Econometric Analysis of the Characteristics Cattle Purchased at Mubi – South (Tike) Market, Adamawa State

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Abstract
The study was conducted at the Mubi – South Local Government Area cattle market (Tike) in June, 2021. The specific objectives of the study were to; describe the socio-economic characteristics of the cattle buyers, identify and assess physical characteristics that are predominant in the cattle sold in the market, determine the physical quality characteristics of cattle that influence buyers preferences and price of cattle in the market and identify the general problem associated with cattle marketing in the study area. Purposive and simple random sampling techniques were used to select 200 respondents in the market, while structured questionnaire was used to elicit the data. The data generated was subjected to analysis using descriptive statistics (frequency counts and percentages) and inferential statistics (hendonic regression analysis). The result reveals that all the buyers are males, about 37% aged between 41 -50 years, majority (80%) were married, majority (70%) had secondary education and purchased medium sized cattle's, 40% purchased cattle that are above 300kg and of medium height (2.6-3.0 meters). Also, 30% had between 16 – 20 years of marketing experience and 25% has more than ₦300, 000 as weekly operating capital. The result further reveals that, physical characteristics of cattle such as size and weight were significant at 1% alpha level of significance, while length is significant at 5% and height is significant at 10%. The sex and breed were not significant. The study therefore, concludes that, cattle producers should pay attention to size, weight, length and height of cattle since buyers attached premium to them. The study recommended that, facilities for measuring weight, height and length should be installed in all the cattle market to facilitate effective and efficient measurement to achieve standardization and pricing policy, cattle farmers should be sensitized by extension agents and non – governmental organization (NGOs) etc. on basic physical characteristics of cattle which buyers prefer and attach premium. Cattle farmers should also be encouraged to form co-operative societies to pull their strength together to generate economic and political power to minimize some of their challenges.

Keywords: econometric, analysis, cattle, characteristics, purchased, market

Introduction
Cattle play a major social and economic roles in African societies in terms of food security and income generation (Babale, et al. 2012). Cattle and other small ruminants play significant roles in religious perspectives because they are normally slaughtered during the sallah, christmas and easter periods. The growing demand for meat and meat products from city dwellers also present opportunities and improved market for cattle producers which marketing actors need to grab by supplying the right type of cattle, at the right time, place and affordable price (Thallafa, 2019, Babale et al. 2012).

A large percentage of rural people in West Africa are involved in livestock production which includes the rearing and marketing of cattle. Over 80% of the West African livestock population, especially cattle are in traditional herds and remain the most prominent of all domesticated animals in West Africa. They are owned mostly by pastoral ethnic groups such as the Fulani, Hausa, Kanuri and Tuareg, generally located in the northern grasslands and Saharan regions or dry areas (Ikeme, 1990; Ba, 1994; .Jewe 1995; Tamboura, et al. 1998, Oseyola and Olujide, 2000).

The pastoralists were thought to have arrived Nigeria around the thirteenth or fourteenth century, migration feast from Senegambia region (Bleach,

1994). Since, then, Cattle production leand itself to small, medium and large scale production (Ikpi, 2012). According to Sonaiya (2010) families employ various but largely extensive management systems to take advantages of common villages resources to produce cattle. Therefore, cattle production is predominantly under traditional system.

The traditional cattle production is based on free natural pasture grazing, crop residues and little or no supplements, which is becoming increasingly problematic whereas the intensive cattle production whereby the animals are confined to small area of land and fed-ad-libtum with certain livestock feeds within a certain time period is therefore becoming increasingly necessary. The implication is that, the intensive cattle production is coming with it consequences of additional expenditure of keeping animals under confinement (cost of feed, water, medication), etc. These cost implication need to be matched with corresponding revenue and profit components. Suggesting that, cattle production might no longer be business usual, therefore certain specifics need to be done, which includes understanding the physical characteristics of cattle that attract customers and serve as incentives to price, revenue and profit which cattle producers should pay attention to while raising their animals for market because modern marketing concepts requires that products should be consumer/ customer oriented, implying that, consumer preference must be taken into consideration and attended to for maximum satisfaction to be strike between the producers and buyers. The understanding that most studies in the area on cattle is on production systems, cost and benefit of cattle production and general marketing such as margins, structure, conduct and performance has necessitated this study on physical characteristics of cattle which consumers prefer / consider when purchasing cattle and how they attached premium to these characteristics which at the moment there is little or scanty knowledge in the study area, understanding this can improve marketing conduct and performance in the area, through inculcating standards, buying of cattle without physical presence of a buyer, and thereby simplify marketing process, more especially during tight circumstances such as COVID 19 lock – down which made physical travelling difficult.

Specifically this study examined the socio – economic characteristics of buyers or consumers of cattle in the study market, identified and assess physical characteristics that are predominant in the cattle sold in the study market, determined the physical quality characteristics of cattle that influence buyers or consumers preferences and price in the study market and identified the general problems associated with cattle marketing in the study market.

Methodology
Study Area
The study was carried out in Mubi cattle market (Tike). The market is located in Mubi – South Local Government Area (LGA) (lat. $10^o06'$-$10^o29'$. Long. $13^o07'$-$13^o30'$E which is one of the twenty – one LGAs in the State with land area of about 515.99km^2 with annual average temperature (max.30.2^{0}Cand min 16.7^{0}C.) while average annual rainfall in the area is 918mm. it has a population of 184,048 and a density of 355 (Zemba et al., 2020).

The Local Government shares boundary with Cameroun republic to the east, Mubi – north to the north and Maiha local government area to the west and all these are important cattle production areas, indicating source of cattle supply to the market.

Sampling Techniques.
The market was purposively selected because, it is one of the major rural bulking market for cattle and other small ruminants (sheep and goats) in Adamawa State.

Sample Size
Information from the revenue unit of the market and informal informants from the market, reported that about 2000 cattle were marketed on weekly basis. A sample of 50 cattle sold in the market were randomly selected on weekly basis and this was consecutively carried out for four (4) weeks. This study was done specifically in June, 2021.

The study consider only one transaction from a buyer, this brought a total number of sampled buyers and cattle's to 200 respectively.

Table 1: Distribution of sampled cattles and buyers

Weeks	Number of cattle sold	Sample size
1	2050	50
2	2010	50
3	2100	50
4	2080	50
Total	8240	200

Source: Field survey, 2021

Table1: shows sampling distribution of cattle buyers at the Tike market Mubi-South local government area. It shows that averagely 2000 cattle were marketed weekly. However, 50 cattle were sampled weekly using the list of cattle buyers in the market. One cattle is considered per buyer per week. This gave total of 200 cattle sampled for the study.

Data Collection / Instrument
Structured questionnaires, oral interviews together with physical examination/ and measurement of physical characteristics of cattle sold in the study market were used to generate information. In essence the data was sourced primarily.

Data Analysis
Descriptive statistics (means, frequency distribution and percentages) and Hedonic regression were used to analyze the data generated.
The Hedonic model used is mathematically expressed as follows:

$$P_g = \sum_{j=1}^{m} X_{g.gj} \ P_{g.gj} - - - - - - - - - (1)$$

Where

P_g = price of the cattle

$X_{g.gj}$ = Quality characteristics of cattle

$P_{g.gj}$ = Implicit price of the characteristics of the cattle

Adopted from Wooldridge 2000 and Musa, 2003.

The ordinary least square (OLS) estimate was adopted in the regression analysis. The price paid for cattle was the dependent variable while the identified physical characteristics of the cattle were the independents variables and are specified in the general model below:

$$Y = f(X_1, X_2, X_3, X_nU)--------------------------(2)$$
Where:
Y = Price paid for the cattle
f = functional notation
$X_1 --- X_n$ = Independent or explanatory variables
U = Error term
The functional linear form of the model on a more specific note, is as follows:
$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U$$
(---3)
Where
Y = price paid for cattle
a = the intercept
b = the coefficient of X
X_1 = breed of the cattle
X_2 = sex of the cattle
X_3 = size of the cattle
X_4 = weight of the cattle
X_5 = height of the cattle
X_6 = length of the cattle
U = Error term

Results and Discussion
Socio-economic characteristics of cattle buyers in the study market

Table 2: Distribution of socio – economic characteristics of cattle buyers in Mubi cattle market (Tike).

Variables	Frequency	Percentage
Gender composition		
Male	200	100
Female	-	-
Total	**200**	**100**
Age class (years)		
≤ 20	10	5.0
21 – 30	30	15.0
31 – 40	60	30.0
41 – 50	75	37.0
> 50	25	12.5
Total	**200**	100.00
Marital status		
Married	160	80
Single	40	20
Divorced	-	
Total	**200**	100.00
Level of education		
Quranic	40	20
Primary	50	25
Secondary	35	17.5
Tertiary	15	7.5
Adult literary	10	5
Total	**200**	100
Marketing experience (No. of years)		
≤ 10	25	12.5
11 - 15	45	22.5
16 – 20	60	30.0
21 – 25	50	25.0
26 - 30	20	10.0
> 30	10	5.0
Total	**200**	100
Family size (No. of persons)		
≤ 5	20	10
6 – 10	60	30
11 - 15	40	20
16 – 20	30	15
21 – 25	25	12.5
26 - 30	10	5
> 30	50	2.5
Total	**200**	100
Capital base (₦)		
≤ 100,000	10	5
101,000 – 150,000	20	10
151,000 – 200,000	20	10
201,000 – 250,000	25	12.5
251,000 – 300,000	30	15.0
301, 000 – 350,000	50	25.0
> 550,000	45	22.5
Total	**200**	100
Monthly income level (₦)		
≤ 100,000	8	4
101,000 – 150,000	22	11
151,000 – 200,000	30	15
201,000 – 250,000	-	-
251,000 – 300,000	35	17.5
301, 000 – 350,000	40	20.0
> 350,000	55	27.5
Total	**200**	100

Source: Field survey, 2021

Table 2 present results on Socio – economic characteristics of cattle buyers in the study market. It shows that all the cattle buyers are males. This implies that women are not physically engage in cattle buying. This could be because of the tedious nature of the business which made it non attractable to women. It could be also due to culture and religion believe which does not allow women to engage in purely out-door activities because purdah is encourage.

Table 2 also present result on age distribution of the respondents, it shows that majority (37%) of the respondents were within the brackets of 41 – 50 years. This shows that they are at their active stage and have the needed energy to put on the business.

The result on marital status of the respondents is presented in Table 2. It shows that majority (80%) of the respondents were married. This shows that they are matured enough to take good decision and pay attention to the business due to family responsibility. As a married person you may wish to take care of your family and therefore will take any income generating activities serious.

Result on educational background of the respondents is presented in table 2. It shows that majority (25%) attended primary school, 17.5% attended secondary school with only 7.5% that attended tertiary institutions. This shows that, educational attainment of the respondents is not high.

Table 2 present result on marketing experience of the respondents. It shows that, majority (30%) have between 16 – 20 years of experience on the business, 12.5% had less than 10 years of experience with on 5% that had more than 30 years of experience.

Result on family size of the respondents was presented in Table 2. It shows that majority (30%) have between 6 – 10 members in their family, 10% have less than 5 members with only 2.5% that have more than 30 as members of their households. This shows that they have few members in their household.

Table 2 present result on capital base of the respondents. It shows that, majority (25%) operate with a capital base of between N301, 000 - 350,000. 23% operate with more than n350,000 while only 5% operate with less than N100,000. This shows that cattle marketing requires large amount of capital to operate.

Result on monthly income of cattle marketers in the study market was presented in Table 2. It shows that majority (20%) of the marketers generate a monthly income from cattle business in the range of N301, 000 to N350, 000. This shows that cattle business is lucrative.

Physical characteristics of cattle sold in Mubi cattle market (Tike).

Table 3: Distribution of physical characteristics of Cattle sold in Mubi Cattle Market (**Tike**)

Variables	Frequency	Percentage
Breed		
Red bororo	110	55
Bokologi	60	30
Ndaama	30	15
Total	**200**	100
Sex		
Male	160	80
Female	40	20
Total	**200**	**100**
Size		
Small	20	10
Medium	140	70
Big	40	20
Total	**200**	100
Weight (kg)		
Very light 200	20	10

Light 201 – 250	40	20
Medium 251 – 300	50	25
heavy 301 – 350	80	40
Very heavy > 350	10	5
Total mean	**200**	100
Length (m)		
Very short < 2	10	5
Short 2.1 – 2.5	30	15
Medium 2.6 – 3.0	80	40
Long 3.1 – 3.5	40	20
Very long 3.6 – 4.0	20	10
Total	200	100

Source: Field survey, 2021

Table 3 present result on physical characteristics of cattle sold in Mubi –south Tike market. It shows that majority (55%) of the breed of cattle sold in the market were Red bororo, followed by Bokoloji (30%), and Ndama (15%). This shows that the most breed marketed was Red Bororo.

The result on the sex of cattle sold in the market was presented in Table 3. It shows that majority (80%) of the cattle marketed were males (Bulls) while the remaining females (cows). This shows that most of the cattle marketed in the marketed were the bulls.

Result on the size of cattle marketed in the study marketed was presented in Table 3. It shows that, most (80%) of the cattle marketed were the medium size. This shows that, based on physical observation majority of the cattle marketed fall on the medium size category.

Table 3 present result on weight of cattle marketed in the area. It shows that, majority (40%) of the cattle marketed in the market fall under the category of 301 – 350kg live weight. This was possible when weighing scale was introduced. The weight were classified based on the kilograms 200kg as very light, 201 – 250 kg as light, 251 – 300kg as medium, 301 – 350kg as heavy, while 350kg and above as very heavy.

Result on length of cattle marketed in the area was presented in Table 3. It shows that majority (40%) of the cattle marketed fall under the category of medium (2.6 – 3.0 m). this was possible with the use of measuring tape. Based on the classification less than 2m was considered very short, 2.1 – 2.5 short, 3.1 – 3.5 long, while 3.6 – 4.0 very long.

Quality characteristics of cattle that influenced buyers in the market

Table 4: Results of estimated Hedonic Regression of physical characteristics that influence buyer choice and price for cattle in Mubi cattle market (**Tike**).

Variable	Standardized coefficient	Standardized error	T-ratio	P – value
Constant (a)	5.644	0.266	30.272	0.000
Breed (X1)	0.121^{NS}	0.134	0.366	0.949
Sex (X2)	-0.131^{NS}	0.042	0.713	0.659
Size (X3)	-0.532***	0.132	-7.102	0.000
Weight (X4)	-0.411***	0.139	-7.138	0.000
Height (X5)	-0.255*	0.118	-2.959	0.077
Length (X6)	-0.283**	0.114	3.183	0.004

R-Square (R^2) = 0682, R-Square Adjusted (R^2) = 0.668
*** Significant at 1% level
** Significant at 5% level
* Significant at 10% level

Table 4 present result on hedonic regression of physical characteristics of cattle influencing price in the market. It shows that cattle size and weight were significant at 1% level of significance respectively, length is significant at 5% level of significance while cattle height is significant at 10% of significance. The breed and sex of the cattle were not significant. The implication of this result is that, cattle farmers should pay good attention to length and height of the cattle's because this constitute the physical characteristics which buyers pay attention to and also attached premium to them. The breed and sex of the cattle's does not matters.

Conclusion

The study concludes that physical characteristics of cattle such as size, weight length and height determine the price of a cattle in the market while breed and sex does not matter much. Therefore cattle producers should pay good attention to these physical characteristics since buyers attached premium to them.

Recommendations

- Cattle / fattening programmers should pay attention to feeds and management practices that will improve cattle size, weight, length and height in the area.
- Weighing scales should be introduced by the government /NGOs through the cattle marketers association in most of the cattle market to simplify weighing exercise and facilitate standardization in the pricing system.
- Extension agents and NGOs, in the area should sensitize cattle farmers in the area on basic physical characteristic identification and measurements.

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