DETERMINANTS OF NET RETURN AMONG BUSHMEAT MARKETERS IN JOS METROPOLIS, PLATEAU STATE, NIGERIA

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ABSTRACT

The bushmeat trade is perceived as a major threat to wildlife population in the tropics, thus, the bushmeat is a common source of income for households all along the supply chain, from the hunter to urban markets and food stalls, and it provides meat for both urban and rural families. This study examined the bushmeat marketers' net returns determinants in Jos Metropolis, Plateau State, Nigeria. A multi - stage sampling procedure was used to select the 65 bushmeat marketers. Primary data were collected with the use of structured questionnaire and oral interview. Descriptive and multiple regression analysis were used to analyse the data collected from bushmeat marketers. Results showed that the majority of the respondents were female (92.3%), married (75.4%), had a secondary school certificate (64.6%) and had less than 6 years of experience in bushmeat marketing (87.7%). The mean age, experience in bushmeat marketing and household size were 38 years, 4 years and 8 persons respectively. The average monthly net return on bushmeat marketing was ₦44,750. The double-log function fitted to explain net return relationship between the average net return of bushmeat marketers per month and their socioeconomic characteristics revealed that the age, marketing experience, transportation cost, tax and selling price for fresh bushmeat were found to be significant positive determinants of bushmeat marketers' net return in the study area. The most severe constraint of bushmeat marketing in the study area was the low demand by customers to buy bushmeat (2.42). The study concluded that bushmeat marketing is profitable thereby enhanced the income of the bushmeat marketers.

Keywords: net return, bushmeat, marketers, multiple regression

Introduction

The term "bushmeat" often refers to wild meat (Van Velden *et al.,* 2020). Many types of wild animals, including rats, antelopes, monkeys, and insect larvae, are used as food sources. In terms of nutrition, bushmeat is a significant source of protein for people. It is also high in vitamins, minerals, and crucial omega-3 fatty acids (Chausson *et al.,* 2020). Bushmeat is sometimes bought and consumed as a luxury good or delicacy on rare occasions. The sale of bushmeat contributes significantly to human livelihood and gives money to several individuals, including hunters, dealers, and transporters in both urban and rural locations (Stone and Stone, 2022). In several African nations, the trade in wild animal goods, particularly bushmeat, has been proven to generate foreign exchange, greatly boosting the national economy and creating work for a large number of people (McNamara *et al.,* 2019). Selling bushmeat might be a way for traders to make money, particularly in Nigeria (Babalola, 2023).

Wild animal hunters used to hunt for domestic food in the past. Nowadays, hunting is seen as a successful industry, with a significant number of hunters actively

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promoting their prey (Von and Allen, 2021). The business' earnings are occasionally used to buy fish, which is a less expensive kind of protein, and the remaining funds are utilized to buy other essentials for the family (Oduntan *et al.,* 2018). Without a doubt, bushmeat contributes to economic growth, creates job opportunities, and provides additional protein for dietary needs. According to Espinosa *et al.,* (2020), the provision of bushmeat from wild sources might be used as a potential strategy to close the gap between the expansion of the human population and livestock output. This implied that the marketing of bushmeat can be crucial in supplying hunters and other stakeholders along the value chain with their basic needs (Van Vliet *et al.,* 2019).

In order to increase the worth of the bushmeat products, bushmeat merchants and intermediaries move along the path of supply from hunters to consumers (Mozer and Prost, 2023). Prices vary from one stakeholder to the next in line with this. For sellers of bushmeat and other related goods, these businesses offer a broad variety of transaction networks and returns, inevitably supporting live (Sas-Rolfes *et al.,* 2019). Bushmeat trade have been found to contribute significantly to the national economy and providing jobs for a number of people in the country (Layade, and Layade, (2020). Marketing of bushmeat could be a means of income generation which could enhance improvement in the livelihood of the traders especially in Nigeria. The study therefore examined the bushmeat marketers net returns determinants in Jos Metropolis, Plateau State, Nigeria with a view to describe the characteristics of bushmeat marketers, determine the factors influencing bushmeat marketers net returns and assess the constraints of bushmeat marketing in the study area.

Methodology

Study Area

The study area was carried out in Jos metropolis, Plateau State, Nigeria. It lies within latitudes 9°45′N to 09°57′N and longitudes 8°48′E to 8°58′E. It covers an area of 249.7km². It has a population of 1,387,785 based on the 2021 Population projection. The mean annual temperature is about 20˚C and 26˚C. The study area is known for its cattle, goats, poultry and fish farming on a smaller scale.

Sampling procedure and Data collection

A multi - stage sampling procedure was used to select the respondents. The first stage involved identification of markets where bushmeat are been sold. Following this five bushmeat markets were selected from 8 identified markets where bushmeat are been sold using simple random sampling method. Following this, a disproportionate selection of a total of sixty-five (65) marketers were interviewed due to the limited marketers of bushmeat in the study area. A structured questionnaire with open and closed ended questions were administered in selected markets where bushmeat are sold in the Jos Metropolis. The result was analyzed with descriptive statistics (frequency counts, percentages and mean) and inferential statistics (Multiple regression analysis).

Thus, the net return (NR) of bushmeat marketers is given as the total revenue (TR) of bushmeat marketers minus the total marketing cost (TMC) of bushmeat marketers

That is, $NR = TR - TMC$ …(1)

To identify the challenges faced in bushmeat marketing, the marketers were asked to indicate the severity of each constraints identified on 3- a point scale of very severe = 3, severe = 2 and not severe = 1 respectively. The mean score analysis used the Likert-type rating scale as the measurement tool.

Multiple regression was used to examine the determinants of net return among bushmeat

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marketers in the study area. The models to be used are given below;

Implicit form:

$$Y = (X_1, X_2, \ldots, X_{11}, X_{12} + e) \quad \ldots(2)$$

Linear function:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \cdots + b_{12} X_{12} + b_{13} X_{13} + e \quad \ldots(3)$$

Semi-log function:

$$Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \cdots + b_{12} \log X_{12} + b_{13} \log X_{13} + e \quad \ldots(4)$$

Double-log function:

$$\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \cdots + b_{12} \log X_{12} + b_{13} \log X_{13} + e \quad \ldots(5)$$

Where Y = Net return (₦)
X_1 = Purchase price (₦)
X_2 = Process cost (₦)
X_3 = Age of respondents (Years)
X_4 = Household size (Members)
X_5 = Marketing experience (Years)
X_6 = Years of education (Years)
X_7 = Transportation cost (₦)
X_8 = Union fees (₦)
X_9 = Selling price for fresh bushmeat (₦)
X_{10} = Tax (₦)
X_{11} = Shop Rent (₦)
X_{12} = Selling price processed bushmeat (₦)
X_{13} = Marital status (married= 1 and non-married= 0)
b_0 = Constant term
e = Error term

Results and Discussion

Characteristics of the respondents

The result in Table 1 revealed that the majority of the respondents (92.3%) were females. This less involvement of males could be attributed to the fact that in most cultures and traditions, women are the marketers while the men are hunters, farmers etc. This agreed with Babalola (2023) and Adebowale *et al.* (2021) who reported that the majority of the bushmeat marketers were females. This implied that females are more active in the bushmeat trade. The result showed that the respondents' mean age was 38 years. This implied that young and active women engage in bushmeat marketing thus, age could to some extent determine the strength and experience of marketing goods. The finding was similar to the result of Ngolela et al. (2019) and Layade *et al.,* (2021) that the respondents were within active age. It was revealed that 75.4% of the respondents are married. This means that married women engage in the bushmeat trade to support their families. It could be explained that these married women sell bushmeat to sustain their families as it generates enough income.

The finding is in line with the results of Layade and Layade, (2020); Jamwal, and Phulia, (2021) which stated that the majority of the respondents had families with the burden to cater for them. The level of education of the respondents indicated that they are all literate. This implied that better-educated marketers also can understand, appreciate, and respond to market trends. This study agreed with Campos-Silva *et al.,* (2021) that education possesses the ability to participate effectively in livelihood enhancement strategies and empowerment programme decisions that will ensure sustainable conservation of natural resources while also meeting their livelihood needs. The result revealed that the respondents with less than 6 years of experience in bushmeat marketing has the highest (87.7%). This implied that most bushmeat marketers are not new to the system of marketing activities and had acquired experience in the trade which enables them properly manage the marketing business (Sun and Yen, (2022). This study agreed with the results of Sackey, *et al.,* (2022) indicating their acquisition of experience over time. The results revealed that mean of the household size was 8 persons. This study agreed with the results of Jacob, *et al.,* (2020) that the marketers found it difficult to cater for the family's needs due to low income as the bushmeat market declined.

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Table 1: Socio- Economic Characteristics of Bushmeat Marketers

Characteristics	Variables	Frequency	Percentage
Sex	Male	5	7.7
	Female	60	92.3
	Single	9	13.8
Marital status	Married	49	75.4
	Separated	1	1.5
	Others	6	9.2
	Primary certificate	7	10.8
Education	Secondary certificate	42	64.6
	Tertiary certificate	16	24.6
	Hunting	3	4.6
	Trading bushmeat	39	60
Major occupation	Food seller	2	3.1
	Teacher	5	7.7
	Others	16	24.6
	<30	7	10.8
Age (Years)	30-39	31	47.7
Mean = 38±7.15	40-49	23	35.4
	>=50	4	6.2
Household size (Household members)	<=6	9	13.8
Mean = 8±1.58	>=7	56	86.2
Bushmeat marketing experience (Years)	<=6	57	87.7
Mean = 4±2.65	>=7	8	12.3

Net return of bushmeat marketers

The result in Table 2 revealed that the total cost of bushmeat marketing which includes the variable and the fixed cost. The variable cost includes transportation cost, firewood cost, charcoal cost, kerosene cost, union fee and tax, while the fixed cost (depreciated) includes shop rent, knife, wire mesh, bowl and cutlass. The average monthly total variable cost of bushmeat marketing was ₦10,460 per marketer. The average monthly total fixed cost for bushmeat marketing was ₦15,130 per marketer. The average monthly total revenue of bushmeat marketing was ₦70,340 per marketer.

The average monthly total marketing cost of bushmeat marketing was ₦25,590 per marketer. The average monthly net return on bushmeat marketing was ₦44,750 per marketer. The result presented implied that the bushmeat marketing is profitable in the study area. This study agreed with Malik *et al.* (2019) that there is high income from the sales of bushmeat.

Table 2: Average net return of bushmeat marketers per month

Variable	Mean value in Naira per month
(A) Total Revenue	70,340
(B)Total Variable Cost	10,460
(C) Total Fixed Cost	15,130
(D) Total Marketing Cost (B+C)	25,590
(E) Net Return (NR) = (A-D)	**44,750**

Determinants of net return among bushmeat marketers

The result in Table 3 revealed the three functional form of the regression model. The double log was selected as the lead equation based on the number of significant variables and the highest R^2 value, thus providing the best fit. The R^2 value of 0.99 indicated that 99% of the observed variations in the determinants of net return among bushmeat marketers were due to the independent variables. In this study, the significant variables that determine the net return among

marketers were; age, household size, marital status, years of experience, transportation cost, tax and selling price for fresh bushmeat.

The estimated coefficient of the age of respondents (0.011) was positive and significant at a 1% level of probability. This positive sign meant a direct relationship. This implied that as the age of the respondents' increased they tend to be active in marketing activities; this in turn increased the net return of the respondents. This study agreed with the results of Dell, *et al.,* (2020) that being active and productive is associated with age which could also translate to higher earnings from bushmeat business activity.

The coefficient of the household size (numbers) of the respondents (0.002) was negative and significant at a 5% level of probability. This implied that an increase in the household size of the respondents would reduce the net return by increasing the expenditures of the respondents. This agreed with the results of Walelign *et al.* (2019) that because of the large family, by implication, the respondents would have many dependents to take care of, thereby increasing their household per capita expenditure.

The coefficient of the marital status of the respondents (-0.187) was negative and significant at a 10% level of probability. This implied that increase in marital status of respondent reduced the net return of bushmeat marketers because married respondents have more dependents or responsibilities which they feed. This agreed with the findings of McNamara, *et al.,* (2019) that larger family sizes appeared to generate the need for income.

The estimated coefficient of the years of experience of respondents (0.099) was positive and significant at a 10% level of probability. This implied that the higher the years of experience, the easier for a marketer to generate more income which enhance increased net return. This agreed with Ntuli *et al.* (2020) that marketing improvement could arise from the fact that the experience in bushmeat sales enhanced the acquisition and development of relevant skills in the trade and this situation may give marketers an advantage regarding the marketing of bushmeat such as obtaining higher returns which will translate into more income.

The estimated coefficient of transportation cost of the respondents (0.107) was positive and significant at a 10% level of probability. This implied that the higher the transportation cost, the higher the cost of selling the bushmeat thereby it increased the net return of the respondents (Chausson, *et al.* 2019).

The estimated coefficient of tax paid by the respondents (0.975) was positive and significant at a 1% level of probability. This implied that when tax increases, the price of selling bushmeat increases thereby increased the net return of bushmeat marketing.

The estimated coefficient of the selling price for fresh bushmeat (0.714) was positive and significant at a 1% level of probability. This implied that when the selling price of fresh bushmeat increases, the selling price of processed bushmeat also increases thereby increasing net return (McNamara *et al.* 2019 and Ngolela *et al.* 2023).

Table 3: Determinants of net return among bushmeat marketers

Variables	Linear		Semi-log		Double-log	
	β	t-value	β	t-value	β	t-value
Constant	11.459	1.135	-17.402	-3.568	1.144	86.121
Age	-3.846	-0.261	1.716	1.174	0.011***	5.874
Household size	-1.261	-0.237	-0.345	-0.320	-0.002**	-2.409
Marital status	-0.813	-0.726	-7.384	-1.017	-0.187*	-1.783
Years of schooling	1.710	0.466	1.493*	1.665	0.525	1.087

Marketing experience	5.872	1.537	4.542	1.054	0.099*	1.978
Processing cost	-1.007*	-1.862	-7.855	-1.138	-0.023	-0.316
Rent	-0.759***	-2.787	-17.690**	-2.260	-0.038	-1.047
Transportation cost	-0.057	-0.117	-2.553	-1.058	0.107*	1.669
Union fee	12.299	0.910	0.458	0.190	0.103	0.579
Tax	0.814*	1.728	0.887***	2.825	0.975***	3.457
Purchase price	2.628***	10.988	6.251***	11.760	0.138	0.438
Selling price for fresh	0.226	0.656	1.690*	1.682	0.714***	2.912
Selling price for processed	0.138	0.758	2.574	0.288	-0.135	-0.565
F-value	18.02		15.11		54.191	
Prob > F	0.000		0.000		0.000	
R-squared	0.81		0.78		0.99	
Adj R-squared	0.76		0.73		0.95	

Note: ***, **, * are *significant at 1%, 5% and 10% respectively at level of significance*

Constraints of bushmeat marketing

The information on constraints of bushmeat marketing are presented in Table 4. The study revealed that the low demand by customers to buy bushmeat (2.42) constituted the most severe constraint of bushmeat marketing in the study area. However, low pricing by customers (2.38), high cost of transportation (2.35), inadequate finance to do the bushmeat business (2.28) and lack of storage facilities (1.71) were other constraints limiting the bushmeat marketers. These could have improved their income and further enable a better livelihood (Van Gils *et al.,* 2019; Walelign *et al.,* 2019 and Lawlor *et al.,* 2020).

Table 4: Constraints of bushmeat marketing

Constraints	Mean	Ranking
Low demand by customers	2.42	1st
Low pricing	2.38	2nd
High Transportation cost	2.35	3rd
Inadequate finance	2.28	4th
Lack of storage facility	1.71	5th

Conclusion

This study has shown and provided additional insights into the bushmeat marketers' current average monthly net return and its relationship with their characteristics. In consequence, net return indicators showed that bushmeat marketing is profitable and this could improve bushmeat marketers' households' income. It was nonetheless concluded that bushmeat marketers' age, household size, marital status, years of experience, transportation cost, tax and selling price for fresh bushmeat are the major determinants of bushmeat marketers' net return in the study area.

Based on this, it is necessary to seriously promote the domestication of fast-growing wild animal species in order to prevent potential over-exploitation as well as to make them readily available for marketing and consumption in order to achieve an optimal profitability for bushmeat sales relative to the contributing factors of bushmeat marketers' net return in the study area.

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