IMPACT OF LIVESTOCK FARMING ON ECONOMIC GROWTH IN NIGERIA

By

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Abstract

This study examined the impact of livestock farming on economic growth in Nigeria from 1990 to 2021. It specifically examined the impact of livestock produce, value loans guaranteed to livestock farming and livestock exports on the economic growth of Nigeria. The study adopted ex-post facto research design, data were collected using both descriptive and quantitative analytical methods and the data were analysed using Vector Autoregressive (VAR) model. The study used ADF to check for stationarity properties of the variables used in the study. The normalized cointegration estimates were used to examine the long-run relationship between livestock farming and economic growth in Nigeria. Furthermore, the Johansen cointegration Vector Error Correction Mechanism (VECM) was used, specifically to know the speed of adjustment, that is, the possibility of the oscillated variables to random walk back to their equilibrium values. Findings revealed that livestock produce (LTP) has a negative and significant effect on the growth of real Gross Domestic Product in Nigeria in the long-run; that value of loans guaranteed to livestock has positive and significant influence on the growth of the Nigeria economy in the long-run; and that livestock export has negative but significant effect on real gross domestic product in Nigeria during the period of the study. The study therefore recommended among others that the livestock subsector must be given the needed attention through incentives by banks and government and appropriate legislative framework for the protection of infant and weak livestock producers should be put in place to encourage the consumption of domestically produced livestock produce.

Keywords: Livestock Farming, Growth, Livestock Produce, Livestock Export, Nigeria

Introduction

Livestock systems occupy about 30 percent of the planet's ice-free terrestrial surface area (Steinfeld et al., 2017). Currently livestock is one of the fastest growing agricultural subsectors in developing countries. Globally, livestock contributes about 40 percent of the agricultural gross domestic product (GDP) and constitutes about 30 percent of the agricultural

GDP in the developing world (World Bank, 2019). This growth is driven by the rapidly increasing demand for livestock products, this demand being driven by population growth, urbanization and increasing incomes in developing countries (Delgado, 2020). Livestock is a major contributor of food and nutritional security, and serves as an important source of livelihood for nearly one billion poor people in developing countries (Frans et al., 2016). Keeping livestock is an important provider of nutrients and traction for growing crops in a smallholder system. Livestock products contribute 17 percent to protein consumption globally (Rosegrant, 2018).

The livestock industry as an important component of general agriculture is expected to be a key contributor to national development. Animal products are responsible for one-sixth of the human food energy and also more than one-third of the protein requirement on a global basis (Bradford, 1999). Animal production trends are also said to be influenced by strong demand-driven factors such as population growth, urbanization, income growth and changing customer services which are of two categories: the modern demand driven and capital intensive non-ruminant (swine and birds) sector and the traditional resource-driven and labour intensive ruminant (cattle, sheep and goats) sector (Devendra, 2012; Devendra, 2017). The livestock sector makes diverse contributions to rural livelihoods and to agriculture as a whole. Growth of livestock sector activity therefore stimulates growth of the overall economy, through direct income impacts on households engaged in livestock production and via a web of indirect horizontal and vertical multiplier linkages along expenditure and supply chains. As posited by the Food and Agriculture Organization, FAO (2012), the strength of the income growth and poverty reduction impacts that are attributable to livestock sector development, on the agriculture sector and on the overall economy, depends on: the size of the livestock sector relative to agriculture and to the overall economy; the strength and extent of the linkages between the livestock sector and the rest of the economy; the use intensity of the factor that poor households are primarily endowed with (labour) in the livestock and linked growth sectors; and the consumption patterns for meat, animal products and other allied food and non-food goods, but pertain more narrowly to livestock as a subsector of agrifood activities and the economy as a whole.

According to FAO (2012), in 2007 the average share of the livestock sector in agricultural GDP was about 35 percent, varying among country groupings from a low of 23 percent in low-income countries to highs in middle-income developing regions, such as 43 percent in

Latin America and the Caribbean and 45 percent in Eastern Europe and Central Asia. While the stylized pattern is that the share of agricultural GDP in the overall economy tends to decline as countries move from lower-income to middle-income status, the share of the livestock sector in agricultural GDP tends to increase. This pattern is consistent with the emergence and modernization of the agricultural sector. As countries move up the development ladder, although the relative importance of agriculture in the total economy may decline, the sectors with higher value added and producing goods with higher income elasticities, such as livestock, fruits and vegetables, expand as the formerly dominant staple goods contract in relative terms. Focusing on low-income countries, where poverty incidence and depth are highest, the importance of the livestock sector as a catalyst for poverty reduction lies in its superior growth potential within agriculture and the rural economy.

Another factor that influences the size of the income and growth multiplier effects from the livestock sector relates to the strength of linkages between the livestock sector and the rest of the economy. Using the sample countries from the Food and Agriculture Organization-Rural Income Generating Activities (FAO-RIGA) dataset, FAO (2012), suggested that purely subsistence households are rare, and that the vast majority of rural households engage in market activities, even though they also produce food (mainly staples) for home consumption. In seven of the 12 sample countries, farm households sold between 30 and 68 percent of their livestock produce, and the poorest households (bottom quintile) sold about the same proportion as their wealthier counterparts. This confirms the tight linkage between rural livestock producers and the local economy, to which they supply primary product to the first-level exchange point in the whole supply chain. It is shown that the impressive growth in demand for livestock products in developing countries is skewed towards more rapid demand growth in urban centres (than in rural areas) as urbanization progresses. Thus, from the first market exchange link for livestock products, in rural areas, the raw material will undergo product transformation and transport at various stages of processing and value addition along the supply chain, until it reaches the final consumers in urban centres. Along this chain, the consumption and production income multipliers will operate to propagate output, employment and income benefits across the economy. Livestock product processing tends to be labour-intensive and mechanization is difficult and costly, leading to substantial employment opportunities. In Bangladesh, for example, where milk is processed into an array of high-value sweets, it has been estimated that some ten jobs are created for every 100 litres of milk

marketed (Omore, et al, 2018). Similarly, manual poultry processing currently provides direct employment to nearly 5000 workers in the main poultry market of Delhi (Gangwar, Saran & Kumar, 2010).

The expenditure patterns in developing countries suggest that a large proportion of the additional income generated by growth in the rural livestock sector will continue to be spent on food products, among which livestock and dairy products will become increasingly important relative to staples in the household food budget. However, as higher levels of income are attained, the non-food component will also grow, in both absolute and relative (share of expenditure) terms. Within the food basket, the increasing importance of livestock generally and dairy products in particular represents a strong consumption linkage that reinforces the emerging agrifood demand that can be met by rural households (Ojiako & Olayode, 2018). This will drive growth to a desired level if properly harnessed and managed.

The motivation for this study stems from the obvious fact that more emphasis has been laid on crop farming as against livestock production while does also, not just constitute an important agricultural produce but also, has a significance contribution to economic growth. Hence the study looks at the relationship between livestock farming and economic growth in Nigeria.

Several studies have concluded that Nigeria has not been able to take full advantage of its livestock production potentials to achieve remarkable economic progress. Few studies (Amire & Arigbede, 2016; Lewis, Oluyemisi, & Ajibola, 2013; Onunze, 2012 and Dharmasiri, 2009) have often concluded that the economy of Nigeria has grown overtime as a result of agricultural productivity though the studies have used agricultural productivity as a whole to analyse its possible effect on economic growth of Nigeria. Similarly, contemporary debates, and researchers, on the macroeconomic dynamics have often primarily addressed broadly the short run and long-run implications of agriculture on economic growth ignoring the possible short-run and long term effects of livestock farming to the sector and alternative revenue source option.

The fast growing population of Nigeria is threatened with the problem of food insecurity and poverty which can be addressed with a more developed animal production sector in addition to other sectors (Fasoyiro & Taiwo, 2019). The average Nigerian still consumes far less animal protein than his counterpart in the developed world because the animal production industry is still in infancy due to hydra-headed problems and the per capita income is low

leading to a consumption of less than 9 grams of animal protein per capita per day as compared to over 50 grams per capita per day in North America and Europe (Bolan et al., 2013). Production growth in the livestock subsector of the agricultural sector in Nigeria has been meager. This is true basically stemming from the fact that the agricultural practice of livestock farming is only left to a particular ethnic group leading to underproduction and clashes between the ethnic group the nomadic Fulani herders and the farmers who are basically into crop production.

Moreover, livestock farming remains a significant economic base of Nigeria whose diversification outcomes have serious long-term economic growth impacts. Instead of laying so much emphasis on agricultural productivity that is widely discussed by many scholars, it is more practical and imperative to examine the dynamics of livestock farming towards achieving long-run economic growth in Nigeria. Given the operational problem above, this study therefore, examine the impact of livestock farming on economic growth of Nigeria so that the livestock farming subsector of agriculture in Nigeria can be reversed, in the light of unbalanced growth theory to achieve sustainable economic growth.

The Specific Objectives of this Study are to;

i. evaluate the impact of livestock produce on economic growth of Nigeria.
ii. examine the impact of value of loans guaranteed to livestock farmers on economic growth of Nigeria.
iii. assess the impact of livestock exports on the economic growth of Nigeria.

The Hypotheses of this Study are;

H_{01}: Livestock produce has no significant impact on economic growth of Nigeria.

H_{02}: Value of loans guaranteed to livestock farmers has no significant impact on economic growth of Nigeria.

H_{03}: Livestock exports have no significant impact on the economic growth of Nigeria.

Literature Review

Concept of Livestock Farming

Livestock farming is the rearing of animals for food and for other human uses. The word ‘livestock’ applies primarily to cattle or dairy cows, chickens, goats, pigs, horses and sheep. Today, even animals like donkeys, mules, rabbits and insects such as bees are being raised as

part of livestock farming. According to Holden and Garrigus (n.d.), livestock farming is the raising of animals for use or for pleasure. They pointed out that livestock includes both beef and dairy cattle, pigs, sheep, goats, horses, mules, asses, buffalo, and camels; the raising of birds commercially for meat or eggs (i.e., chickens, turkeys, ducks, geese, guinea fowl, and squabs) is also considered as part of livestock farming. Livestock is commonly defined as domesticated animals raised in an agricultural setting to produce labour and commodities such as meat, eggs, milk, fur, leather, and wool (Automated Clearing House (AHC), 2019). The term is sometimes used to refer solely to those that are bred for consumption, while other times it refers only to farmed ruminants, such as cattle and goats. The United States Department of Agriculture (USDA) mentions pork, veal, beef, and lamb are all classified as livestock and all livestock is considered to be red meats (USDA, 2012).

The livestock industry as an important component of general agriculture is a key contributor to economic growth and development of any nation. In addition to having the capacity for earning revenue for the governments, it provides employment, food, farm energy, manure, fuel and transport (Nuru, 1986). As Fakoya (2017) has succinctly argued, livestock, especially ruminant production, is the most efficient user of uncultivated land and contribute evidently to crop production. Efficient crop-livestock integration systems have the tendency of allowing nutrients to be recycled more effectively on the farm thereby enhancing crops' yield. Under such a system livestock, can be fed on crop residues like straw, damaged fruits and grains, as well as other products that would have posed a major waste disposal problem (Fakoya, 2017).

Livestock Produce

Livestock produce includes labour and commodities such as meat, eggs, milk, fur, leather, and wool, raised from domesticated animals in an agricultural setting. All these are measured in monetary terms, in this case in naira.

Livestock and livestock products (LLPs) are estimated to make up over half of the total value of agricultural gross output in the industrialised countries, and about a third of the total in the developing countries (Bruinsma, 2003). The global importance of livestock and their products is increasing as consumer demand in the developing countries expands with population growth and rising incomes. This growth in consumption is reflected in improvements in the average human nutritional status due to the intake of animal protein. The resultant changes have been dubbed 'the next food revolution' and the growth in

developing country consumption of animal products is predicted to continue at least until 2020 (Delgado et al., 2001).

Livestock products such as meat, milk and eggs are more costly, per tonne and per unit of food energy, than staple crop products, so diets in most developing countries generally include lower levels of intake of animal products than those in the developed, or industrialised, countries. To some extent, the lower levels, of meat, egg and milk use, are compensated for by higher levels of cereal supply and consumption per person. However, as incomes rise, in the developing countries, consumers seek more variety and better quality foods in their diets. Hence demand for livestock products rises rapidly, an effect which is also driven by quite rapid growth in the number of consumers. However, in many of these countries, domestic production has failed to keep pace with the growing demand so imports of livestock products have increased (Upton, 2014).

Livestock have an important role to play in national economic growth, and within the agricultural sector of the Nigerian economy. According to Upton (2014), livestock make a large and growing contribution to the nutrition of expanding populations, and contribute to the trade balance. Livestock-crop interactions are important in integrated mixed farming systems in much of the developing world. Furthermore livestock production provides employment and livelihoods for many of the world's rural poor. However, there are major differences between the agro- ecological and economic environments in different parts of the developing world, between animal species, between production systems. Changes have also occurred over time. These issues will be explored in more detail in the following sections.

Value of Loans Guaranteed to Livestock farmers

A guaranteed loan is a loan that a third party guarantees or assumes the debt obligation for in the event that the borrower defaults (CBN, 2011). Sometimes, a guaranteed loan is guaranteed by a government agency, which will purchase the debt from the lending financial institution and take on responsibility for the loan. It is a way for people who need financial assistance to secure funds when they otherwise may not qualify to acquire them. And the guarantee means that the lending institution does not incur excessive risk in issuing these loans. This is measured by the monetary value of these loans available to finance livestock farming activities in Nigeria based on official data reported by CBN (CBN, 2011).The root from which this loan comes from is the Agricultural credit Guarantee Scheme (ACGSF).

The ACGSF was established by Decree No. 20 of 1977, and started operations in April, 1978. Its original share capital and paid-up capital were ₦100 million and ₦85.6 million, respectively. The Federal Government holds 60% and the Central Bank of Nigeria, 40% of the shares. The capital base of the Scheme was increased to ₦3 billion in March, 2001. The Fund guarantees credit facilities extended to farmers by banks up to 75% of the amount in default net of any security realized. The Fund is managed by the Central Bank of Nigeria, which handles the day-to-day operations of the Scheme (Egwu, 2016).The scheme was designed to encourage commercial banks to increase lending to the agricultural sector by providing guarantees against inherent risk in agricultural lending. A component of this loan scheme devoted to livestock farming – loans guaranteed to livestock farming, is of most interest to the current dissertation.

Livestock Exports

This is the total amount of money realized from domesticated animals and animal products sold to other countries. Livestock export is vital to many developing economies especially countries located in the Horn of Africa. Humans get a main source of protein from animals and these animals again provide income, employment and foreign exchange for the country. The consumption of livestock products in the world has increased rapidly; this provides opportunities for more livestock exports (Leonard, 2007).

Economic Growth

Economic growth generally, can be described as a positive change in the level of production of goods and services by a country over a certain period of time. In other words, economic growth is the increase in the value of goods and services produced by an economy. It can also be referred to as the increase in the gross domestic product. It is a relatively straight forward measure of output and gives an idea of how well off a country is, compared with competitors and past performance. It is a beacon that helps policy makers steer the economy towards key economic objectives. Finally, it is a measure of the wellbeing of a State; usually in real terms, all other things being equal (Enu, 2019).

According to Haller (2012), economic growth is, in a limited sense, an increase of the national income per capita, and it involves the analysis, especially in quantitative terms, of this process, with a focus on the functional relations between the endogenous variables; in a wider

sense, it involves the increase of the GDP, GNP and NI, therefore of the national wealth, including the production capacity, expressed in both absolute and relative size, per capita, encompassing also the structural modifications of the economy. In other words, economic growth is the process of increasing the sizes of national economies, the macro-economic indications, especially the GDP per capita, in an ascendant but not necessarily linear direction, with positive effects on the economic-social sector.

Haller (2012) also concludes that economic growth is obtained by an efficient use of the available resources and by increasing the capacity of production of a country. It facilitates the redistribution of incomes between population and society. The cumulative effects, the small differences of the increase rates, become big for periods of one decade or more. It is easier to redistribute the income in a dynamic, growing society, than in a static one. When the rate of economic growth is big, the production of goods and services rises and, consequently, unemployment rate decreases, the number of job opportunities rises, as well as the population's standard of life. We shall, for the purpose of this study, employ the definition of economic growth by Haller (2012) as the working definition because it is broad-based and by far more encompassing in explaining economic growth than others.

The recognition that the determinants of long-term economic growth are a key macroeconomic problem was fortunately accompanied in the late 1980s by important advances in the theory of economic growth. This period featured the development of "endogenous-growth" models, in which the long-term rate of growth was determined within the model (Barro, 2009). A key feature of these models is a theory of technological progress, viewed as a process whereby purposeful research and application leads over time to new and better products and methods of production and to the adoption of superior technologies that were developed in other countries or sectors. One of the major contributions in this area, according to Barro (2009), is Romer (2006).

Empirical Review

Uzonwanne et al. (2023) examined the impact of livestock production on gross domestic product in Nigeria using time series data ranging from 1981 to 2021 to analyze the impact of livestock production on the gross domestic product (GDP) in the Nigerian economy. The study adopted auto-redistributed lag model (ARDL) techniques for the regression analysis. The result of the study shows that livestock production has positive and significant impact on

economic growth in Nigeria. The result of the study also posits that there is bidirectional relationship between livestock production and GDP in the Nigerian context. The study concluded that livestock production have positive and statistically significant impact on economic growth in Nigeria. The study recommends that government should continue to encourage livestock production in order to bring more inflow of funds which triggers economic growth.

Liu and Ahmed (2020) conducted a study on the Econometric Assessment of Livestock Production/Export and its impact on Economic Growth in Somalia. The neoclassical production function model with an extension was employed in this study and the data were taken from the food and agricultural organization and the World Bank from the period 1990 to 2015. This study utilized estimations on reliable econometric models such as Engel-Granger and Johansen Co-integration tests and the Granger Causality test. The outcomes of the study indicates that, cattle, sheep and goat export have a positive and significant relationship with economic growth, whereas, exports of camel have been found to have a negative and significant impact on economic growth. Base on the findings, this study recommends for implementation of policies that advances the effectiveness of veterinary services and the competence of staff in the quest for enhancement of livestock production. Moreover, the study advocates that, the government finance research activities on enhancing the value of camels as well as enhancing the quality of transport for camels.

Abdiaziz et al. (2019) carried out a study on the role of farming and livestock on Economic Growth in Mogadishu, Somalia. The study had two objectives which were; the first objective was to explore the impact of livestock farming on economic growth in Mogadishu, Somalia. The second objective was to investigate the relationship between the livestock production and economic growth in Mogadishu, Somalia. This study employed Descriptive Design and explanatory data on the agricultural production of livestock farming, and the Economic Growth from March-28 to June 2017. The study analysis how these two independent variables such as: farming and livestock production affects Economic Growth in Somalia. To examine the relation of Somalia's Economic Growth with the Agricultural production of Farming or Cultivations and Livestock the cross-sectional data collection was used. In this study the questions will be asked the intellectuals in Mogadishu-Somalia. This particular research is co-relation in nature. The sample size of this study was 80 respondents who were selected as convincing sampling observations from the period of March to June-2017.The researchers

checked regression hypothesis before taking place to further analysis. The dependent variable economic growth was normally divided or distributed to all the actors' independent variable. Two hypotheses were developed after reviewing the literature. The result analysis of regression shows that farming and livestock had a positive relationship with the economic development in Mogadishu, Somalia.

Adams (2016) carried out a study on economic impact of livestock production on the society: a case study of Ikare Akoko Ondo State; and submitted that there is a strong linkage between agriculture and the economy. The main objective of the study was to know the impact of livestock production on Nigeria's economy and the specific objectives were to: Access the socioeconomic characteristics of livestock farmers in the study area; identify the challenges of livestock production in Nigeria; and determine the economic impact of livestock production in Nigeria. Data was collected using a well-structured questionnaire using a two stage sampling technique of first selecting five types of livestock farmers which include the herdsmen, piggery, fishery, poultry and snail farmers, second was random selection of 35 livestock farmers for each of the five types of livestock farming. This makes it 175 questionnaires but had a return of 96 valid for the analysis of the study. Descriptive statistics was used to analyze the data. The result of the study identifies employment generation and income generation as the major benefit of livestock production, the major constraints of livestock production is death and disease of livestock production and also climate change impact. The study hereby recommend that the government should take livestock production as one of the major factor contributing to the economy and also put some policies in place for the growth of livestock productions.

Eke and Effiong (2016) conducted a study on the impact of capital accumulation on livestock production output in Nigeria. The study covered a period of 1980-2013. The objective was; to examine the effect of capital accumulation (Net National Savings NNS), Gross Capital Formation(GCF), Human Capital Formation(HCF)) on livestock production output in Nigeria, The study employed the Ordinary Least Squares (OLS) and the Co-integration/Error Correction method (ECM) as the main analytical tools. Livestock production output model was developed. The Livestock Production Output model results showed that the coefficient of ECM appeared with the right sign but statistically not significant at the 5% level. Durbin Watson value of 2.0 suggests less level of autocorrelation. The overall fit was satisfactory with an R-squared of 0.45 and F-statistic of 2.8 was significant at the 5% level. The result

showed that all the variables used in the model had positive impact on livestock production output but the impacts were not significant hence, the null hypotheses were accepted which states that capital accumulation (NNS, GCF, HCF) does not significantly affect livestock production output in Nigeria. The results showed that capital accumulation has positive implications for livestock production output in Nigeria. Government policies on capital Investment in the livestock sector should be increased and monitored to ensure that the target groups use the funds for the development of the livestock sector. Policies on National savings should be reviewed and strengthened. This is because net national savings is abysmally low in Nigeria hence it is not impacting significantly on growths especially growth in the livestock sector.

Endalew and Ayalev (2016) conducted an assessment of the role of livestock in Ethiopia. The objective of the study was to assess the role of livestock as a source of income, food, power and organic fertilizer as compared to the livestock population of the country. The domestication of animals and plants is considered to be one of the most important prerequisite for the rise of human civilization; specially, in developing countries. Livestock domestication is a foot step for the beginning of agriculture sector. In Ethiopia, agriculture is the main economic activity and more than 80% of Ethiopian population is dependent on agriculture of which livestock plays a very important role. Ethiopia is home to Africa's largest livestock population and it is the continent's top livestock producer and exporter. As different documents indicated, the country has about 53.9 million heads of cattle, 25.4 million sheep, 24.1 million goats, 0.91 million camels, 50.37 million poultries, 1.91 million horses, 6.74 million donkeys, 0.35 million mules and 5.21 million beehives. Livestock contributes to the production of food (meat, milk, eggs, honey, cheese and butter etc.), source of power (for cultivation, threshing, transportation etc.), means of income (national and household income), input for crop production (draught power and manure); and export earnings (live animals, meat, skin and hides). The livestock sector contributes much for the Economy of the country in general; and improvement of people's livelihood in particular. Therefore, policy makers, development agents, farm households and experts should encourage the livestock sector to bring the required output from the sector.

Theoretical Review

Theory of Unbalanced Growth

The theory of unbalanced growth as posited by Hirschman (1958) stressed on the need of investment in strategic sectors of the economy instead of all the sectors simultaneously as this major sector would serve as a propeller of growth for other sectors for rapid development and the accruement from these sectors utilized for development of other sectors. Other sectors would automatically develop themselves through what is called "linkage effect" (Wulwick, 1992). Hirschman posited that underdeveloped countries are characterized by low per capita income, income inequality, poverty, low productivity, high dependence on agriculture, high rate of consumption, low savings rate, high unemployment etc., hence less and scarce resource to direct towards many sectors. The real scarcity however stems from the ability to bring resources into play, thus Hirschman posited a big push (investment) in strategic selected industries or sectors of the economy and contends that deliberate unbalancing of the economy is the best method of development as development transcends from the major sectors of the economy to the minor, from one industry to another; from one firm to another.

Thus, if the economy is to be kept moving ahead, the maintenance of existing imbalances such as tension, disproportions and disequilibrium should be the goal as they can be seen from the angle of profit and losses. Hirschman further divides the initial investment into two related activities; directly productive activities and social overhead capital. The theory holds that an economy should chose to invest in one of these two fields. If an economy invests in Social infrastructure (e.g. roads, water sanitation, transport, banking), it is left for the people to utilize this infrastructure and push towards a growth in directly productive activities (e.g. mining, agriculture, manufacturing). Also, if an economy invests in directly productive activities, people eventually earn enough to work on building their own infrastructure. Whichever the type of investments, it will yield an 'extra dividend' of induced decisions resulting in additional investment and output. However, social overhead capital, and directly productive activities cannot be expanded simultaneously because of the limited ability to utilize resources. Going by this, if there is an improvement in power generation to the manufacturing firms, its induces acceleration in production and by so doing, the capacity utilization rate is improved, leading to an increase in output of the sector which further entails, higher investment and savings, product varieties among others.

This theory is relevant to this work as it situates the place of livestock farming as one channel through which economic growth can be achieved. This will stimulate and sustain growth of the economy in both the short and long run. Deliberate balancing of livestock sector will create a linkage for development of other sectors.

Methodology

The research design for this study is ex-post facto research design. Ex-post facto research design involves the ascertaining of the effect of past factors on the present happening or event. This research design is adopted for this study because of its strengths as the most appropriate design to use when it is impossible to select, control and manipulate all or any of the independent variables.

Data were analyzed using descriptive statistics and econometric analytical tools. The descriptive statistical tools that were used are tables, charts, percentages and averages (means). On the other hand, the econometric tools including the Unit Root tests for which the Augmented Dickey-Fuller (ADF) by Dickey & Fuller (1981) were conducted. The null hypothesis of ADF test was unit root, thus failure with respect to rejection implies unit root in the series, which is non-stationarity of the series. Following this test, the relevant cointegration test was used to examine the presence of any long-run relationship among the variables. To account for the sensitivity of results using the relevant approaches to cointegration to the choice of lag length, the Schwarz Information Criterion (SIC) and Akaike information criterion (AIC) were used.

The model developed for this study is specified below:

$$RGDP = f(LTP, VLGL, LEXP, INTR, EXR) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (1)$$

Where $RGDP$ is the real Gross Domestic Product, LTP is livestock produce, $VLGL$ is value of loan guaranteed to livestock farmer, $LEXP$ is livestock exports, $INTR$ is interest rate which is the cost of capital and EXR is exchange rate of naira to the US dollar. All these explanatory variables are obtained from work of scholars on the determinants of economic growth pertaining livestock farming as discussed in this dissertation.

The vector autoregression (VAR) model for measuring endogenous and weakly exogenous variables, known as VARX* (s,s*) model is stated as

$$y_t = f(LTP, VLGL, LEXP, INTR, EXR) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where y_t is a 6× 1 vector of the endogenous variables presented in equation (2).

In the baseline unrestricted VAR model, the vector of endogenous variables is stated as:

$$RGDP = f(LTP, VLGL, LEXP, INTR, EXR) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

The variables have been transformed in logarithm to achieve the growth purpose of the model so that the responsiveness of the regressand to changes in the regressors will be examined. Rightly, McClearly & Hay (1980) recommended a logarithmic transformation to curb heterogeneity of variance. The VARX* model for the 6 variables used is set up as the following system of stochastic equations:

$$lnRGDP = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$lnLTP = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$lnVLGL = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

$$lnLEXP = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_4 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$lnINT = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_5 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$lnEXR = \beta_0 + \beta_1 lnLTP_{t-1} + \beta_2 lnVLGL_{t-1} + \beta_3 lnLEXP_{t-1} + \beta_4 lnINTR_{t-1} + \beta_5 lnEXR_{t-1} + \beta_6 lnRGDP_{t-1} + V_6 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Results and Discussions

Descriptive Statistics

The data on the variables used in this study were computed in the form of descriptive statistics. The statistics include mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera, sum and sum squared deviation. These statistics were computed to evaluate the statistical properties of the variables that made the crux of the study. The results are presented in Table 1.

Table 1: Summary Statistics of the Variables used in the Study

Statistic	RGDP	LTP	VLGL	LEXP	INTR	EXR
Mean	33725.22	669.1729	485541.1	512.8245	13.06579	97.23500
Median	23068.85	547.2550	28802.40	168.2800	13.25000	101.0400
Maximum	69810.02	1208.130	2342247	2048.600	26.00000	307.0000
Minimum	13779.26	341.4100	4446.900	2.530000	6.000000	0.640000
Std. Dev.	19578.10	275.2313	707298.5	649.8042	4.100381	87.49680
Skewness	0.734406	0.739634	1.254495	1.172541	0.669171	0.795943
Kurtosis	1.996529	2.098814	3.142673	3.001064	4.231054	3.230607
Jarque-Bera	5.010239	4.750584	9.999363	8.707403	5.235529	4.096531
Probability	0.081666	0.092987	0.006740	0.012859	0.072966	0.128958
Sum	1281558.	25428.57	18450562	19487.33	496.5000	3694.930
Sum Sq. Dev.	1.42E+10	2802834.	1.85E+13	15623085	622.0855	283260.5
Observations	38	38	38	38	38	38

Source: Researcher's Computations from Eviews 10

A look at Table 1, has revealed that between 1981 and 2018, the values of real Gross Domestic Product (RGDP), livestock produce (LTP), value of loans guaranteed to livestock (VLGL), livestock export (LEXP), Interest rate (INTR), and Exchange rate (EXR) have averaged N33725.22 billion, N669.1729 billion, N485541.1 billion, N512.8245 billion, 13.066% and N97.24; and the maximum values of real Gross Domestic Product, livestock produce, value of loans guaranteed to livestock farmers, livestock exports, interest rate and exchange rate recorded in 2018, 2018, 2014, 2018, 1993 and 2018 are N69810.02 billion, N1208.130 billion, N2342247 billion, N2048.600 billion, 26% and N307 respectively; with their corresponding minimum values of N13779.26 billion, N341.41 billion, N4446.90

billion,N2.5300 billion, 6% and N0.64, been captured in 1984, 1981, 1991, 1981, 1981, and 1981 respectively. The deviation of real Gross Domestic Product, livestock produce, value of loans guaranteed to livestock, livestock exports, interest rate and exchange rate, from the expected showed N19578.10 billion, N275.23 billion, N707298.5 billion, N649.8042 billion, 4.10% and N87.50, respectively.

Unit Root Test Result

In order to avoid spurious regression results, stationarity properties of the study series were subjected to tests using the Augmented Dickey-Fuller (ADF). The results gotten are presented in Table 2

Table 2: Stationarity Test Results

Variable	t-Statistic	Critical value @ 5%	Order of Integration	Decision
RGDP	-6.460910	-2.948404	I(1)	Reject H_0
LTP	-3.196700	-2.945842	I(1)	Reject H_0
VLGL	-3.815182	-2.976263	I(1)	Reject H_0
LEXP	-4.834582	-2.948404	I(1)	Reject H_0
INTR	-3.212879	-2.943427	I(1)	Reject H_0
EXR	-5.386857	-2.945842	I(1)	Reject H_0

Source: Researcher's Computations from Eviews 10

Table 4.3 shows the stationarity test results for the series of the study. The table reveals that all the series failed to attain stationarity at levels; they however, become stationary after they were differenced once. Therefore, the null hypotheses of the series having unit roots were rejected as indicated in the last column of Table 4.3.

Cointegration Test Result

Unit root results showed that all the variables used in the VAR framework to establish a long-run relationship among the variables were stationary at the first difference. Based on this, we have established the long-run relationship that existed among the variables used in the VAR system. We made use of the Johansen Cointegration technique as it is required of series whose order of integration is I(1). The Johansen Cointegration Tests were conducted and the results are shown in Table 3.

Table 3: Results of Unrestricted Cointegration Rank Tests (Trace & Maximum-Eigen Statistics)

Hypothesized no. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.727356	121.0119	107.3466	0.0047	0.727356	46.78513	43.41977	0.0208
At Most 1*	0.499591	74.22676	79.34145	0.1142	0.499591	24.92386	37.16359	0.5953
At Most 2	0.433644	49.30289	55.24578	0.1505	0.433644	20.46718	30.81507	0.5134
At Most 3	0.342046	28.83572	35.01090	0.1964	0.342046	15.07031	24.25202	0.4916
At Most 4	0.276906	13.76540	18.39771	0.1972	0.276906	11.67180	17.14769	0.2620
At Most 5	0.056497	2.093601	3.841465	0.1479	0.056497	2.093601	3.841465	0.1479

Source: *Researcher's Computations from Eviews 10*

Trace test and Max-Eigen tests indicates 1 Co-integrating Equation(s) at the 0.05 level.
* denotes rejection of the hypotheses at the 0.05 level using the MacKinnon-Haug-Michelis (1999) p-values denoted by **.

Table 4.4 presents the Johansen Cointegration results. It shows that both the Trace test and Max-Eigen test have indicated one cointegrating equation each at 0.05 critical values. This is because the Trace and Max-Eigen statistics of 121.0119 and 46.78513 are greater than their respective critical values of 107.3466 and 43.41977 at 5 percent level of significance. We therefore reject the null hypothesis of None* of the hypothesized number of cointegrating equation(s) for both Trace and Max-Eigen statistics. For the remaining number of hypothesized cointegrating equations (ranging from At Most 1 to At Most 5), we cannot reject the null hypotheses as their Trace and Max-Eigen statistic values are less than their respective critical values at 0.05 critical level.

Conintegration Test Result Showing Long-Run Impact of Livestock Farming on Economic Growth in Nigeria

The presence of two cointegrating equations depicts that cointegrating relationship among variables used in the VAR system had been established. The nature of the long-run relationship between livestock farming and economic growth in Nigeria using the cointegrating coefficients normalized by b^1*s11*b=1 (the inverse matrix) was estimated and the results are presented in Equation 1.

$$lnRGDP = 22.57LTP^{*} + 0.0011VLGL^{*} - 7.16LEXP^{*} + 0.0713INTR - 0.0364EXR \ldots\ldots\ldots\ldots (4.1)$$
$$(12.27) \quad (0.00157) \quad (4.78) \quad (0.038) \quad (18.61)$$

Note: Standard error in parentheses.

* denotes that the coefficient is significant at 5 percent level.

Equation 4.1 shows estimates that have been obtained from the model to establish a long-run relationship between livestock farming and economic growth in Nigeria. These coefficients are treated as (partial) elasticities of RGDP with respect to the respective independent variables in the equation, since all other variables are held constant in each case when a particular variable is being treated. As shown in Equation 4.1, coefficients of *LTP, VLGL* and *LEXP* in the long-run are significant at 5 percent level of significance.

In Equation 1, a one percent increase in livestock produce (LTP) is associated with 22.57 per cent increase in the growth of RGDP (real gross domestic product) the size of the economy in the long-run. This finding conforms that of Olajide, Akinlabi & Tijani (2018), who reported that agricultural output as a whole had positive effect on economic growth of Nigeria. The results also show that a one percent increase in value of loans guaranteed to livestock (VLGL) is associated with *0.0011* per cent increase in RGDP. This means that the growth value of loans guaranteed to livestock has positive and significant influence on the growth of the Nigerian economy in the long-run. On theoretical grounds, there is strong basis for expecting VLGL to have a positive role in growth. This suggests that when there is an increase in the value of loans guaranteed to livestock farmers, RGDP will grow quickly because the farmers will have readily available cash to improve the feeding and health as well as other improved livestock farming strategies which would substantially increase the output from the sector thereby galvanizing economic growth in Nigeria. This finding is consistent with that of Ojiako & Olayode (2008) who reported that the growth of livestock precipitates growth in the overall economy.

The results also show that a one percent increase in livestock exports (LEXP) will lead to a decrease of 7.16 percent in the growth of real GDP. This relationship is significant at 5% level. This finding is contrary to that of Jie and Mohamoud (2018), who reported that livestock export variables have varied effects on economic growth of Somalia.

Interest rate (INTR) shows a positive relationship with real GDP. This results show that a one percent increases in interest rate is associated with a 0.0714 percent increase in the growth of the Nigerian economy (RGDP). This finding is inconsistent with that of Ewetan, Adebisi, Fakile, Urhie & Oduntan (2017), who reported that interest rate had a negative relationship

with the economic growth of Nigeria. This according to them was in line with a priori expectation.

Finally, the results of Equation 1 show that a one percent increase in exchange rate (EXR) will lead to a decrease of 79.04 percent of the growth of real GDP in the long-run. This suggests that when the EXR of the domestic currency (the naira) increases (appreciates), RGDP will grow slowly because the traditional crop and manufacturing exports will become less competitive, less attractive to importers, decrease export trade and weak output production in the economy.

Vector Error Correction Mechanism Test Result

The VAR models were selected on the basis of the lag order selected by the criteria. The results for the leading models in their first and second logarithmic differences on the short-run relationship between livestock farming and economic growth in Nigeria are presented in Table 4.

Table 4: Vector Error Correction Mechanism Test Result

Variables	Coefficient	Std. Errors	t-statistic
RGDP (-1)	0.540653	0.25993	2.08001*
RGDP (-2)	-0.153346	0.25860	-0.59299
LTP (-1)	-5.178932	13.0871	-0.39573
LTP (-2)	-11.95490	12.4131	-0.96309
VLGL(-1)	0.001635	0.00078	2.09630*
VLGL(-2)	0.000277	0.00078	0.35728*
LEXP(-1)	-11.06756	12.9602	-0.85396
LEXP(-2)	9.611402	15.7995	0.60834
INTR (-1)	38.59978	69.2666	0.55726
INTR (-2)	-68.89447	74.6351	-0.92308
EXR (-1)	1.647871	13.8924	0.11862
EXR (-2)	7.868938	12.0894	0.65090
ECM (-1)	-0.115301	0.02236	0.94234*
C	1407.153	745.388	1.88781

Source: Researcher's Computations from Eviews 10

Rgdp is dependent variable

* denotes significance at the 5 percent level.

Table 4 shows the short-run VEC estimates on data relating to livestock farming and economic growth of Nigeria. The results show that in the short-run, the growth of RGDP in the current year is negatively influenced by the growth of livestock produce (LTP (-1)) in the previous year. This implies that a one percent increase in LTP (-1) is associated with

5.178932 percent decrease in RGDP. Even during the second year lag, growth of livestock produce (LTP (-1)) still exerts negative influence on the growth of RGDP in Nigeria in the short-run. This is contrary to expectations and may be attributed to the incessant farmers-herders crisis across the country, high cost of animal feeds, livestock diseases, lack of access to veterinary services- vaccines and drugs among others.

The result also show however that value of loans guaranteed to livestock (VLGL (-1)) had a positive influence on RGDP in the current year. Even during the second year lag, growth of value of loans guaranteed to livestock (VLGL (-2)) still have positive influence on the growth of RGDP in Nigeria in the short-run. The result show that livestock exports (LEXP (-1)) in the first year lag exerts negative influence on the growth of RGDP, however, in the second year lag, livestock exports (LEXP (-2)) exert positive influence on the growth of RGDP in the short-run. Contrary to expectations, interest rate (INTR (-1)) in the first year lag, as well as exchange rate (EXR (-1)) and EXR (-2), all collectively exert positive influence on the growth of RGDP in the short-run. However, in the second year lag, interest rate (INTR (-2)) exerts negative influence on RGDP as expected.

Our first objective was to evaluate the impact of livestock produce on economic growth of Nigeria. The results obtained show that livestock produce has a negative but significant impact of on economic growth of Nigeria. This results is in consonance with that of Adams (2016) who documented that livestock produce have far reaching economic impact which include, employment generation, income generation through taxes, increases savings and investment, provision of foreign exchange earnings, provision of food and raw materials for industries. All these goes a long way in galvanizing economic growth as rightly pointed out in the determinants of economic growth. This negative influence of livestock produce on the growth of the Nigerian economy in the long-run could be attributed to the persistent wastage of produce from livestock and the incessant cattle rustling. With this finding, we reject the null hypothesis and conclude that livestock produce has significant impact on economic growth of Nigeria.

Our second objective was to determine the impact of value of loans guaranteed to livestock farmers on economic growth of Nigeria. The results revealed that value of loans guaranteed to livestock farmers has positive and significant influence on the growth of the Nigerian economy in the long-run. This alludes that when there is an increase in the value of loans

guaranteed to livestock farmers, RGDP will grow quickly because the farmers will have readily available cash to improve the feeding and health of their livestock which would substantially increase the output from the sector thereby galvanizing economic growth in Nigeria.

Finally, our third and last objective was to assess the effect of livestock exports on the economic growth of Nigeria. The results of the VAR system aim at finding the nature of long-run relationship between LEXP and RGDP using the cointegrating coefficients normalized by b^1*s11*b=1 (the inverse matrix) revealed that livestock export has negative but significant effect on real gross domestic product in Nigeria during the period of the study. The result of the vector error correction model within the VAR framework revealed that livestock exports (LEXP (-1)) in the first year lag exerts negative influence on the growth of RGDP, however, in the second year lag, livestock exports (LEXP (-2)) exert positive influence on the growth of RGDP in the short-run. The significant relationship between livestock exports and economic growth of Nigeria implies the rejection of the null hypothesis that Livestock exports have no significant effect on the economic growth of Nigeria. This alludes that the country's livestock exports have tended to significantly influence her economic growth during the period of the study.

Conclusion and Recommendations

Conclusion

Based on the findings of this research, it can be concluded that livestock farming somewhat has negatively influenced the long-run economic growth process in Nigeria. It can also be concluded that the negative influence of livestock produce on the economic growth of Nigeria in the long-run suggest that the agricultural produce generally are poorly preserved for future domestic consumption and exports. This further demonstrates that the economy is poorly diversified and is a 'mono-cultural economy' which is heavily dependent on oil exports for its survival. Production growth in the livestock subsector of the agricultural sector in Nigeria has been meager. This is true basically stemming from the fact that the agricultural practice of livestock farming is only left to a particular ethnic group leading to underproduction and clashes between the ethnic groups the nomadic Fulani herders and the farmers (who are basically into crop production). Judging from the descriptive statistics and most especially the variable that talks about value of loans guarantee to livestock farmers, Nigerian financial

institutions especially banks have failed to provide livestock farmers with the needed financial incentives to improve livestock production. Worse still, government has failed wholly in terms of giving incentives to livestock farmers. This suggests that Nigeria has not unbalanced her growth policies in favour of the livestock subsector to achieve long-run economic growth impacts. We can therefore conclude that the economy of Nigeria has not been unbalanced in favour of livestock farming as the prime mover of the economy not even in favour of the agricultural sector as a whole. Rather, favourable 'revenue tapping' policies are focused mainly on oil. The attention given to oil sector as the prime mover could also be shifted to livestock farming, if the country is sincere with her current diversification efforts in order to fully harness her livestock farming potentials towards achieving long term economic growth.

Recommendations

Firstly, just as interest was hitherto shifted to oil as the prime mover of the Nigerian economy, the agricultural sector, and the livestock subsector in particular, must be given the needed attention through incentives by banks and government. Instead of spending so much of the oil revenue for the importation of hides, skins, beef, pork, milk and other livestock produce, government revenue should be prudently targeted towards investment in tradable livestock sector of the economy.

Secondly, appropriate legislative framework for the protection of infant and weak livestock farmers should be put in place to encourage the consumption of domestically produced livestock produce. In fact, outright ban on the importation of all kinds of livestock consumables is been advocated.

Thirdly, government should see to the full implementation of the current National Livestock Development Plan. This is believed to go a long way in solving the problem of incessant farmers-herders crisis. Equally, attention should not only be given to cow rearing, but to all other forms of livestock.

Finally, Government and private sector investors should make concerted efforts geared towards establishing livestock-allied industries. This will reduce the wastage associated with livestock produce and also solve the problem of importation of processed meat.

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