MARKETING STRUCTURE AND PRICE TRANSMISSION IN CATTLE MARKETS IN SOUTHWEST NIGERIA

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Abstract
Cattle breeding and rearing are not localised but rather spread across distant spaces in Southwest Nigeria with variations in the market prices of the cattle across the region. The extent to which prices are transmitted across markets is of utmost importance to producers' and consumers' responses to price changes. This study examined the price transmission in cattle markets in Southwest, Nigeria. Primary data were collected from 121 wholesalers and 379 retailers using structured questionnaires. Data were collected on share of markets by actors and spatial price relationship. The data were analysed using Hirschman-Herfindahl Index (HHI) and bivariate regression model at p < 0.05. The HHI estimate was high for retailers (0.224) and moderate for wholesalers (0.147). Mean retail-wholesale price elasticities were less than 1.0 with an average value of 0.197 showing lower proportionate transmission of prices between traders. Cattle markets was highly concentrated for retailers than wholesalers with poor price linkage and collusion practices. Cattle market integration was poor. Therefore, cattle sellers should increase their participation in cooperative societies to raise adequate fund for cattle marketing with a view to enable more entrants into the business. Government should create special markets for easy and efficient functioning of the cattle marketing system particularly Southwest of Nigeria.

Key Words: *Cattle Marketing, Market concentration, Spatial Price. Hedonic Price, Fluctuation*

Introduction

One of the key requirements for growth and stability of any agrarian economy (like Nigeria), which is rich in both natural and human resources that support both crop and livestock production, is sustainable agricultural development. It is impossible to over-emphasize the

importance of the agricultural sector in the Nigeria's economic growth profile especially during the pre- and post-colonial periods. The sector produces food and jobs, among other things, thus, animal husbandry is a prerequisite for the sustainability of human progress (Oluwafemi, 2001).

According to FAO (2006), cattle account for over 50% of the nation's meat supply needs while various classes of livestock and other domesticated animals make up the remaining 40–50% of the balance. According to Nasiru (2012), Nigeria is home to roughly 16.7 million cattle, 57.9 million goats, and 36.4 million sheep. In reaction to population increase, urbanisation, and rising wages, livestock production systems are changing quickly across the globe. The earnings and standard of living of smallholders, who produce the majority of the food in developing nations, are anticipated to improve as demand for animal products rises. However, most of the increases in livestock production are taking place outside the smallholder sector (Udo and Sunday, 2007).

Since humans require high-quality protein for growth, development, and maintenance of metabolic activities, the demand for animal protein has increased due to the rapid expansion in the human population (FAO, 2016). Animal protein consumption has been connected to economic growth, which suggests that people in countries with high levels of high-quality animal protein consumption have excellent physical and mental health. Nigerians and sub-Saharan African nations consume considerably less protein than the average (FAO, 2016). This is true even though Nigeria has a livestock population. This could be explained by the country's poor performance in terms of animal production due to its regionalized suitability for humid regions.

Ruminants, which include sheep, goats, and cattle, make up the livestock in Nigeria and are raised by farmers in the nation's agricultural system (Hassan, 2009). Majority of these animals are located in the Northern part of the country, despite the fact that livestock production is a tool for socioeconomic transformation to increase income and quality of life. In particular, the Northern region of the country is home to 70% of the sheep and goat populations and about 90% of the country's cattle (Girei *et al*., 2013). The ecological conditions of the area, which are characterized by brief rainfall duration, lighter sandy soils, and a longer dry season, are responsible for the concentration of Nigeria's cattle base in the Northern region (Lawal-Adebowale, 2012).

There are many intermediates and players in the marketing chain as the cattle and other ruminants are primarily produced in northern Nigeria and consumed mainly in the south (Olayemi, 1996; Adamu *et al*., 2005). Due to the difficulty presented by this situation, the final retail price of these animals and their products has tended to grow with time (Adamu *et al*., 2005). The poor, who typically consume low animal protein diets, may find it difficult to access animals and their products as a result of the actions of the intermediaries and stakeholders (Okumadewa and Mafimisebi, 2006; Mafimisebi, 2011). Given that Nigeria's consumption of animal protein is so low compared to the recommended amounts, there is every reason to be concerned about this scenario (Mafimisebi, 2011). More worrisome is

the claim that the nation's national meat supply situation is severe and deteriorating, with beef alone making up around 70% of the overall national meat supply (Nasiru, 2012; Umar and Ogwuche 2014; Tibi and Aphunu, 2010).

Nigeria's transportation of cattle and other livestock from the north to the south presents a challenging issue because it is an expensive and a dangerous endeavour. For the duration of the lengthy trip, which lasts between 2-3 days, animals are kept standing and, in some cases, lying down in the trucks (Nasiru, 2012). Trucks and other vehicles frequently break down or are involved in accidents, and livestock and freight insurance is still unpopular with the majority of uneducated animal rearers, middlemen, and carriers. Transporters and traders could potentially be robbed while in transit (Filani, 2006). Considering its effects on the Nigerian economy, the sudden rise of cattle rustling and the hijacking of trucks carrying cattle during the movement of the animals between places is a very severe contemporary issue.

Even though Nigeria is one of the top four producers of cattle in the sub-Saharan region, a significant amount of cattle, sheep, and goats, as well as a variety of milk products, were imported in 2003 to the tune of over $250 million (FAO, 2006). As a result, it is necessary to address the issue of the rising demand for cattle products. Doing so will boost productivity and, in turn, efficiency in their marketing in Nigeria. According to Todaro and Smith (2014), the agricultural industry in sub-Saharan Africa (SSA) is heavily reliant on the trade of live animals. According to Little *et al*. (2001), the sale of livestock serves as the primary source of income for a significant majority of rural households in SSA. Despite the functions that these animals serve, research is needed to address the challenges in cattle markets and marketing practices. From the point of breeding to the consumption, the issues are readily apparent. Stress-related issues during transit, supply issues, the occurrence of economically significant diseases, middlemen's speculative actions, lack of knowledge about the sources of supply and demand and revenue generation, among others, issues, are encountered (Filani, 2006).

The main objective of the study is to investigate the marketing structure of the market and price linkages for cattle trade in the Southwest region of Nigeria. The specific objectives are to investigate the nature of market concentration among the cattle markets in Southwest Nigeria; and examine the nature of price communication in cattle markets in the Southwest Nigeria.

Methodology
Study Area
The research was carried out in Southwest Nigeria. Nigeria has a population of roughly 170,000,000 people and a land area of 923,768 square kilometers (National Bureau of Statistics, 2014; Central Bank of Nigeria, 2012). The primary traditional occupation of the population is the production of crops, and smallholder farming, which is characterized by the cultivation of both cash and food crops, is most common. Additionally, small animals and poultry are kept for subsistence. About 75% of the population reportedly relies on farming as their primary or secondary source of income due to these favourable annual weather changes. Nigeria is able to grow

crops and raise cattle due to its favourable climatic conditions and vegetation (Adenegan *et al*., 2012).

States in the Southwest geopolitical zone, which was the subject of the study, were Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. Due to favorable climatic circumstances, the area is agrarian and well suited for the development of permanent crops like cocoa and oil palm as well as arable crops (maize, yam, and cassava). The states have three distinct ecological zones: the rainforest belt, derived savannah, and Guinea savannah. With a sizable population comes a comparatively high demand for cattle. The indigenous Fulani population, who move their cattle haphazardly and cause clashes between farmers and herders, also raised cattle locally in the area. The area is filled with many cattle markets.
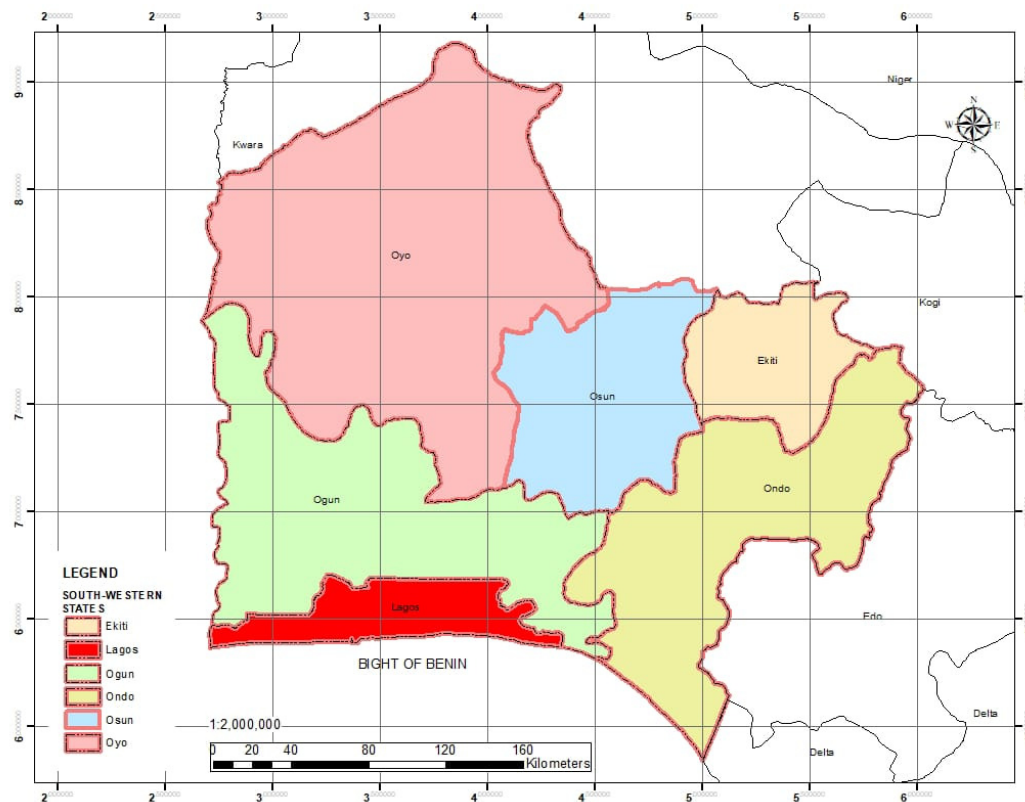

Fig. 1: Map of Southwest Nigeria indicating the Study Area
Source: article.sapub.orgsors

Data Collection Techniques and Resources

For this investigation, primary data were employed. The primary data were gathered using a structured questionnaire to gather relevant information on the market/marketer characteristics, cattle market prices, elements thought to be crucial in price formulation and determination, and market restrictions. The study area's livestock markets and market patrons were randomly sampled to collect data.

Sampling Techniques and Sample Size

The study used a multi-stage sampling process. As a result of the heavy traffic of

cattle dealers in the States during the initial stage, three of the six states in Southwest Nigeria were purposefully chosen based on fact that they are well known for cattle marketing. These are Lagos, Ogun, and Oyo States. The second stage comprised the selection of five Local Governments Areas in each State that were known to harbour thriving cattle markets. However, one market was chosen from each local government area in the third stage. In the fourth stage, leaders of market associations' member registers were used to proportionally choose 30 per cent of the respondents in each market. Finally, 169 cattle marketers were selected from Lagos State, 160 from Ogun State, and 171 from Oyo State giving a total sample size of five hundred (500) respondents.

Table 1: Sample Size and Sampling of the Respondents in the Study Area

State	Market Name	Total Registered Marketers	30% of Registered Marketers	Wholesalers	Retailers
Lagos	Sabo	143	43	9	34
	Oko-oba	207	62	15	47
	Alaba Rago	78	23	6	18
	Imota	68	20	5	15
	Igan	68	20	5	15
	Sub-Total	564	169	40	129
Ogun	Imowo	138	41	10	31
	Mowe	130	39	10	29
	Ikeoluwa	54	16	4	12
	Corner	55	17	4	12
	Berger	157	47	11	36
	Sub-Total	534	160	39	121
Oyo	Kara	129	39	10	29
	Amode	138	41	10	31
	Akinyele	106	32	8	24
	Bodija	142	42	11	31
	Oke-ose	55	17	3	14
	Sub-Total	570	171	42	129
Total		1,668	500	121	379`

Classification of Cattle Marketers

Based on the kind of tasks performed and quantities handled, marketers were divided into two groups: wholesalers and retailers. Bulk cattle buyers are known as wholesalers. Retailers, on the other hand, are those marketers that acquire cattle in small amounts and then sell to end users. However, for the purpose of this study marketers that handles more than 40 herd are classified as wholesalers while those handling less than 40 herd are regarded as retailers. Girei *et al*, (2013) did classify cattle marketers in their study as 'the wholesalers or bulk are those that (irrespective of the sizes of cattle), are considered as having uniform weight and therefore attracts the same average price, while the retailers are those that deal with fragmentating the animals into various weights, sizes, breeds, male or female with each animal attracting different prices to be determined by their above mentioned attributes'.

Analytical Methods

The following analytic techniques were employed to meet the goals of this study: budgeting technique, multiple regression, descriptive statistics, and Herfindahl-Hirschman Index (HHI). The means of the respondents' differences were calculated using an independent T-test.

Nature of Cattle Markets' Concentration using Herfindahl- Hirschman Index (HHI)

Herfindahl-Hirschman Index (HHI) was used following Darryl and James (2004).

$$HHI = \sum_{i=1}^{n}(MS)^2$$

Where:

HHI = Herfindahl-Hirschman Index
MS = Market share
N = Number of observations

The market share (MS), is the proportion of the sales of a seller relative to others in the market:

$$MS_t = \frac{Qt}{\sum_i^t Qt}$$

Where:

Qi= Quantity of cattle handled by seller *i*
$\sum Qi$ = is the sum of cattle handled by all the sellers in the market *(i-t)*.

Any HHI that is less than 0.1 is regarded as unconcentrated, indicating a competitive market state, according to Krivka (2010), Hrazdil and Zhang (2012), Ruttoh *et al.* (2018), and Egwuma, *et al.* (2019). HHI values more than 0.18 indicate high market concentration, whereas values between 0.1 and 0.18 suggest moderate market concentration. The market is more likely to be dominated by a small segment of consumers the higher the HHI.

Movement pattern of cattle among actors and services provided

Flow diagram was used in mapping the movement of the cattle from the points of purchases to the ultimate consumers in the lower end of the channel. The percentage of use of the channel was equally identified.

Nature of price communication in cattle market

Correlation coefficient and price linkage

Investigating price linkage, correlation model stated, could be found useful following Meissner (2015):

$$\rho(X)(Y) = \frac{COV(X,Y)}{\rho(X)\rho(Y)}$$

Where:

X and Y = sets with the elements $\{x_1,...x_n\} \in R$ and $\{y_1...,y_n\} \in R$,
$\sigma(X)$ and $\sigma(Y)$ = standard deviation of X and Y
COV = covariance
Defined as $COV(X, Y) = 1/(n-1)\sum_{I=1}^{n}(Xi - \mu X)(Yi - \mu Y)$

Price Transmission Model

In investigating inter-market price relationship, the regression model stated, was used following Akanni (2013):

$$Pr_i = \alpha + \beta Pr_j$$

Where:

Pr_i = Retail price in cattle market *i*
Pr_2 = Retail price of cattle in market *j*
α and β = Regression coefficients

In calculating the extent to which changes in the retail price of cattle in market *i* respond to change in their corresponding price in market *j*, the model is represented by:

$$\frac{dPi}{dPj} = \frac{pi}{pj}$$

Where:

dpr_i and dpr_j = derivative of equation measuring the elasticity of the inter-market retail prices

Results and Discussion

Analysis of Cattle Marketing Channels

The systematic transportation of cattle from areas of surplus to shortfalls is known as the cattle marketing channel. Additionally, it shows the methods in

which various actors participate in the value chain. The goal of this study's channel analysis is to better understand how cattle move among market participants. Each type of marketer used a different marketing channel for a variety of reasons. Traditionally, pastoralists (Fulani) from the north of Nigeria have transported cattle down to the south using roads or railroads. This was due to the favorable climate, where the tsetse fly, the carrier of *trypanosomiasis*, was less common. The cost of marketing, however, increases with the length of the marketing channel (Okeoghene, 2013). The data gathered via direct observations and from the survey instrument used on the cattle traders were organized into five channels as shown in Figure 2.

Five marketing outlets for cattle were found in this study's study area. According to poll results, channel I receives the greatest attention from viewers, while channel V receives the least. Figure 4 presents an illustration of these channels. The attempt to boycott the standard (I) channel in order to save time and increase profit is further explained in Table 1. The mark*et al*lows for entry by business owners who are willing to take the appropriate risks and who can raise money to buy in bulk from wholesalers or butchers in order to avoid unnecessary delays and benefit from economies of scale. This result was in line with Mafimisebi *et al*. (2013). The pages that follow detail the services that each actor offers.

Table 2: Distributions of Marketing Channels of Cattle in Southwest Nigeria

Channel	A	B	C	D	E	F	G	%
I	*	*	*	*	*	*	_	31..14
II	*	*	*	-	*	*	_	20.32
III	*	*	*	*	*	*	_	17.53
IV	*	*	*	*	*	-	*	15.01
V	*	*	*	-	*	*	-	10.8
VI	*	*	*	-	*	-	*	5.2

A= Breeders, B: Local Marketers, C= Wholesalers, D= Retailers, E= Butchers, F= Primary consumers

Market Concentration

Oladejo and Sanusi (2008) referred to market structure as 'the dominant form of competition in a market that is characterized by the quantity of customers and sellers, their size distribution, the degree of product differentiation, and the simplicity of entry for new market entrants'. 'These traits have an impact on the market's pricing, information, and competition systems' (Oladejo and Sanusi, 2008). Table 3 shows the findings of the Herfindahl-Hirschman Indices (HHI) for the cattle markets sampled for the southwest Nigeria. The estimates revealed that market HHI values ranged

between 0.0002 (0.02 per cent) to 0.5256 (52.6 per cent). This demonstrates the presence of cattle market participants who exhibit various forms of concentration, such as unconcentrated, moderate and pure competitive behaviour. This suggests that in some marketplaces, a small number of dealers who could afford the enormous capital requirements of the industry control a significant percentage of the cattle dealing. It should be noted that according to Kohls and Uhl (1990), 'a concentration ratio of over 50 per cent indicates a strong monopolistic business, 33–50 per cent a weak monopolistic industry, and less than 33 per cent an

unconcentrated (fully competitive market)'.

This discovery provided evidence of an amalgamation of the three concentration status of the markets. The most notable is the dispersed market environment, which is typical of markets in Ogun State. This is a sign of the dealers' perfect competition. For the marketplaces in Oyo State's Kara and Akinyele as well as Lagos State's Imota, a high concentration status was reported. These could have a number of causes, including the cyclical nature of the cattle marketing industry's economic operations. At the Alaba market in Lagos State, a similar high concentration condition was reportedly present. The wholesalers concentration indices were somewhat tending towards moderate concentrations. This is however expected as the wholesalers hold the cattle for brief period of time when they need to dispose them off for the next round of trading. The somewhat unequal distribution of trade among the respondents that results from high capital requirements may explain both the moderate and relative concentrations observed, and this may allow marketers to have an impact on market prices. This may also be due to the Southwest's short-term shortage of cattle due to the necessity for marketers to travel to Northern Nigeria. It is important to note that while smaller market concentrations may result in perfect competition, bigger market concentrations can lead to monopolies. Girei *et al*. (2013) and Mukaso *et al.* (2012) both noted the intense concentration of cattle markets in Nigeria. This result agreed with that of Juma *et al*. (2006), who noted that small ruminants' markets were insufficient.

Table 3: Estimations of the Herfindahl - Hirschman Index for Wholesalers and Retailers in Southwest's Cattle Markets

	Retailers		Wholesalers	
Market	HHI	Remarks	HHI	Remarks
Sabo	0.2496	Moderate concentration	0.2741	Moderate concentration
Oko-Oba	0.2258	Moderate concentration	0.2025	Moderate concentration
Alaba	0.5256	High concentration	0.1131	Unconcentrated
Imota	0.4425	High concentration	0.1027	Moderate concentration
Igan	0.1642	Moderate concentration	0.1533	Moderate concentration
Imowo	0.1533	Moderate concentration	0.2104	High concentration
Mowe	0.1290	Moderate concentration	0.1310	Moderate concentration
Ike-Oluwa	0.0714	Unconcentrated	0.1124	Moderate concentration
Corner	0.2556	High concentration	0.1212	Moderate concentration
Berger	0.1915	Moderate concentration	0.0714	Unconcentrated
Kara	0.3577	High concentration	0.2250	High concentration
Sango	0.1355	Moderate concentration	0.1242	Moderate concentration
Akinyele	0.3465	High concentration	0.1124	Unconcentrated
Bodija	0.1124	Moderate concentration	0.2520	High concentration
Oke-Ose	0.0002	Unconcentrated	0.1142	Moderate concentration
Mean	0.2241	High concentration	0.1470	Moderate concentration

HHI<0.1= unconcentrated; HHI: 0.1 & 0.18= moderate; HHI: > 0.18 = high concentration
Source: Krivka (2010), Hrazdil and Zhang (2012), Ruttoh *et al*. (2018), and Egwuma, *et al*. (2019).

Analysis of Price Communication and Linkage

Cattle Retailers' Market Linkages

'Market integration is considered to show the market's competitiveness, justifying government intervention as a means of boosting competition to increase market efficiency where it is deemed lacking' (Baffes and Ajwaad, 2001). Market integration is the 'interrelationship between price changes in two marketplaces' (Engle and Granger, 1987). The strength of price links between markets is evaluated using the price correlation coefficient. 'The simplest method for determining price co-movements in a spatial market is to use correlations' (Akanni, 2013). Market integration gauges how closely two markets' price movements are related to one another. Table 3 displays the analysis' findings. The retail price pairings of cattle marketplaces often had low values for the price correlation coefficient. These low price co-efficient values, which were attained in the markets, are a sign of poor communication and proof of the markets' independence. Since "many of the elements of perfection do not exist in as pure a form as is required to constitute a perfectly competitive market system," according to Goletti *et al*. (1995), 'perfect connection at a given time between the prices in spatially separated markets is frequently not possible'. The absence of a consistent grading system, institutional rigidities imposed by the government, transfer costs, the nature of intermarket product mobility, and the presence of transfer costs are prerequisites for achieving perfect integration.

The matrix of correlation coefficients between the marketplaces in the southwest region of Nigeria is displayed in Table 4. There are variances in respect of degree and direction with regard to the correlation between prices across all markets, even though it is relatively weak in the aggregate. Due to the very unaffordable transaction costs caused by inadequate infrastructure in the research locations, the prevalence of low correlation points to market segmentation. With a few localised markets in Oyo State, where the Akinyele market serves as a secondary distribution market for decentralization to neighbouring ones, most cattle markets in the study areas received their supply directly from the far north. Even though both are positive, the correlation coefficient between Sabo in Lagos State and Oke-Ife in a secondary distribution market is only 0.162, despite both being positive. Lundhal (1983) averred that where lower correlation is observed, the market system reflects bottlenecks such as lack of market information, lack of product homogeneity or monopoly power. This signposts the existence of an inefficient cattle marketing system in the study area. Another possible reason could be that trade is none unidirectional.

Cattle Wholesalers' Market Linkage

The matrix of wholesalers' correlation coefficients between the marketplaces in the southwest region of Nigeria is displayed in Table 5. Differences exist in terms of direction and magnitude regarding correlation indices between wholesalers' prices. On the average, they recorded relatively low inter-relationships. This is expected since the wholesalers are primarily interested in immediate disposal or selling of their wares with minimal overhead cost to get ready for the next round of business trip.

Table 4: Matrix of Retailers' Market Price Correlations

Variables	Sabo	Agege	Alaba	Igan	Imota	Imowo	Mowe	IkeOlu	Corner	Berger	Kara	Sango	Akinyele	Bodija	OkeIfe
Sabo	1.000														
Agege	-0.331	1.000													
Alaba	0.370	-0.174	1.000												
Igan	0.113	-0.105	0.323	1.000											
Imota	-0.383	-0.233	0.190	0.203	1.000										
Imowo	-0.062	-0.032	-0.245	0.101	0.472	1.000									
Mowe	0.161	-0.313	-0.292	-0.233	-0.159	-0.122	1.000								
Ikeolu	0.048	-0.400	-0.002	0.486	0.339	0.125	-0.212	1.000							
Corner	-0.421	0.053	0.055	0.229	0.141	-0.255	0.232	-0.034	1.000						
Berger	0.342	-0.079	-0.129	0.400	-0.240	0.159	0.304	-0.052	0.291	1.000					
Kara	-0.030	0.527	0.235	-0.070	-0.068	0.111	0.641	-0.349	-0.222	-0.168	1.000				
Sango	-0.455	0.432	-0.307	-0.146	0.397	0.201	0.017	0.115	0.079	-0.127	0.115	1.000			
Akinyele	0.080	-0.034	0.191	-0.055	-0.003	0.262	-0.295	-0.363	-0.173	-0.035	0.580	-0.260	1.000		
Bodija	0.348	-0.319	0.045	0.426	-0.009	0.072	-0.028	0.720	0.114	0.372	-0.369	-0.154	-0.284	1.000	
Okeife	0.132	0.078	-0.372	0.222	-0.138	0.262	-0.073	0.222	-0.055	0.495	0.027	-0.020	0.071	0.297	1.000

Table 5: Matrix of Wholesalers' Market Price Correlations

Variables	Sabo	Agege	Alaba	Igan	Imota	Imowo	Mowe	IkeOlu	Corner	Berger	Kara	Sango	Akinyele	Bodija	OkeIfe
Sabo	1.000														
Agege	-0.167	1.000													
Alaba	0.079	-0.043	1.000												
Igan	-0.105	0.224	0.276	1.000											
Imota	-0.200	-0.210	0.289	0.477	1.000										
Imowo	0.042	-0.084	-0.174	0.007	0.374	1.000									
Mowe	0.475	-0.257	-0.217	-0.516	-0.330	-0.195	1.000								
Ikeolu	-0.079	-0.192	0.031	0.404	0.143	-0.005	-0.446	1.000							
Corner	-0.332	0.137	0.119	0.164	-0.095	-0.492	0.102	0.001	1.000						
Berger	-0.028	-0.087	-0.243	0.096	-0.138	0.016	0.317	0.023	0.372	1.000					
Kara	-0.256	0.363	0.125	0.183	-0.049	0.078	-0.448	-0.271	0.076	-0.284	1.000				
Sango	-0.106	0.389	-0.372	0.218	0.237	-0.011	-0.103	-0.163	-0.024	-0.272	-0.055	1.000			
Akinyele	0.168	-0.090	-0.336	-0.230	-0.350	0.226	0.078	-0.416	-0.376	0.066	0.312	-0.105	1.000		
Bodija	0.103	-0.357	0.065	0.305	0.239	0.487	-0.165	0.564	-0.315	0.337	-0.413	-0.201	0.002	1.000	
Okeife	0.084	-0.252	-0.061	0.054	-0.016	0.292	-0.032	0.626	-0.300	0.260	0.572	-0.276	-0.014	0.790	1.000

Transmission of Prices in the Cattle Market Chain

Studying the rate at which price signals are transferred between markets for similar products is one area in which players in the marketing system are interested. The mean retail price and mean wholesale price were regressed for the different marketplaces in order to determine their elasticity using the coefficients obtained from the regression analysis. In table 6, elasticity results revealed values that were less than one. As a result, a unit shift in the market's wholesale price of cattle led to a decrease in the retail price of those same cattle. The results imply that there is relatively little transmission along the chain. This restricts the likelihood of all increments from wholesalers to retailers. Relatively stiff competition within the market enclave could have resulted in the less than unity transmission. For instance Achoja (2010) in a study on price transmission and households demand for Frozen Fish in Delta State found that retail price has positive and significant response (co-integration) with farm gate price of Frozen Fish. He further averred that wholesale price is a response to price signals from farm gate price and that retail price depends on wholesale price signals. However, Acquah *et al*, (2012) reported poor price transmission for cassava markets in Ghana.

Table 6: Elasticity of Retail - Wholesale Market Price in the Study Area

State	Market	Elasticity (P*e*)
Lagos	Sabo	0.1120
	Agege	0.0801
	Alaba	0.0341
	Igan	0.1448
	Imota	0.3039
Ogun	Imowo	0.0568
	Mowe	0.0809
	Ikeolu	0.1288
	Corner	0.4636
	Berger	0.3113
Oyo	Kara	0.1227
	Sango	0.0341
	Akinyele	0.2489
	Bodija	0.3287
	Oke- Ife	0.5035

Conclusions and Recommendations

In the circumstance of the results obtained from this study, the following major conclusions were drawn: In the research area, a sizable portion of cattle traders are quite young. The relatively youthful age will affect their propensity to adopt new marketing strategies and technologies and to cope with the difficulties that frequently accompany the cattle trade in Southwest Nigeria. Inadequate supporting market infrastructure that could assist efficient service offering in the market exists. The cattle markets were highly concentrated for retailers than wholesalers with poor price linkage and collusion practices. Cattle marketing was profitable but the

marketing system was inefficient while the lack of strong correlation among the retailers and wholesalers market prices showed evidence of poor linkage, an indication of possible collusion practices. The low-price signals between markets exhibited poor communication and proof of the markets' independence. Thus, the marketing system for cattle in this case can be regarded to be poorly integrated.

Based on the findings and conclusions drawn from this study, a number of policy implications arose and appropriate recommendations to improve on cattle markets in Southwest, Nigeria are made as follows: On the average, the level of concentration of cattle markets was moderate. Thus, policy emphasis should be directed at frameworks that will eliminate impediments to the entrance of new market participants.

References

Adamu, A., Filani, M. and Mamman, A.A. (2005). Market and Transport Institutions in Nigeria's Livestock Trade: Case Studies from Sokoto and Ibadan. Briefing report; CNTR 04 5785 University of Middlesex, UK and The Nigerian Marketing Network, pp 197.

Adenegan, K. O., Adeoye, I.B. and I. Ibidapo, (2012). Spatial Price Analysis of Tomatoes in Nigeria, *International Journal of Management and Marketing Research*, 5(2): 31-38.

Afolabi, J.A. (2012). Evaluation of Poultry Egg Marketing in South-Western Nigeria. *International Journal of Poultry Science*, 6 (5), 362-366.

Agholor, I.A. (2013). Analysis of Constraints of Rural Beef Cattle Cooperative Farmers: A Case Study of Ga-kibi, Norma and Mogalakwena in Blouberg SA: *Journal of Agricultural Science;* 5 (8): 11.

Akanni, K.A. (2013). Spatial Integration and Price Communication in Foodgrains Markets in Ogun State of Nigeria, *African Journal of Agricultural Research. (AJAR),* 8 (28): 3789-3805.

Baffes, J. and Ajwad, M.I. (2001). Identifying Price Linkages: A Review of the Literature and an Application to the World Market of Cotton. *Applied Economics*, 33: 1927-1941.

Central Bank of Nigeria (2012): Statistical Bulletin, Central Bank of Nigeria, pp 1-231

Darryl, H. and James, R. (2004): Measuring Industry Concentration in Canada's Food Processing Sectors, Agriculture and Rural Working Paper Series, Working Paper No. 70, University of Manitoba, pp. 5–6

Egwuma, A.E., Muhammed, O.A. Ojeleye, Y.U. Oladimeji, and A.A. Hassan (2019). Analysis of Structure and Efficiency of Cassava Marketing in Ado–Ekiti Local Government Area of Ekiti State, Nigeria *Nigerian Journal of Basic and Applied Science,* 27(2): 62 – 69

Engle, R.F. and Granger, C.W.J. (1987). Cointegration and Error Correction: Representation, Estimation and Testing, *Econometrica*, 55: 251-276.

Erhabor, P. O., Ahmadu, J. and Ingawa, S.A. (2008). Efficiency of Beef Marketing in Edo State, Nigeria. In: Aiyedun, E. A, Idisi, P.O., Nmadu,

J.N. (Eds). Theme: Consolidation of Growth and Development of Agricultural Sector, Proceedings of the 10th Annual National Conference of the Nigerian Association of Agricultural Economists (NAAE). University of Abuja. Pp.570 – 577.

Filani, M.O (2006). Transport Market Study- The Bodija Cattle Market in Ibadan. Department of Geography, University of Ibadan, Nigeria. p 22.

Food and Agriculture Organisation (2006): Food and Agricultural Organisation Statistical Service http://FAOstat.FAO.web.org

Food and Agriculture Organisation (2013): FAO Statistical Yearbook 2013, World Food and Agriculture. Food and Agriculture Organization of the United Nations Rome. p. 289.

Food and Agriculture Organisation (2007). Responding to the livestock revolution, in: Livestock Policy Brief 01, Livestock Information Sector Analysis and Policy Branch, Animal Production and Health Division, FAO, Rome, p. 8.

Food and Agriculture Organisation (2016). State of Food and Agriculture; Climate Change, Agriculture and Food Security Rome, pp. 1-188.

Girei, A.A., Dire, B. and Bello, B.H. (2013): Economics of Cattle Marketing on the Socio-economic Characteristics of Cattle Marketers in Central Zone of Adamawa State, Nigeria *International Journal of Advanced Agricultural Research,* 2: 1-5.

Goletti, F., Ahmed, R. and Farid, N. (1995). Structural Determinants of Market Integration: The Case of Rice Markets in Bangladesh. *The Developing Economies,* 33:185–202.

Hassan, M.R. (2009). Assessment of Efficiency in Livestock Markets in Tanzania: The Case of Primary Livestock Markets in Morogoro Region. MSc dissertation submitted in the Agricultural Economics Department of Sokoine University of Agriculture, Morogoro, Tanzania. P. 119

Hrazdil, R. and Zhang, R. (2012). The Importance of Industry Classification in Concentration Ratios. *Economic Letters*, 114 (2): 224 -227.

Jayaraj, D. (1992). Spatial Pricing Efficiency in Groundnut Markets in Tamil Nadu, India. *Indian Journal of Agricultural Economics,* 47(1): 79-89.

Juma, G.P., Drucker, A.G., Baltenweck, I. and Ngigi, M. (2006). Market Power and Efficiency in Indigenous Small Ruminant Marketing Channels in Marsabit, Kenya. Paper presented at the International Conference on Connecting Science, Society and Development: Development Studies Association (DSA) held at the University of Sussex, 18-20 September 2007. Nairobi (Kenya): p. 11

Kennedy, P. (2003). *A Guide to Econometrics*, Cambridge, Massachusetts: The MIT Press.

Kohls, R.L. and Uhls, N.U. (2002). *Marketing of Agricultural Products*, 9th ed. Macmillan Publishing, p. 173.

Krivka, Algirdas (2010). The Elements of Competitive Environment of an Enterprise: A Case of Oligopolic

Markets Comparative Analysis. *Science – Future of Lithuania*, 2(2): 32–37.

Lawal-Adebowale, O.A. (2012). Dynamics of Ruminant Livestock Management in the Context of the Nigerian Agricultural System. INTECH. http://creativecommons.org/licenses/by/3.0.

Lise, W. and Tol, R. (2002). Impact of Climate on Tourism Demand, *Climatic Change*, 55 (4): 429-449.

Little, P.D., Smith, K., Cellarius, B.A., Coppock, D.L. and Barrett, C.B. (2001). Avoiding Disaster: Diversification and Risk Management among East African Herders. *Development and Change*. 32: 401–33.

Lundhal, M. (1983). Price Series Correlation and Market Integration: Some Evidence from Haiti. *Ibro-American, Journal of Latin American Studies*, 13(1): 61-76

Mafimisebi, T.E., Oguntade, A.E. and Mafimisebi, O.E. (2010). Re-engineering Agriculture for Enhanced Performance through Financing. *Journal of Economics, Finance and Administrative Sciences*, 15(29): 35 - 49.

Mafimisebi, T.E. (2011). Spatial Price Equilibrium and Fish Market Integration. *Journal of Fisheries and Livestock Prod*, 3(2):100-135.

Mafimisebi, T.E. (2012). Spatial Equilibrium, Market Integration and Price Exogeneity in Dry Fish Marketing in Nigeria: A Vector Auto-regressive, (VAR) Approach. *Journal of Economics,* 17: 31-37.

Mafimisebi, T.E., Bobola, O.M. and Mafimisebi, O.E. (2013).

Fundamentals of Cattle Marketing in Southwest, Nigeria: Analysing Market Intermediaries, Price Formation and Yield Performance, Fourth International Conference, September 22-25, 2013*,* Hammamet, Tunisia 161462, African Association of Agricultural Economists; p. 24

Mukaso, C., Ojo, A.O., Adepujo, S.O. and Dabo, A. (2012). Market Analysis of Cattle in Southern Kaduna State. *Science Journal of Agricultural Research and Management*, 2 (12): 196.

Musa, Y.M., Iheanacho, A.C. and Nyiatagher, Z.T. (2018). Analysis of Channel and Structure of Cattle Marketing Intermediaries in Mubi Local Government Area of Adamawa State, Nigeria. *International Journal of Environment, Agriculture and Biotechnology,* 3(2):4 33-440.

Nasiru, M. (2012). Economics of Livestock Marketing in Gamawa Local Government Area, Bauchi State, Nigeria. 8th AFMA Congress, November 25-29, 2012, Nairobi, Kenya. pp 411-424

National Bureau of Statistics (2014). Statistical Reports on Women and Children, National Bureau of Statistics, 2013, p. 130

Okeoghene, E.O. (2013). Assessment of the Marketing of Frozen Fish (Iced Fish) in Edo State, Nigeria. *Asian Journal of Business Management,* 5(4): 353 – 357.

Okumadewa, F.Y. and Mafimisebi, T.E. (2006). Are Middlemen Really Exploitative? Empirical Evidence from the Sun-dried Fish Market in Southwest, Nigeria. In: *Re-building*

Fisheries in an Uncertain Environment, CD-ROM of the 13th Biennial Conference of the International Institute of Fisheries Economics and Trade. p. I2.

Oladejo, J.A. and Sanusi, W.A. (2008). Marketing Analysis of Plantain in Owo and Ose Local Government Areas of Ondo State, Nigeria. *International Journal of Agricultural Economics and Rural Developmen*t, 1(2): 93-101.

Olayemi, J.K. (1996). *Food security in Nigeria*. The report of a research study sponsored by Development Policy Centre, Ibadan. Nigeria.

Oluwafemi, R.A. (2001). Study of Tsetse fly and Bovine Trypanosomosis in the Biological Control of Tsetse Fly Project Area in Lafia Local Government of Nasarawa State, Nigeria. An Unpublished Master's Degree Thesis, Federal University of Technology, Akure. Ondo State, pp 165.

Ruttoh, J.K., Bett, E.K. and Nyairo, N. (2018). Empirical Analysis of Structure and Conduct of Tomato Marketing in Loitoktok, Kajiado County, Kenya. *International Journal of Agricultural Extension*

and Rural Development, 6(4): 628-638.

Tibi, K.N. and Aphunu, A. (2010): Analysis of Cattle Market in Delta State- The Supply Determinants. *African Journal of General Agriculture,* 6: 199-203.

Todaro, M.P. and Smith, S.C. (2014). *Human Capital: Education and Health in Economic Development.* 12th Ed. The Pearson Series in Economics. Pp 382-425

Udensi, I.E. (2003). Agricultural Marketing of Poultry Products in North Bank LGA Makurdi, *Research Journal of Agricultural and Environmental Management*. 2(8): 197 – 201.

Udoh, E.J. and Sunday, B.A. (2007). Estimating Exportable Tree Crop Relative Price Variability and Inflation movement under different Policy Regimes in Nigeria. *European Journal of Social Science,* 5(2): 17-26.

Umar, Y., Nasiru, H. and Ogwuche, P. (2014). Factors Influencing Profitability among Gum Arabic Marketers in North-Eastern Nigeria, *Direct Research Journal of Agriculture and Food Science*, 2(4): 33-39.