FACTOR PRICE ANALYSIS OF CHARACTERISTICS INFLUENCING SOKOTO GUDALI CATTLE BREED IN KARRA-JEBBA MARKET IN NIGER STATE, NIGERIA

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Abstract

This study was carried out to highlight and analyze characteristics influencing Sokoto Gudali cattle breed prices in Karra cattle market in Niger State. Mokwa Local Government was purposively selected based on high concentration of cattle and cattle marketers in Karra cattle market, via Jebba North. The market also serve as the mid-point between the cattle merchants in the Northern and Western region of the country. A total of 130 cattle merchants were randomly selected by truncation on weekly basis for period of 7 months. Data collected were analyzed using descriptive statistics, Gini-coefficient, and multiple regressions were employed to analyze the physical characteristics that determines the choice of cattle breed and prices. The result of the study revealed that all the respondents (100%) were males having mean age of 41years. About 75 percent of the respondents were married and 70 percent of the merchants were small-scale merchants, 18.40% medium scale merchants and 11.54% were large-scale merchants. The Ginni co-efficient of 0.474 shows that the market structure in the area is that of competitive. The regression results indicated colour of the ear, shape of the cattle face and type of horn were the factors that influenced the buyer's preference. However, the result of the regression model also shows that female cattle (cow), big carcass size, short horn cattle and height were found to be statistically significant ($P<0.10$), ($P<0.01$), ($P<0.10$) and ($p<o.10$) respectively, with positive coefficient across all the models, which implies that for any unit increase in these variables, buyers will be willing to pay more premium on cattle characteristics studied. It was therefore recommended that research efforts should target the characteristics of these cattle that buyers are sensitive to, so as to enhance profitability of cattle husbandry and marketing.

Keyword: Price Analysis, Sokoto Gudali, Breed, Karra, Market and Niger.

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Introduction

The livestock and meat industry has been an important component of the Nigerian economy. Despite the importance of this sub-sector, it has been plagued with myriads of production problems relating to diseases, inadequacy of forage and pasture, high cost of inputs, paucity of capital and lack of trained personnel as well as poor marketing system. Added to these, are problems of continuous adherence to traditional methods of rearing animals and ignorance as well as taboos (Giwa, 1988; Lukden et al; 1999; Diouf, 1995 and Tanki et al 2010). These problems collectively make animal products scarce and unaffordable to Nigerian populace and thus making demand for each product to outstrip their supply. Fasanya (2004) submitted that a productive livestock sector implies that the entire production phenomenon must be on hand to ensure that the production line is not interrupted. The problems of food insecurity and hunger have continued in recent years, to attract the attention of experts and governments worldwide (Babatunde et al; 2007). Food and Agriculture organization (FAO) and the World Health Organization (WHO) noted that several conferences and World Food submits on human nutrition have brought back to centre-stage for debate, the issue of eradicating extreme poverty and hunger, and that the recommended animal protein intake of 65grams per caput per day is far from being a reality in Nigeria. Diouf (1995) and Agunbiade (2008) have observed that Nigerians daily protein intake stands at 28grams per caput per day which falls below the recommended 65grams per day ostensibly because of limited poor and equally expensive sources of protein available. Comparatively, CBN (2002) revealed that North America, Western and Eastern European countries consumes only 63 gram and 39gram of animal protein per head per day respectively. The most critical in the global food basket crisis is protein, especially of animal origin, and its source especially meat, is expensive, in short supply and out of the reach of majority of the population (Chukwu et al; 2002). More so, it has been difficult to provide reasonable figures on livestock population of the country (Ariyo, 2002 and Fasanya, 2004).

Cattle, especially Sokoto Gudali is one of the conventional animals (cattle, sheep, goals, poultry, fish and rabbits) as sources of animal protein (Musa et al; 2012). Livestock production in Nigeria, especially cattle has been a practice made for the Fulani herdsmen. It is known to involve its movement from the Northern part of the country to the southern part. This movement is governed by the pattern of rainfall and its distribution which influences the pattern of

vegetable cover. Furthermore, the vegetation cover of the Nigerian mass indicates that in the last 500 years, there has been a great modification (Fasanya, 2004 and Thephilos, 2008). The modification is more obvious in the last 50 years due to human activities and climatical changes. The human activity has continued unabated to the extent that the little vegetation cover available for grazing is now no longer tenable.

The Fulani herdsman must of necessity find another friendly environment for its cattle and other livestock. The result is low productive and high cost of cattle and other livestock.

Cattle command a prominent position in our meat supply and livestock industry. Beef is estimated to supply about 45 percent of total meat consumed in Nigerian (Usman and Nasiru, 2007). Our National herd contain an estimated 16 million herd of cattle in 2010 (Musa *et al*; 2013). Over 90 percent of these are in the hands of traditional producers and in the Northern part of the country (Ken, 1982). Fasanya (2004) had reported that it is difficult to provide reasonable figures on the population and growth rate of national herd, Musa *et al*; (2013) however revealed that the growth rate in the national herd is estimated at 1.5 percent annually. It is interesting to note that although developing counties contain about two-thirds (2/3) of the world cattle populations, about two-third of total beef production is accounted for by developed countries. Whatever their level of production, livestock in developing countries provide millions of families with better nutrition, family income, employment opportunities, draft power, products of savings especially by seasonal farmers food security, source of foreign exchange, source of economic stability, source of fertilizer (Manure) and fuel and a more balanced agriculture (Theophilus, 2008).

Sokoto Gudali, popularly called *Bokoloji* is a breed of cattle that is distributed throughout the north eastern districts of Sokoto State, Nigeria. It is a medium of fairly large animal of about 127cm high at the withers. Mature bulls weigh up to 450kg at maturity. The hump is well developed and the animal has the appearance of a dairy type and is essentially a diary breed but the cattle are also used for beef production. The breed is less tolerant to trypanosomiasis, and is the most popular breed among farmers in Northern Nigeria.

Cattle marketing and associated service sub-sectors provide a range of employment, savings, income stability, poverty alleviation, income earning opportunity for populations on both sides of

the border. Contributions of cattle trade to the cash income and purchasing power of various population groups within pastoral areas are significant. Despite the seasonality of cattle demand (demand-driven *Livestock Revolution*) and prices, the cattle trade has a multiplier effect on local economies through the creation of employment opportunity, wealth creation and excessive intersectoral linkages. According to Theophilus (2008), the demand-driven Livestock Revolution is one of the largest structural shifts to ever affect food markets in developing countries and how it is handled is crucial for future growth prospects in developing countries agriculture for food security, poverty alleviation, foreign exchange reserve, the livelihoods of the rural poor, and for environmental sustainability. Some of the population groups benefiting from the livestock sector include: cattle owners; hired cattle herders; cattle breeders; cattle traders, buyers and brokers; sellers of fodder and water; veterinary professionals and other animal health assistants; truck owners, money venders; militias who extort illegal taxes at check points; and local authorities who generate revenue through legal taxation on livestock sales.

In view of the rapid increase in the level of animal protein intake in many parts of the developing countries, it has become evident that a *Livestock Revolution* currently taking place (Delgado *et al*; 1998; Delgado *et al*; 1999 and Delgado, 2001) is associated with the existence of many regional markets. In a recent study. Kerven (1992) also points at the existence of long distance livestock trade flows in pre-colonial sub-saharan Africa. Livestock, and livestock products such as skins and hides and leather are being traded in many livestock markets across the country.

Therefore, the main objective of this study is to evaluate the influence of cattle characteristics (specifically, *Bokoloji* breed) determining buyers decision

Specifically, the study;

i.   Examined the socio-economic characteristics of cattle buyers in the study area.

ii.   Describe the structure of cattle market in the area.

iii.   Determine the cattle characteristics that influence buyers choice of breed-Bokoloji.

iv.   Determine the effect of cattle characteristics on buyers prices in the study area and on buyers prices in the study area and

v.   Identified the constraints to cattle marketing in the study area.

Methodology

This study was carried out in Niger State, Nigeria The state is located in the middle belt region of Nigeria. It is located between latitudes 3^0 and 7^0E and longitudes 8^0 and 14^0N of the Greenwich Meridian (Tanko *et al*; 2010). The state has a population of three million, nine hundred and fifty thousand two hundred and forty nine (3,950,249) people (NPC; 2007). The state has a land area of 92,800 square kilometers, which is about 10% of the total land area of the country (Idachaba *et al*, 2000). The state's potential for *fadama* development is also enormous and the *fadama* area of the state is 682.33ha, of which only 105,556ha is put to use (about 15.5%) NSADP, 2001). The extensive flood plains at the southern boundaries of the state, availability of large water boshes including rivers Niger, numerous streams as well as the distinct six months dry weather offers great opportunity for dry season cultivation of crops and fodder for feeding livestock. Agriculture is the mainstay of the inhabitants. The major crops grown include yam, cassava, guinea corn, rice, millet, sweet potato and maize. Goats, sheep, cattle and poultry are some of the types of animals reared. Minna is the major commercial city in the state. The vegetation type is Guinea savanna.

Karra cattle market was purposively selected based on the high concentration of cattle and cattle marketers in the area. It also serve as distributor for most cattle markets within the Northern and Western part of Nigeria. Primary data were collected through a well structured questionnaire administered to the buyers by the researcher with the assistance of well-trained enumerators from the Niger State Agricultural Development Project (NSADP). Systematic sampling technique was used in selecting 130 cattle merchants on a weekly basis. The survey lasted for a period of 7 months, beginning from March to September, 2012. The unit of administration of the questionnaires was the beef marketers that sell *Bokoloji* breed of cattle in the study area. The information collected was on the number of cattle sold, their prices, taxes paid, transportation cost, among others.

The Analytical tools employed for this study were: Descriptive statistics such s frequency distribution and cumulative frequency distribution, means/averages and percentages was used to determine socio-economic characteristics of the merchants and constraints to beef marketing, Ginni Coefficient was also used to determine market structure, multiple regressions were

employed and Hedonic price analysis model was used to determine physical attributes influencing *Bokoloji* cattle prices.

The Empirical Model Specification

Following Olarinde and Kuponiyi (2004) and Ekweme *et al* (2006), an econometric model was specified. The implicit form of the production function estimated is as follows:

Q = Where:	X_1	=	Purchase Price
	X_2	=	Gender
	X_3	=	Carcass size
	X_4	=	Skin type
	X_5	=	Colour of Ear
	X_6	=	Shape of face
	X_7	=	Type of horn
	X_8	=	Height of cattle
	X_9	=	Length of cattle
	E	=	Error term

Similarly, for physical characteristics affecting price in Karra cattle market, equation (?) becomes:

$$Q = f(X1, X2, X3, X4, X5, X6, X7, X8, e) \text{ equation (iii)}$$

Where Q	=	Price of cattle breed
X_1	=	White Fulani
X_2	=	Red Bororo
X_3	=	Female Cattle
X_4	=	Small Size
X_5	=	Big Size
X_6	=	Short Face
X_7	=	Short Horn

for the religion. The study area reveres the institution of marriage so much that the marriage people are viewed as more responsible and gentlemanly. The mean number of years of experience in the business is 8.75 years, which is an indication that most of the respondents have been in the business for almost a decade now and therefore were very much aware of all the problems and prospects in it already. Category of buyers explained the level of respondents in the business. Results reveled that most of the respondents (70%) are small scale buyers followed by medium scale buyers (18.46%) and the large scale buyers constitute only 11.54%. capital was a limiting factor in the scale of the business and this corroborates the finding of Ndanitsa (2005) that capital was the most limiting factor for agricbusiness activities in the area.

Table 1: Distribution of Cattle Merchants based on Socio-economic characteristics (N=130)

Variables	Frequency	Percentage (%)
Gender		
Male	130	1000.00
Female	0	0.00
Age (Years)		
21-30	33	25.38
31-40	61	46.92
41-50	17	13.08
51-60	19	14.61
Mean (X) Age =	41	
Educational Status		
Islamic/Qur'anic	78	60.00
Primary	27	20.77
Secondary	18	13.85
Tertiary	4	5.38
Marital Status		
Single	28	21.54
Married	97	74.62
Divorced	3	2.30
Separated	2	1.54

Years of Enterprise experience (years)		
1-10	31	23.85
11-20	67	51.54
21-30	24	18.46
31-40	8	6.15
Means (X) =	8.75	
Category of buyers		
Small	91	70.00
Medium	24	18.46
Large	15	11.54

Source: Field survey Data, 2012

Distribution of cattle merchants to determine market structure in Karra Market

The distribution of cattle merchants in the study area in terms of structure is presented in table 2. The analysis of the table shows that the estimated Gini co-efficient for cattle merchants was 0.474 (47%). This suggests that there is high level of inequality among the buyers. Therefore, empirical results indicated that cattle market was highly concentrated, indicating that there was competitive behavior in the market structure of the cattle market in the study area. The result of the Gini-coefficient also reflects the inefficiency in the market structure for cattle. This agrees with the findings of Okuneye (2009) and Musa et al (2012).

Table 2: Summary Distribution of cattle merchant (Structure) in Karra Market.

Purchase Range	Frequency	Proportion of Buyers	Cumm. Frequency	Cumm.. Proportion of Buyers	Total Purchase	Prop. Of Purchase	Cumm. Prop	XY
25,000-70,000	51	0.4	51	0.4	2,363,000	0.22	0.22	0.088
70,001-115,000	52	0.4	103	0.8	4,632,000	0.43	0.65	0.26
115,001-160,000	22	0.16	125	0.96	2,727,000	0.25	0.9	0.144
160,001-205,000	3	0.02	128	0.98	512,000	0.05	0.95	0.019
205,001-250,000	2	0.015	130	1.00	480,000	0.045	1	0.015
Total	130	1			10,714,000	1		0.526

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Mean value of purchase   =   N82,415

Ginni Co-efficient   =   1-0.526

Source: field survey Data Analysis, 2012.

Characteristics influencing buyers choice of cattle breed in Karra Market

The result of the regression analysis (table 2) showed significant buyers preference levels for colour of the ear and shape of the face were statistically significant at $(P<0.01)$, type of horn and sex of the cattle were statistically significant at $(P<0.05)$ and $(P<0.1)$ respectively. Carcass, size, skin type, length and height of cattle were not statistically significant/ this means buyers were not sensitive to these characters.

Table 2: Summary of the regression analysis which estimated the characteristics that influences buyers choice of cattle breeds in Karra market, Niger State.

Variable name	Estimated value	T-Value	P-Value
(Constant)	2,890	10.026	0.000
Purchase Price	0.001	0.901[NS]	0.370
Gender	0.161	2.033**	0.044
Carcass size	-0.102	-1.024[NS]	0.308
Skin type	-0.131	-1.298[NS]	0.200
Colour of Ear	0.687	12.792***	0.000
Shape of face	-0.672	-3.911***	0.000
Type of horn	-0.657	3.487**	0.001
Height	0.006	0.584[NS]	0.561
Length	0.001	0.122[NS]	0.903

R- Square   =   0.714

R- Square Adjusted   = 0.708

***Significant at 1% (P<0.01), ** Significant at 5% (P<0.05), *Significant at 10%. (P<0.10)

Source: Field survey Data Analysis, 2012.

Physical characteristics affecting price in Karra Market

The result of the regression analysis presented in table 3 with price as dependent and cattle physical characteristics as independent variables. Several models were considered but only four were presented in this research study. The breed of cattle was entered with three variable dummies (i.e white Fulani, Red Bororo and Sokoto Gudali) but the later-Sokoto Gudali 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 on R^2 value ranging from 53% to 74%, indicating that 53% to 74% 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 1.77 to 1.98 was also reported in the four models, which indicates there is a positive first order auto correlation.

In Karra cattle market, Sokoto Gudali (Bokoloji) breed of cattle were compared with white Fulani and Red Bororo, the results shows that Sokoto Gudali were fund to be statistically significant at probability level of (P<0.010), in all the models with negative coefficient, which implies that price of Sokoto Gudali were higher than that of other two breeds in Karra cattle market, this may suggest that there is high preference and demand for the breed in the study area.

Result in model I to IV, shows that female cattle were found to be statistically significant in all ramification with positive coefficient, this implies that the price of female cattle (cow) were higher in Karra cattle market compared with male cattle (Bull). This may be as a result of high demand for female cattle in the area for fattening activities or reproductive purposes. The finding

corroborates Oyedeji (2004), who reported that the price of cow is higher than that of Bull in separate cattle markets in Ibadan metropolis, and yet the former is still in high demand than the later.

Medium size cattle were also compared with small size and big size cattle, the result of the comparison indicated that big size cattle were found to be statistically significant ($P<0.01$) with positive coefficient and small size cattle were also found to be significant ($P<0.01$) with negative coefficient. This suggests that big size cattle attracted more prices and medium size cattle were cheapest in Karra cattle market, the reason of medium size cattle in this market but their demand is low.

In model I and model II, long horn cattle were also compared with short horn, the result shows that short horn cattle were found to be significant ($P<0.10$) with positive coefficient, implying that, cattle with short horn are sold at higher prices than the long-horned cattle in Karra market of Niger State.

The height of cattle is another important physical characteristic that influences the size of cattle and height was found to be highly statistically significant in all the models and positive coefficient, which implies that cattle with height attracted higher prices, which indicates that for any unit increase in these variables, buyers would be willing to pay premium. These findings agree with Oyedeji (2004), Edmeades (2006) and Musa et al (2012).

Table 3: Summary of the regression analysis for physical characteristics affecting price of cattle in Karra market, Niger State.

Variable	Model I	Model II	Model III	Model IV
White Fulani	-839.92	-1272.9	-839.92	-1119.9
	(-1.970)*	(-2.295)*	(-1.970)*	(-2.560)*
Red Bororo	1793.1	125.11	1793.1	-53.459
	(1.007)	(0.5571)	(1.007)	(-0.3012)
Female Cattle	1308.1	2434.3	1308.1	1413.4

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Based on the result of the findings, it is therefore imperative for individuals, corporate organizations, government and non-governmental organization to assist cattle merchants in the areas of marketing to boost cattle supply and improve the nutritional benefit in cattle. For instance, all existing credit facilities and schemes put in place to assist the marketers with soft loans should be strengthened so that they can expand their scale of operations. The present tempo to assist the farmers by *fadama* project in the area should be sustained. There is also a need for utilization of modern cattle marketing facilities like standard weight, loading facilities (like crush) and grading equipment. This will go a long way in transforming the cattle marketing system in the study area.

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