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Economics of Physical Attributes Influencing Cattle Prices in Ngalzarma Livestock Markets, Yobe State

A.B. Mohammed[1], A.T. Lawal[2] and S.A. Musa[3]

[1]Department of Agricultural Economics and Extension, Faculty of Agriculture, Bayero University, Kano State- Nigeria

[2]Government Girls' Science and Technical College Potiskum, Yobe State-Nigeria

[3]Kano University of Science and Technology, Wudil, Kano State-Nigeria

Corresponding author: A.B. Mohammed, Department of Agricultural Economics and Extension, Faculty of Agriculture, Bayero University, Kano State- Nigeria

Abstract. This study examined the physical attributes influence cattle prices in Ngalzarma livestock market in Yobe State, Ngalzarma cattle market in Fune Local Government was purposively selected based on high concentration of cattle and cattle marketers. A total of one hundred thirty (130) Buyers were selected using systematic sampling by truncation on weekly basis for period of 26 weeks. Descriptive statistics, ginni co-efficient and multiple regressions was employed to analyze the collected data. The result of the study revealed that 100% of the respondents were male, 39.7% of cattle buyers were within age group of 31-40years and 96.7% were found to be married. The respondents (52.3%) were small buyers category, 24.9% medium and 22.8% were large scale buyers. Greater percentage of the cattle marketers (63.3%) preferred Red Bororo, 29.2% White Fulani and 7.4% Sokoto Gudali. The Ginni co-efficient model shows that the markets structure was competitive with low Ginni co-efficient of 0.507. The regression results indicated that colour of the ear, shape of the cattle face and type of horn were the factors that influenced the buyer's preference. Hedonic regression generally showed that female cattle, big carcass size and height were found to be statistically significant ($P < 0.05$), ($P < 0.001$) and ($P < 0.001$) respectively with positive coefficient. 1t was therefore recommended that research efforts should target the characteristics of these cattle that buyers are sensitive to so as to enhance profitability production and marketing.

Keywords: Attributes, Cattle Prices, Livestock, Market and Hedonic.

INTRODUCTION

Cattle are found throughout Nigeria but are commonest in the Northern part of the country. Seasonal transhumance does take place but to a limited extend. Almost half the total cattle population is permanently resident in the sub-humid zone, White Fulani, Sokoto Gudali and Red Bororo are the common cattle in North-east geopolitical zone of the country (Idris, 2008).The predominant cattle production system in Nigeria is the extensive free range grazing practiced by the nomadic and semi-nomadic pastorals. Over 80% of cattle production in Nigeria is managed by the traditional Fulani who depend mainly on the natural range to raise their animals (Adamu, 1992) under this system, production is concentrated only in the savannah zones of the northern part of the country due to absence of tsetse fly infestation. Livestock and livestock product are highly regarded by the people who usually breed livestock for the purpose of marketing; one way to ensure that cattle and cattle product reach every part of the nation is through efficient production and marketing of cattle and cattle product.

Marketing is an important aspect of any livestock system. It provides the mechanism whereby producers exchange their livestock and livestock products for cash. The cash is used for acquiring goods and services which they do not produce themselves, in order to satisfy a variety of needs ranging from food items, clothing, medication and schooling to the purchase of breeding stock and other production inputs and supplies. Bekure *et al,* (1982). Marketing, as a concept, is based on two fundamental beliefs (Stanton, 1981): all activities of a firm (or producer), including planning, operations and policies, should be oriented towards the consumers (or customers); and profitable sales volume should be the goal of every firm. Consequently, as the firm's activities should be devoted to determining what the consumers' wants are and to satisfying these wants while still making a reasonable level of profit. In the case of livestock producers, especially if they are smallholders, the public sector has a role to play in advising the

farmers on what products are in demand and in assisting them to develop and promote consumption of new livestock-based products whenever feasible.

Because of its strategic role in economic development, marketing development has come to be accepted as a complementary activity to production development. Hence marketing may be viewed as a social and managerial process through which individuals and groups obtain what they need and want by creating and exchanging products of value with each other. Marketing management can then be viewed as the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchanges that satisfy individual and organisational objectives. The process thus involves analysis, planning, implementation and control, covering not only physical goods and services but also ideas. This rests squarely on the notion of exchange in which the goal is to produce satisfaction for the parties involved (Kotler, 1988).

Therefore the main objective of the study is to evaluate economics attributes influence price of cattle. However the specific objectives of this research work are to:-

1) Describe the socio-economic characteristics of cattle buyers in the study area.
2) Describe the structure of cattle market in the area.
3) Determine cattle characteristics that influence buyers choice of breeds.
4) Determine the effect of cattle characteristics on buyers prices in the study area.

METHODOLOGY

Study area

The field survey was carried out in Fune Local Government Area of Yobe State, is located within latitude $11^{0}53`$ North and longitudes $11^{0}54`$East of the equator (YBSG, 2007). It has an area of 4,948 square kilometres and a population of 300,760 at the 2006 census (NPC-2003).

Method of data collection and sampling techniques

The data used in the study was obtained through a well-structured questionnaire administered to the buyers by the researcher with the help of well-trained enumerators; this was done between the month of February and August 2012. Ngalzarma cattle market was purposively selected based on the high concentration of cattle and cattle marketers in the area. It also served as a distribution point for most markets within the Northern part of Nigeria. A sample of 5 cattle buyers were selected on a weekly basis using systematic sampling by truncation for a period of 26 weeks, making a total of three hundred and ninety (130) respondents.

Analytical techniques

The analytical tools employed for this study were: Descriptive statistics such as frequency distribution and percentages was used to determine socio-economic characteristics of the buyers, Ginni Co-efficient was also used to determine market structure, multiple regressions was employed and Hedonic price analysis model was used to determine physical attributes influence cattle prices.

Ginni co-efficient

The Ginni co-efficient was used to measure market structure. In practice the actual value of the Ginni-Co-efficient lies between zero and one. The closer the value is to unity, the greater is the degree of inequality and vice versa, (Okereke and Anthonio,1988).

G.C =1 -∑ XY----------equation 1

Where G.C =Ginni Co-efficient

X = Percentage of markets per period of study

Y = Cumulative percentage of markets sales

Multiple regression

Multiple regressions are the casual relationship between two or more independent variables and the dependent variables. Bhattacharya and Johnson (2002) defined regression analysis as a body of statistical methods dealing with formulation of

mathematical models that depict relationship for the purpose of prediction and other statistical inferences.

In this study preference will be the dependent variable, while the independent variables will be attributes to characteristics like skin type, colour and type of eye, tail type, hair type, breed, etc.

The model is generally specified as follows:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6 \text{ ----- } X_n\mu)$ ----------equation 2

Where

y = consumer preference/price of the animal

f =Functional notation

(X_1----X_n) = Independent or explanatory variables

μ = Error term

Derived from equation (1) above, the functional linear cob. Doglas form of the model was as follows:

$y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + \mu$ *where:*

y = consumer preference/price of the animal

a = The Intercept

b_1 = The coefficient of X_1

X_1 = Purchase price

X_2 =Sex of cattle

X_3 = Size

X_4 = Skin type of the cattle

X_5 = Colour of Ear

X_6 = Face type

X_7 = Horn Type

X_8 = Height of the cattle

X_9 = Length of the cattle

Model specification and framework

The hedonic model, which is derived from the theory of consumer choice as postulated by Lancaster (1966) shall be used. The model states that the price of a good is explained in terms of a good's characteristics. Thus, it describes the price of a good as a linear summation of the implicit value of its attributes. (Wooldridge, 2000, Rosen 1974 & Edmeades, 2006) mathematically expressed as:

$$Pc = \sum_{J-1}^{M} Xcj\ Pcj \quad \text{----------equation 3}$$

Where:

Pc = price of cattle

Xcj = cattle characteristic j such as breed (red bororo, white fulani and sokoto gudali), sex (male and female cattles), body size (small, medium and large body sizes), face size (short and long face), horn (short and long horns) and height.

Pcj = Implicit of price characteristic j

Red bororo, male cattle (bull), medium size cattle, long face and long horns are the reference groups in the models.

RESULTS AND DISCUSSION

Socio-economic characteristics of cattle marketers in Ngalzarma market

The social factors of interest in this study were age distribution of the farmer, gender, marital status, level of education and category of occupation. It has been represented in frequency tables and shown in Table1, the result in shows that 100% of cattle buyers were Male, the result indicates that males who are more capable of coping with the drudgery associated with cattle marketing dominated the study area. Age is an important determinant of social-economic status of a population. Majority (85.4%) are within the active age of 21 to 40 years. People wear in energy as they advance in age. Also age has effect on level of awareness and on agricultural production. Older people

are not willing to adopt innovations in agriculture because they believe their forefathers practiced farming successfully. But, the older the farmer, the better is his understanding of the social, climatic and economic factors that affect farming and the more experienced is the farmers. Younger farmers are likely to adopt new innovation faster than the older ones.

The study further revealed that (62.3%) had no formal education, those with primary and secondary education constituted the highest percentage (37.7%) of the respondents. Education is regarded as an investment in human capital which is able to raise the skill and quality of the man, narrow his information gaps and increase his allocative efficiency thereby leading to more productive performance (Patel and Anthonio, 1981). Therefore, penetration of new ideas and adoption of new innovation and technology into the society in the study area will be easy. This will in turn increase yield, income and agricultural production in general.

The study also revealed that, majority of the respondents (86.9%) are married. This shows that the respondents are responsible according to the societal standard and therefore are likely to have some experience of life. Table 1 further explained category of buyers as the level of respondents in the business. Result shows that (70.7%) of respondents are small scale buyer followed by medium scale buyer with (19.2%) while the large scale buyers were the least (10%). This implies that most of the buyers were small scale farmers.

Distribution of cattle buyers to determine market structure In Ngalzarma Market.

The result as presented in Table 2 shows that the estimated Ginni Co-efficient for cattle buyers was 0.507 (51%). This figure suggested that there is high level of inequality among the buyers. Therefore empirical results indicated that cattle market was highly concentrated as revealed with a low Ginni coefficient of 0.507, indicating that there was competitive behaviour in the market structure of the cattle market in the study area. This is in accordance with the findings of Musa (2003) who stated that, there is relative

high level of inequality in the sale revenue of respondents and consequently high level of concentration and the result is a reflection of the inefficiency in the market structure.

The result of the regression analysis which estimated the characteristics that influences buyers choice of cattle breeds in Ngalzarma market.

Table 3 revealed that, the regression results showed significant buyers preference level for colour of the ear and type of horn are all statistically significant ($p < 0.001$).While shape of the face showed significant level ($p < 0.05$). Cattle sex, carcass size, skin type, length and height of cattle were not statistically significant. This means buyers were not sensitive to them, which means that buyers will ask for discount for any increase in these variables. These results agree with Edmeades (2006).

Hedonic regression analysis for cattle quality characteristics in Ngalzarma market

The results of hedonic regression analysis presented in Table 4 with price as dependent and cattle characteristics as independent variables. Several models are considered but only four are presented in this research work. The breed of cattle was entered with three variables dummies (i.e. White Fulani, Sokoto Gudali and Red Bororo) but Red Bororo was the reference group; gender was also entered as male and female, but female was the reference group. Cattle size (i.e. small, medium and big) and medium size was the reference groups. Face type of cattle was entered as long face and short face but short face was the reference group. Horn type was also entered as short horn and long horn; also, short horn was the reference group. The heights of cattle were entered as values.

The results of the estimated coefficient with price as dependent variable shows an R^2 value ranging from 78% to 83%, indicating that 78% to 83% of the variation in prices were explained by variables included in the models. The remaining proportion can therefore be attributed to error or random distribution term. Durbin Watson p-value of 1.70 to 1.94 was also reported in the four models, which indicates there is a positive first order auto correlation as confirmed by Gerald and Brain, (1997).

Model II indicates that, Red Bororo breed of cattle were compared with White Fulani and Sokoto Gudali, the results shows that White Fulani were found to be statistically significant (P<0.05), with negative coefficient, which implies that price of Red Bororo were higher than that of White Fulani and Sokoto Gadali in Ngalzarma cattle market.

Male cattle were also compared with female cattle breed, the result shows that female cattle were statistically significant (P<0.05), in model I to IV with positive coefficient, this implies that female cattle attracted significantly higher prices than male cattle, the area is dominated by Fulani, therefore, there demand would be high because female cattle usually provide milk for the cattle owning household and some time also for local sale and reproduction purposes.

In model I,III and IV, it was reported that, medium size cattle were also compared with small size and big size cattle, the result indicated that big size cattle were found to be statistically significant (P<0.001) with positive coefficient and small size cattle were also found to be significant (P< 0.001) with negative coefficient. This implies that big size cattle attracted more prices and medium size cattle were cheapest in Ngalzarma cattle market, the reason was that there were more of medium size cattle in this market but their demand is relatively low.

The height of cattle is another important physical characteristic that determine the size of cattle and height was found to be highly statistically significant (P<0.05) in all the models and positive coefficient, implies that cattle with higher height attracted more price which means for any unit increases in these variables buyers would be willing to pay premium. These results agree with Edmeades (2006).

CONCLUSION AND RECOMMENDATION

Conclusion

The study was carried out in Fune Local Government of Yobe State of Nigeria. The findings revealed that cattle marketing in the study area was a male dominated business and most of the men involved were young men indicating that there was less

participation in the venture by the elders. The structure of the market based on the criteria laid was said to be competitive. The variable factors that mostly determine the buyer's preference and prices were found to be carcass quality (big size cattle), sex (female cattle), and height of cattle. Meaning as people found out the price and carcass size is okay and they are convinced there is nutritional benefit in the cattle then they can buy it.

Recommendation

Research effects should target the characteristics of these cattle that buyers are sensitive to so as to enhance profitability production and marketing. There is a need for utilization of modern cattle marketing facilities like standard weight, crush for loading and grading in the market. This will help in transforming the marketing procedures that form the current traditional system to more modern ones. Government should intensify efforts to encourage the production of cattle. This can be achieved by giving incentives to producers in form of loan or credit through agricultural banks and other conventional banks which undertake agricultural financing scheme.

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Table 1. Distribution of socio-economic characteristics of cattle amarketers

Variable	Frequency	Percentage (%)
Age (years)		
21-30	39	30
31-40	72	55.4
41-50	14	11.5
51-60	4	3
Total	**130**	**100**
EducationalQualification		
Qur'anic	81	62.3
Primary	32	24.6
Secondary	17	13.7
Tertiary	0	0
Total	**130**	**100**
Marital status		
Single	17	13.1
Married	113	86.9
Divorced	0	0
Total	**130**	**100**
Category of Buyers		
Small	92	70.7
Medium	25	19.3
Large	13	10
Total	**130**	**100**

Table 2. Summary distribution of buyers at Ngalzarma cattle market

Purchase Range	Frequency	Proportion of Buyers	Cumm. Frequency	Cumm. Proportion of Buyers	Total Purchase	Prop. of Purchase	Cumm. Prop.	xy
20,000 – 36,000	21	0.16	21	0.16	602,000	0.08	0.08	0.013
36,001 – 52,000	37	0.28	58	0.44	1,666,000	0.23	0.31	0.08
52,001 – 68,000	36	0.27	94	0.71	2,165,000	0.29	0.6	0.16
68,001 – 84,000	24	0.18	118	0.89	1,813,000	0.23	0.83	0.15
84,001 – 100,000	12	0.09	130	1.00	1,094,000	0.15	1	0.09
Total	**130**	**1**			**7,340,000**	**1**		**0.493**

Source: Field Survey, 2012

Mean value of purchase =N56,461

Ginni Co-efficient = 1- 0.493 = 0.507

Table 3. Summary of the regression analysis which estimated the characteristics that influences buyers choice of cattle breeds in Ngalzarma market.

Variable name	Estimated value	T- value	P-value
(Constant)	3.721	14.228	.000
Purchase Price	.000	.206$^{NS.}$	.837
Gender	.065	1.365^{NS}	.175
Carcass of cattle	-.018	-.280^{NS}	.780
Skin type	.042	.717^{NS}	.475
Colour of Ear	-.742	17.261***	.000
face shape	-.230	-2.632*	.010
Horn type	-1.532	-13.59***	.000
Height	.005	.485^{NS}	.628
Length	-.006	-.605^{NS}	.546

R- square=0.893 R- square Adjusted= 0.885

***Significant at 0.1% ($p < 0.001$), **Significant at 1% ($p < 0.01$), *Significant at 5% ($p < 0.05$).

Table 4. Summary of estimated hedonic regression for physical characteristics affecting price in Ngalzarma cattle market

Variable	Model I	Model II	Model III	Model IV
	-0.11633	-0.4179	-0.11633	-0.1170
White Fulani	(-0.6558)	(-2.122)*	(0.6558)	(-0.6629)
	0.15225	0.2996	0.1525	0.1526
Sokoto Gudali	(0.8728)	(1.528)	(0.8728)	(0.8773)
	(0.2532)	0.4169	0.2532	0.2538
Female Cattle	(1.693)*	(2.451)*	(1.693)*	(1.706)*
	-0.9671		-0.9671	-0.9659
Small Size	(-4.999)***		(-4.999)***	(-5.022)***
	0.1204		0.12048	0.12067
Big Size	(4.794)***		(4.794)***	(4.836)***
	-15602		-15602	
Short Face	(-0.1009)		(-0.1009)	
	0.1380	0.2234	0.1380	0.1325
Short Horn	(0.8712)	(1.311)	(0.8712)	(0.8956)
	0.18858	0.2734	0.1885	0.1885
Height	(10.60)***	(20.67)***	(10.60)***	(10.65)***
	-0.2895	-0.7220	-0.2895	-0.29003
Constant	(-3.392)	(-11.48)***	(-3.392)**	(-3.415)**
	83.91%	78.01%	83.91%	83.91%
R^2(R^2Adj)	(82.85%)	(77.12%)	(82.85%)	(82.99%)
DWP -Value	1.87	1.57	1.87	1.87

***Significant at 0.1% ($p < 0.001$), **Significant at 1% ($p < 0.01$), *Significant at 5% ($p < 0.05$).

Figures in parentheses are t-values.

Source: Field survey, 2012