Determinants of Level of Investment in Poultry and Piggery Enterprises in Abia State, Nigeria

Chima, A. A. and Timothy, C.

Department of Agribusiness and Management,
Michael Okpara University of Agriculture Umudike, Abia State, Nigeria
Corresponding Author's email: chimaamarachi68@gmail.com

Abstract
This study analysed the determinants of the level of investment in poultry and piggery enterprises in Abia State, Nigeria. A multi-stage random sampling technique was used in selecting the sample for study. Primary data were collected from 83 livestock enterprises comprising of 50 poultry enterprises and 33 piggery enterprises. Data collected were analyzed using Maximum Likelihood Stochastic (MLS) regression model. Findings showed that size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan, significantly determined the level of investment in poultry enterprise in Abia State, while size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan significantly determined the level of investment in the piggery enterprise. The study therefore recommends that both the government and other agricultural investors consider the various factors identified in this study that influence the level of investment in poultry and piggery enterprises in Abia State in order to make a profitable investment that will provide job opportunities for the masses, increase the availability of chicken and pork meat, and generate more funds to run the state's affairs.

Keywords: Capital, structure, poultry, piggery, enterprises, Abia State

Introduction
Investment in livestock enterprises is often seen as a wise move toward expanding livestock production and improving the degree of profit realized by livestock enterprise owners. Livestock production is still a significant sub-sector in Nigeria, and improving performance through an appropriate financial structure is one of the country's fundamental needs. Sheep, calves, goats, pigs, poultry (ducks, guinea fowl, and chicken) and rabbits, among other livestock, are largely produced at a subsistence level in Nigeria by nomadic or rural households. Agriculture's Gross Domestic Product (GDP) averaged N3,771,185.70 million between 2010 and 2017, reaching an all-time high of N5,189,365.99 million in the third quarter of 2017, with livestock production accounting for only 38.7% of agriculture's GDP (Nwankwo, Nnamerenwa, and Elechi, 2018). Without the profitability of agro-based businesses, including animal production, no substantial economic growth can be achieved (Kira 2013). Livestock are properly referred to as the engine of growth and catalyst of socioeconomic transformation of any country as a result of their tremendous contribution to the growth and development of numerous countries (Onwumere, 2008). For many Nigerians, livestock production is an asset as well as a source of income, providing employment opportunities, revenue to the government (taxes and exports), food and meat that partially meets the animal protein requirement, animal manure for crop production, and power and transportation options (Rahman and Yakubu, 2006). The importance of livestock production is considered in the role they play in the general society. Livestock production provides food, income and other useful product to the people. They contribute substantially to the livelihood of many rural households (Duru, 2006). Investment is a valuable tool for ginger processing because of their willingness to grow their business. Investment, according to Obike, Ukoha, and Ezeh (2019), is defined as activities that result in the accumulation of capital and yield a stream of returns over time. In farm processing, investments are made to enable the purchase of farm processing inputs or raw materials, real property, processing machinery and equipment. The decision to invest in processing by ginger processing entrepreneurs is prerequisites to their ability to access financial instruments. Aside the problem of poor access to modern technology, the major set-bank of agricultural development in Nigeria especially farm processing is low investment finance (Salami and Arawomo, 2014). Credit supply to farm

processor is a widely perceived strategy to increasing productivity investment, and transformation of rural economy away from poverty rate economy (Awotide, Abdoulaye, Alene, and Manyong 2015). The true nature of this in Abia state can be determined by identifying the elements that influence the degree of investment in poultry and piggery firms. This is the topic of this research, which aims to determine the factors that influence the degree of investment in poultry and pig farms in Abia State, Nigeria. This study promotes and improves the livestock production and ensures increased returns to the farmers to sustain their living standard. Results from studies like this are of immense relevance to livestock farmers, government and other stakeholders in the agricultural industry. The result of this study is expected to stimulate far reaching concern and draw attention to the need of ensuring appropriate capital structure for livestock farming as an economically relevant strategy for improving the performance and relevance of the poultry and piggery enterprises. The result of the study acts as a reference to the government, farmers and investors in agriculture, non-governmental organization, research institutes, government agencies and other corporate bodies in their dealing with capital structure and performance of investment in such livestock enterprises as poultry and piggery enterprises in Abia state.

Empirical studies on the determinants of the level of investment in enterprise. Rehman (2010) reported that married household heads are less likely able to save, due to increase in daily expenditure and responsibilities towards family. Thus, the marital status of entrepreneurs is negatively related to their investment capacity. In a study on the determinants of investment capacities of farming households in Udi Local Government Area of Enugu State, Nigeria, Nwibo and Mbam (2013) reported that farmers who are educated tend to save and invest better than those who are illiterate. Also, Haruna (2011) revealed that the higher the educational level, the better ones understanding and appreciation of the benefits of investment and hence higher investment. This implies that the educational level of agribusiness entrepreneurs positively affect their investment capacity. An increase in household size of an entrepreneur will result to an increase in the household spending and hence, resulting to a decline in investment. This is because an entrepreneur with large family size spends more money for their upkeep and hence cannot save much amount of money for investment. This is in consonance with the finding of Rehman *et al*. (2010) who studied the demographic and other influences on long term saving behaviour in India came up with the finding that large family size had a depressing effect on long term household investment rate. Similarly, Kibet *et al*. (2009) posited that an increase in household will bring about increase in dependency ratio and as such is bound to cause a decline in investment. Thus, household size inversely affects the saving and investment capacity of an entrepreneur. Experience has a direct relationship with investment decision, as increase in one's experience in the line of business will bring about

increase in his/her quest to invest his/her resources. This is in consonance with Ngore *et al*. (2011) who found experience in meat agribusiness to have directly influenced investment in meat production and value added to meat production in Egerton, Kenya. In a similar way, Armagan and Ozden (2010) found experience to be positively related to investment in diary agribusiness in Turkey. Thus, agribusiness entrepreneurs with long experience in agribusiness will tend to be more inclined to investment in agribusiness activities whose rates of returns are higher (Nwibo and Mbam, 2013). Similarly, increase in the income level of a household will bring about increase in the investment capacity as increasing income will result to surplus that will be invested after consumption expenditure has been made (Nwibo and Mbam, 2013). This agrees with the finding of Sameroyinina (2005) who studied investment behaviour among household in Russia and found that the marginal propensity to save out of income was positive. Thus, an increase in the income level of agribusiness entrepreneurs will lead to an increase in their investment capacity.

Methodology
The comparative survey research design was adopted in the study. The study was conducted in Abia State, Nigeria. Abia State was carved out of the former Imo state in 27th August, 1991. The name "Abia" was coined from the first letters of the name of the geographical (political group that made up the state namely; Aba, Bende, Isiukwuato and Afikpo though Afikpo joined Ebonyi state in 1996. Abia State is one of the 36 states of the Federal Republic of Nigeria. The state is located in the south east geo-political zone of Nigeria. It lies between longitude 7^{0} $23^{'}$ and 8^{0} $02^{''}$ E and latitude 50 $47^{'}$ and 60^{0} $12N$. The state covers an area of about 5,243.7sqkm which is approximately 5.8% of the total land area of Nigeria (Nigerian Galleria com, 2017 Report). The estimated population statistics puts the state at a population of 4,533,911 (NPC, 2017). Abia State is bounded by the North and Northeast by the states of Anambra, Enugu and Ebonyi. Imo State to the West and by the South east is Cross River and Akwa-Ibom States and to the South by River State. The Southern part of the state lies within the rive line part of the country. The state is low lying with a heavy rainfall of about 2,400mm which is evenly distributed between months of April through October. The rest of the state is moderately high plain. The most important rivers in the State are Imo and Aba rivers which flow into the Atlantic Ocean through the Niger Delta. The State is located within the forest belt of Nigeria and the temperature ranges between $20^{\circ}C$ and $36^{\circ}C$ (Onwumere, 2008), comprising of seventeen (17) Local Government Areas, three (3) Agricultural Zones namely: Aba, Umuahia and Ohafia. The population of the study consist of all the poultry and piggery enterprises in Abia State. The total population of registered poultry and piggery enterprises in Abia State are 63 and 42 enterprises respectively as documented by the Ministry of Commerce and Industry of Abia state. This gave a total population of 105 registered livestock enterprises (poultry and piggery

enterprise) considered in the study. Multi-stage sampling technique was employed in the selection of poultry and piggery enterprises for the study. First, two out of the three agricultural zones in the state were selected for the study. The agricultural zones selected are Umuahia and Aba, this was based on the fact that there were good number of poultry and piggery enterprises in these selected zones. Second, two Local Government Areas (LGas) were selected from each of the two agricultural zones. Finally, the selected ones were accumulated at the LGA level, because they were too few in the different communities and villages. Fifty (50) poultry enterprises as well as thirty-three (33) piggery enterprises were randomly selected from the entire four (4) LGAs used for the study. Thirteen (13) poultry enterprises were selected from each of the four (4) selected Local Government Areas, whereas nine (9) piggery enterprises were selected from each of the four (4) selected LGAs. In this study, primary data was used. The information that was used was elicited through the administration of questionnaire and oral interview. The researcher also assisted respondents who found it difficult to answer some questions in the questionnaire especially where they could not understand. A total of fifty (50) copies of questionnaire were administered to the poultry enterprise owners, whereas thirty-three (33) copies of questionnaire were distributed to the piggery enterprise owners in the State. Each respondent was allowed a maximum of two days to study the questionnaire and respond accordingly. At the end of the period, the researcher and the two research assistants that were hired for the study went back and retrieved the questionnaire from the respondents. Prior to the administration of the questionnaire, the instrument was validated and also ensured that the item statements addressed the research objectives, questions and the adequacy of the constructs used in the questionnaire. Data collected for the study were analysed using appropriate statistical tools. The determinants of the level of investment in poultry and piggery enterprises in the study area was analysed using the Maximum Likelihood Stochastic (MLS) regression approach.

Model Specification
The Maximum Likelihood Stochastic (MLS) regression model that was used to estimate the level of investment into poultry and piggery enterprise each in the study area is specified explicitly thus;

$INV = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \beta_5 Z_5 + \beta_6 Z_6 + \beta_7 Z_7 + \beta_8 Z_8 + \beta_9 Z_9 + \beta_{10} Z_{10} + \beta_{11} Z_{11} + \beta_{12} Z_{12} + \mu_i$ ...... (1)

INV = Investment on piggery and poultry enterprise each (Amount of equity and debt capitals invested in Naira)
Z_1 = Size of the enterprise (measured by log of sales).
Z_2 = Amount of expenses on research and development (Naira)
Z_3 = Outstanding debt of the enterprise (naira)
Z_4 = years of operation/existence (Early stage of the business = 1; otherwise = 0)
Z_5 = Location of the enterprise (Urban =1; Rural =0; semi Urban=otherwise)
Z_6 = Scale of operation (measured by output 0 = Otherwise)
Z_7 = Amount of savings (Naira)
Z_8 = Profitability of the enterprise (measured as operating income/total assets)
Z_9 = Access to loan ($\frac{\text{amount of credits received}}{\text{amount of credit applied}}$ X 100)

Z_{10} = Amount of interest payment on loan (Naira)
Z_{11} = Total expenditure requirement of the business (naira)
Z_{12} = Age of the business enterprise as at the time of the survey (Years)
μ_i = Error term
$\beta_0 - \beta_{12}$ = Parameters to be estimated

Results and Discussion
Determinants of level of investment in poultry enterprise in the study area
The Maximum Likelihood Stochastic (MLS) regression model that was used to estimate the level of investment in poultry enterprise in the study area is presented in Table 1.The gamma and sigma were significant at 1% implying goodness of fit and correctness of the specified assumption of the composite error distribution according to Okoye and Onyenweaku (2007) and Kadurumba *et al.* (2009). The gamma value also indicates that 89.9% of the variability in the level of investment in poultry enterprise in the study area was accounted for by the exogenous variables included in the model specified for the study. Table 1 shows that for the poultry enterprise, the coefficients of size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan, were significant factors that determined the level of investment in the poultry enterprise. The coefficient of size of the enterprise was significant at 5% and positively related to the level of investment in poultry enterprise in Abia State. This agrees with *a priori* expectation and implies that increase in the size of the enterprise leads to an increase in the level of investment in the enterprise. Increase in size of an enterprise is an indication towards increasing production (Ominikari, Onumadu and Nnamerenwa, 2017). Such increase is expected to be commensurate with the level of investment in such an enterprise. Therefore, level of investment will increase as the size of an enterprise increases. The coefficient of outstanding debt of the enterprise was significant at 1% and negatively related to the level of investment in poultry enterprise. This agrees with *a priori* expectation and implies that increase in the outstanding debt of the enterprise leads to decrease in the level of investment in the enterprise. Debt repayment reduces investment capacities of an enterprise (Peric and Durkin, 2015). This finding agrees with Kahle and Stulz (2013) who noted that where external funding through banks are not available to all enterprises, some enterprises are forced to finance themselves through their own cash flow and for firms to invest more, retaining a sufficient amount of internal finance is a must, and when a firm lacks its own funds due to repaying outstanding debts, this greatly

restricts the investment activities of such firms. The coefficient of business stage of the enterprise was significant at 5% and positively related to the level of investment in poultry enterprise. This implies that poultry enterprise in their early stage of investment invests more. In the early stage of any business enterprise, finance is required for both variable and fixed cost items of the enterprise. This makes more capital to be required for investment rather than in the maturity stage of the enterprise. Investing in variable cost items becomes more of a priority than investing in fixed cost items which have long time of usage. This finding agrees with Mendes, Serrasqueiro and Maçãs (2014) who posited that young Portuguese SMEs requires more capital for investment in both fixed and variable cost items than old SMEs. The coefficient of location of the enterprise was significant at 1% and positively related to the level of investment in poultry enterprise. This implies that poultry enterprises located in the urban areas invests more. Investing in the urban areas requires more capital than investing in the rural areas due to cost of materials, labour and meeting up with standards required for investing in such location. This finding agrees with Igboji (2014) who noted that business environment/location is one of the critical factors that influences investment decision and that investing in a politically influenced location like the urban areas is not cost effective than investing in a politically uninfluenced location like the rural areas. The coefficient of scale of operation of an enterprise was significant at 5% and negatively related to the level of investment in poultry enterprise. This implies that a small-scale poultry enterprise in Abia invests more. Increase in investment is expected to bring about a proportionate increase in output. Although it is theoretically expected that the larger the firm, the more capital required for investment. Ogbe (2009) noted that the larger the farm size, the larger the scale of farming operation and hence the higher the demand for funds to meet up with the scale of operation. However, economies of scale as the cost advantage experienced by a firm when it increases its level of output causes the average cost of producing a good to fall as the volume of its output increases (Onyebinama and Nnamerenwa, 2013). Our study therefore, shows that small scale poultry enterprises in Abia invests more on the average than medium-to-large scale poultry enterprises in attaining their respective level of output due to diseconomies of scale associated with small scale operations and economies of scale associated with medium-to-large scale operation. The coefficient of amount of savings of an enterprise was significant at 1% and positively related to the level of investment in poultry enterprise in the State. This agrees with *a priori* expectation and implies that increase in the amount of savings leads to an increase in the level of investment in the enterprise. Enterprises with huge savings will have higher propensity to invest since savings is a component of equity capital. This finding agrees with Osundare (2013) and Rikwentishe, Pulka, and Msheliza (2015) who noted that firms with higher marginal propensity to save also have higher marginal propensity to increase their level of investment in future. The coefficient of access to loan of an enterprise was significant at 1% and positively related to the level of investment in poultry enterprise in Abia. This agrees with *a priori* expectation and implies that increase in access to loan of a given poultry enterprise leads to an increase in the level of investment in such enterprise. The extent of access to credit a farm firm has will influence its decision of how capital to much land, labour, inputs and equipment required for, and will also influence its rate of adoption of new and improved systems of agribusiness production (Nnamerenwa, 2012). Therefore, access to loan will enable most poultry enterprises to fund their purchase of raw materials and other business inputs that will help them increase their output, hence the higher would be their level of investment. This result is consistent with Nwaru (2004) and Kadurumba *et al.* (2009) both of whom agree that access to credit increases the level of investment. The coefficient of expected total expenditure requirement of the business was significant at 1% and positively related to the level of investment in poultry enterprise. This agrees with *aproiri* expectation and implies that increase in the expected total expenditure requirement of a business leads to increase in the level of investment in poultry enterprise. A business enterprise will invest only to the level of its expected total expenditure requirement despite how much cash is available for investment. This result also agrees with Mashenene and Rumanyika (2014) and Siro (2013) who noted that expenditure of a business enterprise determines its level of investment.

Determinants of level of investment in piggery enterprise in the study area

The Maximum Likelihood Stochastic (MLS) regression model that was used to estimate the level of investment in piggery enterprise in the study area is presented in Table 2. The gamma and sigma were significant at 1%, implying goodness of fit and correctness of the specified assumption of the composite error distribution according. The gamma value also indicates that 91.2% of the variability in the level of investment in piggery enterprise was accounted for by the exogenous variables included in the model specified for the study. Table 2 shows that for the piggery enterprise, the coefficients of size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan, were significant factors that determine the level of investment in the piggery enterprise in Abia State. The coefficient of the size of the enterprise was significant at 5% and positively related to the level of investment in piggery enterprise. This agrees with *a priori* expectation and implies that increase in the size of the enterprise leads to an increase in the level of investment in the enterprise and vice versa. The coefficient of outstanding debt of the enterprise was significant at 1% and negatively related to the level of investment in piggery enterprise. This agrees with *a priori* expectation and implies that increase in the outstanding debt of the enterprise leads to decrease in the level of investment in the enterprise and vice versa. The coefficient of business

stage of the enterprise was significant at 5% and positively related to the level of investment in piggery enterprise in Abia State. This implies that piggery enterprises in their early stage of investment invest more. The coefficient of location of the enterprise was significant at 1% and positively related to the level of investment in piggery enterprise. This implies that piggery enterprises located in the urban areas invests more. The coefficient of scale of operation of an enterprise was significant at 5% and negatively related to the level of investment in piggery enterprise in Abia State. This implies that medium-to-large scale piggery enterprise in Abia state invests more than small scale piggery enterprise in Abia state. This finding agrees with Ogbe (2009), who noted that the larger the farm size, the larger the scale of farming operation and hence the higher the demand for funds to meet up with the scale of operation. The coefficient of amount of savings of an enterprise was significant at 1% and positively related to the level of investment in piggery enterprise. This agrees with *a priori* expectation and implies that increase in the amount of savings in piggery enterprise leads to an increase in the level of investment. The coefficient of access to loan of an enterprise was significant at 1% and positively related to the level of investment in piggery enterprise. This agrees with *a priori* expectation and implies that increase in access to loan of a given piggery enterprise leads to an increase in the level of investment in such enterprise. The coefficient of the expected total expenditure requirement of the business was significant at 1% and positively related to the level of investment in piggery enterprise. This agrees with *a priori* expectation and implies that increase in the expected total expenditure requirement of a business leads to increase in the level of investment in piggery enterprise. This result also agrees with Mashenene and Rumanyika (2014) and Siro (2013) who noted that expenditure of a business enterprise determines its level of investment.

Conclusion

The level of investment decision is crucial for any business enterprise as it affects the performance of such organization. The decision is important because of the need to maximize returns from the level of investment in poultry or piggery enterprise in the study area. The result of the study has shown that size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan, significantly determined the level of investment in the poultry enterprise, while size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, access to loan significantly determined the level of investment in the piggery enterprise in Abia State. Any policy aimed at enhancing the level of investment in poultry and piggery enterprises in the state should seriously consider such factors as size of the enterprise, outstanding debts of the enterprise, business stage, location of the enterprise, scale of operation, amount of savings, etc. which significantly determined the level of investment in the poultry and piggery enterprises in the state.

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Table 1: Maximum Likelihood Stochastic (MLS) regression estimates of determinants of level of investment into poultry enterprise in the study area

Variable	Poultry enterprise
Constant	-0.651(-11.079)***
Size of the enterprise	0.163(2.216)**
Expenses on research and development	-0.003(-0.380)
Outstanding debt of the enterprise	-0.036 (-2.833)***
Business stage	0.007(2.649)**
Location of the enterprise	0.026(2.776)***
Scale of operation	0.007(2.196)**
Amount of savings	0.225(6.977)***
Profitability of the enterprise	0.002 (1.271)
Access to loan	1.997(11.606)***
Amount of interest payment on loan	-0.008 (-1.281)
Expected Business total expenditure requirement	0.172 (5.137)***
Age of the business enterprise	0.011 (2.397)
Diagnostic statistics	
Sigma-square (δ^2)	1.833(7.294)***
Gamma (λ)	0.899(31.045)***
Log-Likelihood	98.134
LR Test	71.086

Source: Computed by the author from Field Survey data, 2018.
*Note: Asterisk *** and ** represent 1% and 5% significance levels respectively. Figures in parenthesis are t-value*

Table 2: Maximum Likelihood Stochastic (MLS) regression estimate of the determinants of level of investment into piggery enterprise in the study area

Variable	Piggery enterprise
Constant	0.860(9.912)***
Size of the enterprise	0.175(2.225)**
Expenses on research and development	-0.023(-0.013)
Outstanding debt of the enterprise	-0.052 (-2.784)***
Business stage	0.013(3.264)***
Location of the enterprise	0.026 (2.905)***
Scale of operation	-0.012 (-2.429)**
Amount of savings	0.129 (5.573)***
Profitability of the enterprise	0.004 (1.491)
Access to loan	-3.840(-15.115)***
Amount of interest payment on loan	-0.010(-0.818)
Expected Business total expenditure requirement	0.361(5.492)***
Age of the business enterprise	0.019(2.082)
Diagnostic statistics	
Sigma-square (δ^2)	1.861(7.785)***
Gamma (λ)	0.912(33.112)***
Log-Likelihood	99.758
LR Test	74.121

Source: Computed by the author from Field Survey data, 2018.
*Note: Asterisk *** and ** represent 1% and 5% significance levels respectively. Figures in parenthesis are t- value*