenue is positive and benefit cost ratio is more than one, it implies that the project is viable. The result by implication means that for every ₦1.00 spent in processing palm oil in Abia state among male processors, a profit of ₦2.9 was realized. Also the Gross Ratio (GR) was 0.35 which implies that for every ₦1.00 return on palm oil processing, the venture incurs ₦0.35 expenses.

The result of cost and returns on oil palm processing among female palm oil processors indicated that a revenue of ₦47,590,750 and a total cost of ₦16,871,480. The gross margin was ₦38,982,770 while the net revenue was ₦30,719,270. The result showed that like the male processors, palm oil processing in Abia state, Nigeria was also profitable. The result implies that every ₦1.00 spent in processing the fruit in Abia state among the female processors ₦2.8 was realized. Also the Gross Ratio (GR) was 0.36 which implies that for every ₦1.00 return to the venture, ₦0.36 was spent. Although the venture is profitable for both male and female processors, the difference lies in the magnitude of business carried out by gender. It could be argued that the male processors are less efficient than their female counterparts given the infinitesimal difference in their cost benefit and gross ratios. The higher fixed cost for male processors which culminated in large total cost have serious implications on further profit and may affect its ability to meet certain debt obligations as they fall due in the long run.

Paired differences in profit between processors (male and female) in Abia State, Nigeria

The results in Table 2 show that there was a significant difference between the profit of the male processors and female processors, given that the mean value of male processors was more than that of female processors. This implies that the male processors make more profit than their female counterparts. This result is without prejudice to the meaningful contributions of female farmers to global food security. The mean difference of 4.1913E5 between them could be due to the fact that the women processors do not possess equal opportunities in terms of access to allocative and productive resources such as human capital in the form of managerial and

technical skill; which impinge upon their overall efficiency. Beside these, are long held cultural, social tendencies and technological developments in many countries that create unequal opportunities such as less access to institutional services. Prakash (2003) and Unamma *et al.*, (2004) have shown that women are more adversely affected by poverty than men in the rural areas given mirage of these challenges they face even in appropriate techniques which do not suit their physique.

Table 2: Paired differences in profit between male and female processors in Abia State, Nigeria

	Mean	N	Std. Deviation	Std. Error Mean	95 % Confidence Interval of the Difference		Z	df	Sig. (2-tailed)
					Lower	Upper			
Male	9.8345E5	60	8.98719E5	1.16024E5					
Female	4.1913E5	60	1.15898E6	1.49623E5	1.9738E5	7.18530E5	2.801***	59	.007

Source: Field Survey Data, 2015

*** Denotes 1% Level of Significance

Poverty and other uncontrollable factors affect their inability to afford and adopt current innovations that will increase their overall performance. This finding is in consonance with those of Loscocco *et al.*, (1991) and Unamma *et al.*, (2004). This finding highlights implications of socio-cultural, institutional and political factors on the struggles for gender equality in most societies across the world especially in most developing countries where these factors converge to create unequal access between male and female and thus widening inequality in our societies.

Determinants of profit for male and female processors

The results above have shown a wide profit margin between male and female processors. Although, one may infer the reasons, but it becomes pertinent to establish the peculiar factors that determine profit along gender lines. The result of the multiple regression is presented in Table 3. Linear functional form was chosen as the lead equation based on established econometrics criteria such magnitude of R^2 and significance and appropriateness of regression coefficients (Gujaranti, 1995). The result is presented in Table 3.

The strength of the regression model and result lies in the fact that the coefficient of multiple determinations (R^2) was 0.604 and 0.968 respectively for male and female palm oil processors. This implies that 60.4 and 96.8 percent variability in the output of palm oil was explained by the model, while the remaining for instance 39.6 percent for male could be attributed to error and omitted variables. In addition, the F-value was significant at 1 percent level which implies that the model is adequate for use in further analysis and it indicates a requirement of best fit.

With regards to male processors, the result showed that only processing method was positive and statistically significant at 1 percent probability level. This result justifies the significant value of innovation on productivity and agricultural value addition along the value chain. It means that as the adoption of innovative technologies increases, the propensity for improved profit is expected. This is because technology offers several possibilities for cost and time saving advantages, reduce drudgery, as well decrease the cost of labour and increase productivity. Omoti (2001) had opined that Nigeria has enormous potential to increase her production of palm oil and palm

kernel primarily through application of the improved processing technique. Given this assertion the result is plausible.

Table 3. Multiple regression analysis for palm oil processors by gender in Abia State, Nigeria

Variables	+ Linear (Male)	+ Linear (Female)
Constant	254334.879 (0.519)	152012.880 (1.428)
Age (X_1)	-2651.059 (-0.217)	-743.977 (-0.295)
Educational status (X_2)	2714.298 (0.163)	-2983.143 (-0.675)
Household size (X_3)	-48858.447 (-1.271)	-3439.443 (-0.441)
Marital status (X_4)	201263.157 (0.654)	-59278.790 (-1.193)
Years of experience (X_5)	9719.601 (0.849)	300.302 (0.160)
Income (X_6)	0.191 (1.549)	0.970 (14.621) ***
Total Fixed Cost (X_7)	0.58 (0.126)	-0.997 (-5.389) ***
Total Variable Cost (X_8)	0.753 (1.733)	-0.956 (-5.354) ***
Processing Method (X_9)	605969.252 (2.541) **	20911.281 (0.283)
R^2	0.604	0.968
F-ratio	8.489 ***	170.336 ***

Source: Field Survey Data, 2015.

Note: Figures in parenthesis are t-values, while *, **, *** are statistically significant at 10, 5 and 1 percent respectively

For the female processors, income was significant at 1 percent probability level with a positive coefficient. This implies that an increase in income would lead to an increase in output of palm oil, which would also lead to an increase in profit of the female processors. Higher income will enable the processors purchase modern technologies, which have the propensity to increase their performance and by extension expansion of their business. Agwu and Ibeabuchi (2011) opined that income is a positive stimulus in any business and leads to increase in quantity traded and thus expansion of the enterprise. This result is consistent with Ezech (2006) who had a similar result.

Total fixed cost and total variable cost were significant at 1 percent probability level but with a negative coefficient. This result is in line with *a priori* expectation. It implies that as cost increases, the profit level of the female processors decreases. Increasing cost would lead to expenditure that would have been used as profit. Nweke *et al.*, (2005) opined that fixed cost affects the profit of most crops and livestock enterprises especially in the short run planning period. This corroborates with Ohajianya *et al.*, (2010) that high cost of inputs would lead to reduction in output and income generated.

These results have several implications on management of any business. The infinitesimal difference in gross margin and cost benefit ratios highlights the importance of effective management of both fixed and variable costs. Although the result highlights better results (profits) of men in palm oil processing, it nevertheless established that female processors ingenuity in managing limited resources and could do better if given access to more capital to boost their level of operations. Again, the result shows that the percentage of expenditure as represented by the fixed and variables costs of male and female to revenue presents a huge gap which means that females are better manager of resources because they pose good management skills naturally. According to Gallup/State of American manager report, women are more engaged with their employees than their male counterparts.

Conclusion and recommendations

This study analyzed the gender differentials in profit among palm oil processors in Abia state, Nigeria. Specifically, it estimated the profit between male and female processors and compared the differences in profit between the processors (male and female). The result showed that male processors made more profits than the female processors and also there was a statistical difference between their profits. The study therefore recommends that, women should be given necessary assistance in their processing and other related activities by relevant government agencies. Such assistance could be in the form of credit to enable them to expand their businesses and acquire modern tools required for their processing and thus increase profits. This study will serve as a gap bridging effort to removing barriers that create unequal opportunities for both genders as a measure to enhance overall efficiency in business practices.

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