CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The economy of Nigeria is multifaceted and multidimensional in nature. These includethe agricultural sector, manufacturing sector, mortgage sector and so on. The sectors are not only driven by cash but by credit as well. The global economy is geared towards credit economy, which the developed economies of Europe, United States and the emerging ones like the Asian Tigers have employed to sustain their economy for better living. For years, deposit money banks' lending has not been targeted for development, hence, the inadequate supply of credit to the agricultural sector in Nigeria. This study focuses on the effect of deposit money banks' (DMBs) lending on Agricultural production in Nigeria (1995-2017), with a view to ascertain the relationship between deposit money banks' lending and agricultural production in the Nigeria economy.

Abe (1982) asserts that farming is well known as the oldest occupation in the world and indeed, it remains till date one in which the largest number of people are engaged. The vast majority of the population of the world depends upon it for living. This is because farming or in its right sense, agriculture is basically concerned with the production of food as basic necessity of life. Agriculture is the art or science of tilling the soil, cropping, keeping of poultry,

fishery and rearing of animals; that is crop and animal husbandry (IDS, 2014). Agriculture is an age long profession, identified not only as a strategic sector but the dominant economic sector with potentials for addressing the multiple challenges of achieving the broad based objectives of economic growth, wealth creation, poverty reduction, food security and employment (Daramola,2012).

Agriculture is the most important sector of the economies of most developing countries especially Nigeria, but its relative share to the total national income has declined. According to Nnamocha& Eke (2015), Nigeria is endowed with huge expanse of fertile arable and graze land as well as a large active population that can sustain a high productive and profitable agricultural sector.Adubi (2000) admits that this enormous resources base if well managed could support a vibrant agricultural sector capable of ensuring self- sufficiency in food and raw materials for the industrial sector as well as providing gainful employment for the teeming population and generating foreign exchange through exports. Thereby aid to achieve the macroeconomic objectives of full employment, sustainable economic growth, a stable price level, internal and external balance of payments position and maximum economic freedom (Ogbanie, Yahaya&Kolawole, 2012).

Emphasizing further, Pasquin& Alexander (2005) maintain that Nigeria has about 84 million hectares of arable land which can cultivate a wide range of crops to boost domestic food security requirements and also enable increased

exportation.Ajakaiye (1993) notes that arable land constitutes about 75% of her total land resources while Mathew (2008)reports that the country has fresh water sources covering 68 million hectares, 960km of coastline, and an ecological diversity of crop and livestock, forestry and fishery products. Agriculture has become the focal point not only for the government and entrepreneurs but also for investors and financial institutions.

In recent times, banking sector credit to the agricultural sector has continue to rise yearly, presently standing above four percent of total credit given out by banks. The sector with its own peculiar nature has not found funding by bank easy to come by, as the regulators continue to use moral suasion (persuasion) to drive bank lending to agric sector (Agronews, 2016). Banks and the agricultural sector are indispensable in all aspects of the Nigeria economy. In 1960s and early 1970s governments showed great interest in agriculture. This sector made immense contribution to the economy. But now, the relationship between the banking industry and the agricultural sector in Nigeria has been a contentious issue; agricultural sector was least cared for**.** Banks as private entity and profit maximizing would not invest in financing agriculture, which is problematic and exposed to high risk of low return relative to other sectors.

Ogbeide, Daniel &Atole (2012), postulate that the main objectives of government's agricultural policy are to:

- Make the country self-sufficient in food and agricultural raw materials

- Improve the standard of living of the farming population by increasing agricultural incomes.

- Reduced rural – urban migration by increasing rural development prospects

In a broad sense, the objectives of the new agricultural policy include: the achievement of self- sufficiency in basic food supply and the attainment of food security, increased production of agricultural raw materials for industries, increased production and processing of export crops, using improved production and processing technologies; generating gainful employment; rational utilization of agricultural resources, improved protection of agricultural land resources from drought, desert encroachment, soil erosion and flood, and the general preservation of the environment for the sustainability of agricultural production; promotion of the increased application of modern technology to agricultural production, and improvement in the quality of life of rural dwellers (Zakaree, 2014). However, not all these objectives can be achieved without adequate investment in the agricultural sector.

Under the Agricultural Policy and Institutional Support, the Federal Ministry of Agriculture and Natural Resources launched the Agricultural Transformation Action Plan (ATAP), 2011-2015, as the anchor for the Transformation Agenda of the Federal Government. The objectives of the plan were to facilitate the attainment of food security, diversify the economy, create more jobs and generate foreign earnings. In specific terms, additional 20 million

tons of food would be produced, while 3.5 million new jobs would be created in the agricultural sector over the four-year period. The key components of the plan involve reforms in input supply management, particularly fertilizer, marketing institutions, financing the agricultural value- chain and creating an investor-friendly framework for agricultural investment (CBN, 2011). The policy was revisited by the present administration to promote agriculture and diversify the economy.

Despite the endowmentin the agricultural sector, it has continued to experience a decline in productivity (Nnamocha& Eke, 2015). The capacity of the sector to fulfil its traditional role in the Nigerian economy has been constrained by various social-economic and structural problems. These include unavailability of credits to local farmers, discovery of crude oil, high interest rates on loans to farmers, rural-urban migration and ineffective institutions charged with policy implementations. Both the government and the populace have neglected the sector, which has contributed immensely to economic growth before the discovery and exploration of crude oil in commercial quantity in the 1970s. Agriculture has been sacrificed on the platter of crude oil which has transformed our economy into a single (monoculture) economy. However, the current economic hardship as a result of the drop of oil price in the International market and persistent food scarcity resulting in inflation (high cost of living) has led to refocusing the economy via agriculture for sustainable development.

Agricultural sector is associated with a mirage of problems including lack of deposit money banks' lending which is capable of undermining the role of agriculture in the economy. Deposit money banks' lending in this study comprises of commercial banks' lending, microfinance banks' lending and any other deposits receiving banks' lending to the economy, deposit money banks' lending to small and medium Enterprises and deposit money banks'total lending to the private sector. This could be inform of loans and advances, and other related instruments to support economic growth including the farming process. Udih (2014) observes that banks' credit is expected to impact positively on the investible sectors of the economy through improved agricultural production of goods and services. Noting that sufficient financing of agricultural projects will not only promote food security, but also enhance the entrepreneurship performance of our young investors. Agunuwa, Inaya&Proso (2015) see banks' credits as a catalyst that can activate the engine of growth enabling it to mobilize its inherent potentials and to advance in the planned or expected direction. This explains the importance of credit in the economy.

Okeke (2011) observes that Nigeria with her land resources, rich soils, is anexample of a country that has abandoned agriculture. For instance, a significant area of Nigeria is natural rice territory, but the country still imports 60 percent of rice it consumes. Not only does Nigeria have the capacity and capability to feed itself but also to become a food basket for Africa. Any honest survey of current

agricultural situation in the country will immediately reveal not only a progressive decline of the contribution of agriculture to the Gross Domestic Product (GDP), but also a wide gap in the country's ability to maintain its food independence. Agricultural contributions to the wealth of a Nation cannot be overemphasized. These include, creating employment, source of raw materials for industrial development, poverty eradication, food security and capable of turning a nation into economic power of food basket. The contribution of the sector to the economy could go a long way to minimize the insecurity of lives, properties and food shortage. That is engaging the youths positively

Agunuwa, Inaya&Proso (2015) ascertain that deposit moneybanks 'credit has the capacity to remove the financial constraints faced by farmers, as it provides incentives to enable farmers to switch quickly to new technologies which can enhance the achievement of rapid productivity and growth. Banks' credit has significant contribution to economic development by enhancing production and productivity and thus higher income and better quality of life to the people (Agunuwa, Inaya&Proso, 2015). Unfortunately, credits are not easily available for most farmers because of lack of skills, collateral and other documentation that are usually required by the deposit money banks and other credit institutions, hence the reason for the recent low agricultural production (Nnamocha& Eke, 2015). Operators in this sector have not been able to estimate the capital adequacy level for agricultural activities, hence the continual financing gab, as a result of

inadequate fund. The low funding by deposit money banks invariably lead to low production, since farmers are not adopting mechanized farming.Enyim, Ewno&Okoro(2013) identify poor credit supply as one of the factors accounting for the poor performance of the agricultural sector in Nigeria. However, Nigeria has large scale growth and production of food crops like tomatoes paste, but its exports are processed outside the country.

Rahman, Hussain &Taqi (2014), establish that farming requires capital like other businesses for its farm operations. Timely availability of capital leads to adoption of improved seeds, fertilizers and modern technologies, which increased the farm production, and ultimately the growth rate. Therefore, the dearth of agricultural credit, which is an essential element for modernization in agriculture, can hinder large-scale production of agricultural products.

Agricultural output is low in Nigeria due to smallholdings, traditional methods of farming, poor irrigation facilities, and low modern farm technology and so on. The performance of agricultural sector depends to a large extent on the availability of credit and granting of credit depends on the ability to repay. We identify the following problems: - inability of farm officials to estimate the capital adequacy level for agricultural activities (Thelma, 2017). – Lack of efficient and effective internal control system in the sector;

-Inability of the farm officials to consistently follow the established banks procedures in the cause of their operation;

-Inadequate training opportunities for the farm officials on credit management;

-Non availability of developed process of identifying of risk related control designed to minimize lost.

- Poor review and update of the operation mechanism by farmers and lastly,

-Ineffective product control system of operation and having knowledge of seasonal crops that require massive investment at the peak period.

Long before now, various studies have been carried out on deposit money banks' lending and economic growth while very few have studied banks' credit and agricultural production. In their studies, some findings agreed that DMBs' credit has significant effects on agricultural production while others are in conflict. There remain a gap in understanding the causal relationship between deposit money banks' credit to agriculture(DBCA), deposit money banks' Small and Medium Enterprises (DSMEs) Sub-sector Credit, deposit money banks' total Credit to Private Sector (DCPS), deposit money banks' total credit (DBTC) and Agricultural Production (AP). Therefore, this study attempts to fill this research gap in finance literature.

1.2 Statement of the Problem

Inadequate funding and other numerous problems bedevil agricultural sector. These include farmers being faced with serious financial constraints that can hinder the achievement of rapid production and growth. Commercial banks have failed to finance farmers in the bush, nomad in the fields and fishermen in the waters; as a result of their inability to recoup their investment. For this reason, agriculture has not taken its deserved place in the economies of the nation.

. In agriculture, fund is needed to enable the farmers run their farms, purchase more land, buy implements at the appropriate time and to pay for hired labour or farm machinery, construction of farm houses, and proper storage system. Lack of necessary inputs to grow the sector is because of poor credit supply by deposit money banks. The sector has been starved of investible funds mostly by small and medium enterprises sub sector and private sector. Deposit money banks' credit to SMEs sub-sector- the dominant unit in the Nigeria economy- could not boost the credit needs of the small and large scale farmers to expand production. This has made the sector unattractive to potential investors and has affected the performance of the agricultural sector. The situation is compounded by inappropriate fiscal and monetary policies and official neglect.

As Garba (2000) notes, deposit money banks' credits are inadequate and unsatisfactory for the credit needs of the farmers.Ajetomob&Olagunju (2000) explained that 58% of farming- related borrowings were obtained from family and

friends, 4% from professional private money lenders, 15% from merchant banks and only 3% from commercial banks and other institutional sources. Ilegbinosa, Watson and Itoro (2012) report that 54% of farmers obtain credit facilities from relatives, cooperatives, etc against the 3% who obtain from Deposit Money Banks in South- Western Nigeria. While in South-Eastern Nigeria, Agbo, Iroh and Ihemezie (2015) assert that 75.5% of these respondents accessed credit from informal sources, only 25.5% had access through formal sources. It is on record that only 1.25 per cent of the 2016 budget was allocated to agriculture (Agriknowledge, 2017). In examining the constraints experienced by cashew farmers, Uwagboe, Adeogun&Odebode (2010) findings revealed that most (70%) of the respondents ranked inadequate capital as the most severe constraint. (Zakaree, 2014; Obilor, 2013, Olowa&Olowa, 2011, CBN, 2010). The farmers have not been able to garner the required fund for the sector to grow. Thus, there is the need for larger credit sources.

Extant studies on the relationship between Deposit Money Banks' lending and Agricultural production have shown conflicting results. Deposit money banks' lending has various degrees of effects on Agricultural production. Some studies reveal positive and significant relationship; others find negative significant relationship. Various studies have solely been on commercial banks' credit to agriculture for output, employing interest rate alongside with bank credit, exchange rate; inflation while others employed government expenditure and

consumers price index as variables. To the best of my knowledge, very few have been able to determine the effect of deposit money banks' credit on agricultural production but did not take into consideration other relevant internal credit variables in a single study. This study will apply microfinance banks' credit as in DMBs, credit to SMEs and total credit to private sector.

To the best of my knowledge, most studies used old data from the 1970s, 1980s and 1990s which have created misunderstanding. We intend to include current data. This was what informed our choice of data from 1995-2017 to reflect the true and current dispensation. Most studies did not determine the various credit effects of current formal sources on agricultural productivity. More so, studies on Deposit Money Banks' lending and Agricultural production in Nigeria are common to large-scale farmers; this study will include investigation of small-scale farmers. This study intends to fill the gap by including relevant internal credit and microfinance banks' credit circulating in the Nigerian economy to present a comprehensive and holistic result. The study intends to use wide spectrum of deposit money banks' credits and Agricultural production proxy by AGDP variables for a betterreport.

To what extent has deposit money banks' credit affected agricultural production? It has not targeted agriculture for growth in the economy. The agricultural credit crisis has remained plaguing and entangling factors, which hinder economic growth in Nigeria. Unless deposit money banks' credit supply to

agriculture is steady and adequately matched the objectives of the agricultural sector may be undermined.

1.3 Objectives of the Study

The main objective of the study is to determine the effect of deposit money banks' (DMBs) lending on agricultural production (proxy by AGDP) in Nigeria. The specific objectives of the study are to:

(1) Determine to what extent deposit money banks' agricultural (DBA)lending has affected agricultural production (proxy by AGDP) in Nigeria.

(2) Assess the extent deposit money banks' SMEs (DSME) sub- sector lending has significantly boosted agricultural production (proxy by AGDP)in Nigeria.

(3) Ascertain to what extent deposit money banks' total Private Sector (DPS) lending has affected agricultural production (proxy by AGDP) in Nigeria.

(4) Determine to what extent deposit money banks' total (DBT) lending has enhanced agricultural production (proxy by AGDP) in Nigeria

1.4 Research Questions

The following research questions will shape the focus of the problem:

(1) To what extent has deposit money banks' agricultural (DBA) lendingaffected agricultural production (proxy by AGDP)in Nigeria?

(2) How far has deposit money banks' small and medium Enterprises (DSME)sub-sector lending significantly boosted agricultural production (proxy by AGDP) in Nigeria?

(3) How far has deposit money banks' total private sector (DPS) lending affected agricultural production (proxy by AGDP) in Nigeria?

(4) To what extent has deposit money banks' total (DBT)lending enhanced agricultural production (proxy by AGDP) in Nigeria?

1.5 Statement of Hypotheses

The following research hypotheses stated in Null Hypotheses (Ho) are to guide the study:

Ho1: Deposit money banks' agricultural (DBA) lending has no significant effect onAgricultural production (proxy by AGDP) in Nigeria.

Ho2: Deposit money banks' small and medium Enterprises sub- sector (DSME) lending has no significant boost on agricultural production (proxy by AGDP) in Nigeria.

Ho3:   Deposit money banks' total private sector (DPS)lending

has no significant effect   on   Agricultural production (proxy by AGDP) in

Nigeria.

Ho4:   Deposit money banks' total (DBT) lending has not significantly enhanced

Agricultural production (proxy by AGDP) in Nigeria.

1.6 Significance of the Study

The agricultural sector cannot perform itsmajor role of ensuring food
security and sustaining the Nigeria economy without the support of deposit money
banks' credit. To contribute to the issue of credit crises in the agricultural sector;
which is the mainstay of any economy, made this studyof deposit money banks'
lending on agricultural production – timely. This study is set to reveal the
relationship between deposit money banks' lending indicators and agricultural
production for better understanding.

It became necessary to embark on a research as this, so as to suggest ways
of resolving the persistent problems of fund shortage faced critically by the active
working farmers in Nigeria.

This research can lead to better deposit money banks' lending to
agricultural sector to boost economic growth in Nigeria. Farmers can no longer be
disturbed with the problems of deposit money banks' lending to manage their
farms. The unchecked problems of wastage, diversion, fraud and theft can be

reduced if not eradicated when credits met for the sector are monitored properly by the lenders and they are effectively and efficiently utilized for the farm. Deposit money banks and the organized private sector could learn more on ways to manage their agricultural credit for a good returnbytrading off risk for returns while investing in the agricultural sector. This can be possibleif they are able to lay their hands on this study.

The most significant of this study is to appreciate the contagious effects of credit policy failure on the economy and the society. As such, the study helps build strong and virile economic environment through better agricultural credit, which increase and advance better economic opportunities that will generate gainful jobs.

We sincerely hope that the research will be useful as a source of reference and information to the institutions, specifically; the study is expected to be significant to the following groups:

The Bankers

This sector grants these credits and could benefit from the findings and recommendations of the study. They are guided on the proper channel to transmit their credits to the benefit of the bankers. Bank managers can monitor the effectiveness and efficiency of the loan facilities granted to the agricultural sector by understanding the links between the two sectors. Bankers are to have growing

confidence on the farmers to repay borrowed money and be credit friendly. With a better practice, bankers are willing to partner with the sector to enhance credit supply at favourable terms. This is possible if they read and apply this study.

The Farmers

This sector receives the credit and can benefit from the findings and recommendations of the study. The result could motivate them to always apply and utilize the sources of credit with comparative advantage in their production. The farmers can easily employ the channel of credit that is cost effective. This could make loan repayment easy. The study guides the farmers to apply credit met for the sector judiciously or for the purpose to enhance agricultural production, increase in income and economic growth. The study can stem the tide of unemployment, existing farm jobs are preserved, and new jobs created in the sector. There could be food security, price stability; industrial and sustainable economic growth if this problem is given the required attention by farmers. The availability of this study to the farmers will make these possible.

The Investors:

These include Foreign and local investors in the sector. The outcome of the findings in deposit money banks' credit -commercial and microfinance banks' credit; the private sector credit can also be of benefit to these investors in the economy. The result of the study guides the investors on the best decision to

maketo grow the agricultural sector. The investors will benefit if they go through this study.

The Government and Regulators

The relevance of agricultural sector to economic growth has become crucial, particularly to those policy makers who nowadays have to face increasing food shortages and economic recession. In other to get out of this current economic recession, there is need to diversify the economy and encourage productivity in the agricultural sector. However, on appraising the effectiveness or otherwise of agricultural sector policies on economic growth in the country, the study is useful in policy decisions of the constituted authorities- Legislators, Central Bank of Nigeria and others. The study therefore benefits policy makers in understanding the technique of response of the economy from short run disequilibrium to long run equilibrium in the event of any crisis in the economy. The study also could help government and policy makers to understand what levels of deposit money banks' lending that can deter agricultural productivity. The governments of Nigeria are encouraged to source and create more credit avenue for the farmers to grow because of their commitment to reducing the credit barrier in the sector.

Thus, the result of the study therefore, is highly relevant in the formation and implementation of effective and consistent agricultural policies that can

promote productivity and impact on the Citizens. If this study gets to the appropriate authority and is applied there will be good result.

The Researchers and Academia

The study can also serve as a reference point for scholars and academia alike in the future, for further research in this area. This provokes yet another source of knowledge to complement the existing ones on the effect of deposit money banks' lending on agricultural production in Nigeria. Hence, the study significantly benefit the general public, who are always interested in understanding the state of the economic productivity, the private sector, public sector, domestic sector, as well as small- and medium enterprises sub-sector performance. A country understanding about its production performance can help to fast track their economy recovery. All these are possible if they can lay their hands on the study.

Finally, this study serves as a good reference source for those intending to carry out further research work on related topics

1.7   Scope of the Study

Agricultural production problem is a broad subject to dwell in, it is impossible to cover every aspect of it in a study such as this. Therefore, the effect of deposit money banks' lending on Agricultural Production was chosen.

It covers the period 1995-2017, a period of about twenty-three (23) years when economic crises were highly pronounced and measures to solving the problems sought. The period is also characterized by various government policies to go back to land, to promote agriculture, enhance food security and diversify the economy. Data collected and employed in the study include: deposit money banks' credit to agriculture, deposit money banks' credit to SMEs sub-sector, deposit money banks' total credit to private sector, deposit money banks' total credit and agricultural production (proxy by AGDP); the lending covers loans and advances of commercial and microfinance banks to the sectors as indicated. They are good representatives of the deposit money banks' lending and agricultural output. The size is enough to make a generalization of the findings. The broad objective of the study is covered.

1.8   Limitations of the study

Given that this research depends on existing literature and data, the availability and inconsistency of the data largely will limit the comprehension and reliability of this study. This is taken care of by using reliable instrument of data analysis after duly edited for completeness, legibility and consistency.

We have observed that changes in policies of microfinance banks have led to the establishment of peoples' banks of 1980s. It also led to the establishment of community or microfinance banks of 1990s, and 2000s respectively. This change in policies made it difficult to apply data of 1980s and beyond. To the best of the researcher's knowledge, existing literature on this study captured mostly community and commercial banks' lending while the studies on DMBs lending are limited, thereby hindering information for further study. As a result, this study is motivated to combine relevant information from community banks of 1990s and microfinance banks of 2000s to generate data to support the DMBs to advance knowledge. We could have covered the year 2018 for our analysis, but data for 2018 is not available for this study.

Some data are classified by relevant authorities while the person(s) in charge of releasing this document is or are naturally not friendly. Some information were being coded by the organizations which were not released to the researcher. Several visits to gather data were really tasking, but yielded result by the intervention of some influential persons; this reduces stress and eases off the

problems. Endogenous growth theory as applied has limited the use of other theories, however, the expansion of the model has helped to determine other extraneous variables involved in performance. All these had reinforced the researcher to do a perfect in-depth study and had made the study valid and reliable.

CHAPTER TWO

REVIEW OF RELATED LITERATURE.

2.1 Conceptual Review

2.1.1 Deposit Money Banks' Credit and Financing

Since its inception, the banking industry has been providing credits to the economy. Ijaiya (2003) defines deposit money banks as a monetary institution owned by private businessmen for intermediation and profit maximization. Deposit money banks accept deposit from the public; these deposits are in turn given as credit to trade, industry, agriculture etc. which lead to more production and employment. Credit is the money from the lender to the borrower (Nwanyanwu, 2010). Spencer (1977) notes that credit implies a promise by one party to pay another for money borrowed or goods and services received. Credit cannot be divorced from the banking sector which serves as a conduit for funds to be received in form of deposits from the surplus spending units, such as, savings, depository institutions and so on of the economy and passed on to the deficit spending units such as, investors, entrepreneurs, manufacturers and so on, who need fund for productive purposes. Credit is the amount extended out with a future date of repayment (Aryeetey, 1996). In a wider view, Ijaiya (2003)includes the aggregated all loans, advances, overdraft, commercial papers, bankers' acceptance, bills discounted, leases and guarantees as credit. In the same vein, BOFIA (1991) in its prudential guidelines defined bank credit as loans, advances, overdraft, commercial

papers, bankersacceptances, bills discounted- inability to collect the bills at maturity, leases, guarantees and other loan contingencies which are associated with the bank's credit risk.

Yakubu&Affoi (2014) state that bank credit is the borrowing capacity provided to an individual, government, firm or organization by the banking system in the form of loans. While CBN (2003) explains that the amount of loans and advances given by the banking sector to economic agents constitute bank credit. Bank credit is often accompanied with some collateral that helps to ensure the repayment of the loan in the event of default. Credit channels savings into productive investment thereby encouraging economic growth. Thus, the availability of the credit allows the role of intermediation of financial institutions to be carried out, which is important for the growth of the economy. The total deposit money banks' credit can be divided into two: credit to the private sector and credit to the public sector. Banks dominate business financing in Nigeria as most businesses are averse to equity financing through the stock exchange. Cumulative bank loans to the private sector stood at ₦6.5 trillion in 2013 (Ogidi&Ehima, 2015), which is now₦25.48 trillion (Okunade, 2018). The dominance of bank-based financing has led to shortcomings, which is a major reason for the growth pattern of an economy. Banks are conservative in their disposition and strategies, which often hinder entrepreneurial and industrial risk-taking necessary for innovation and development of SMEs crucial to economic

growth. They are averse to lending to the real sector and tend to extract more from the future credit terms (Ogidi&Ehima, 2015).

Bayraktar& Wang (2006) reveal that banking sector openness had a direct and indirect effect on economic growth through a combination of improvement in access to financial services, and the efficiency of financial intermediaries. Both of these lead to a reduction of costs, whichstimulates capital accumulation and economic growth. Sparks (2014) argues that the banking sector plays a crucial role in channeling finance and investments to productive agents within the economy and thus acts as catalysts of economic growth. Policies, which have the effect of restricting or slowing banking reforms by protecting or favouring particular industries or firms, are likely, overtime, to lead to unsustainable economic growth. The availability of banks' credit allows farmers to increase production, output and efficiency and in turn increase the profitability of banks through interest earned (Sparks, 2014**).**

According toFadare (2010) the theoretical expectation is that, all things being equal, loanable funds available for lending increase when the size of capital available to banks increases as experienced in the banks' recapitalization exercise of 2005. In addition, the more the fund available to the private sector, the less the crowding out effects and the more thatcan be used to promote private enterprise and production. The availability of loanable funds to the private sector depends on government desire for loans. A reduction in banking sector funded government

spending would result in a fall in interest rates (loanable funds). As demand for loanable funds falls, the private sector is thus able to secure the loanable funds for entrepreneurships and investment.Balogun (2007) statesthat despite the increase in lending inNigeria, the production level in agriculture and mining remain low. This simply suggests that the money meant for these projects are used for other purposes.

2.1.2The Agricultural Sector Development

Agriculture is of two types, the subsistence agriculture and commercial agriculture. Thesubsistence agriculture is the type of farming which involves the farmer and his family, whichthe farmer, produces for himself and his family with little or none to sell in the market. It is practiced on asmall-scale. It involves only a little amount of money to practice unlike commercial farming that involves huge amount of money to practice. It does not involve the use of machine to carry out, since the land is very small and fragmented (Amechi, 2004).The second type is commercial agriculture; this is where a farmer produces his crops and sells them in the market. It is carried out in large scale with enough land and machines. These machines are used in cultivating crops. It involves a lot of capital and time, and also increases the farmers' income. Commercial farming helps farmers to engage in the cultivation of different varieties of crops, since the money, land and equipment could easily be used(Nnamocha and Eke, 2015).

Sparks (2014) reports that the history of agriculture dates back to thousands of years, and its development has been driven and defined by greatly different climates, cultures and technologies. However, all farming generally relies on techniques to expand and maintain the lands that are sustainable for cultivation and animal rearing. For plants, this usually requires some form of irrigation, although there are methods of dry land farming; pastoral herding on rangeland is still the most means of raising livestock. In the developed world, industrial agriculture based on large scale monoculture has become the dominant system of modern farming, although there is growing support for sustainable agriculture (e.g. permaculture or organic agriculture).

It went further to explain that until the Industrial Revolution of the 20th century, the vast majority of the human population labored in agriculture. Pre-industrial agriculture was typically subsistence agriculture in which farmers raised most of their crops for their own consumption instead of trade. A remarkable shift in agricultural practices has occurred over the past century in response to new technologies and the development of world markets. The technological improvement in agricultural techniques, such as the use of Haber-Bosch method for synthesizing ammonium nitrite, has made the traditional practice of recycling nutrient with crop rotation and animal, manure less necessary. Noting that modern agronomy, plant breeding, pesticide and fertilizers, and technological improvement have sharply increased yields from cultivation, but at the same time

have caused widespread ecological damage and negative human health effects. Selective breeding and modern practice in animal husbandry such as intensive pig farming have similarly increased the output of meat but have raised concern about animal cruelty and the health effect of the antibiotics, growth hormones and other chemicals commonly used in industrial meat production.

According to the United Nations Food and Agricultural Organization(2000) Prediction year book, agriculture is defined to include cereals, starchy roots, sugar, edible oil, crops, nuts, fruits, vegetables, wine, cocoa, tea, coffee, livestock and rubber. In their expression, Anyanwu&Anyanwu (1979) defined agriculture as the cultivation of the land for the purpose of producing food for man, feed for animals and fibre or raw materials for industries. It also includes the processing and marketing of crops. Ijaiya (2003) sees agriculture as the cultivation of land and rearing of livestock. It is thus equivalent to farming. Through land cultivation, food crops and grains are produced. These include subsistence crops like rice, beans, maize, millet, yam, cocoyam, cassava etc and basic cash or export crops like cocoa, coffee, rubber, palm produce, cotton, groundnutsetc.

The agricultural sector in Nigeria is concerned with the production, distribution and storage of agricultural crops, livestock, forestry and fishing. The export crops provide the major foreign exchange need of the country. But the discovery of oil makes the government to look down on the contribution as well as the linkages of the sector to the development of the economy. These linkages,

Vogei (1994) observes are stronger in development and it plays a key role in agricultural led industrialization. In collaboration, May (1991) contends that countries that emphasized the agricultural sector ended up with faster industrial growth than those that focused on industries alone. Hence, agriculture may therefore be the fastest road to industrialization.

The major agricultural products can be broadly grouped into food, fibres, fuel- wood and articles of wood, wood charcoal and articles for heating; and raw materials. In the 21st century, plants have been used to grow biofuels, biopharmaceuticals, bioplastics and pharmaceuticals. Specific foods include cereals, vegetables, fibres and meat. Fibres include cotton, wool, and hemp, silk and lax. Raw materials include rubber and bamboo. Plants, such as resins, produce other useful materials. Biofacts include arethane from biomass, ethanol, and biodiesel. Cut flowers, nursery plants, tropical fish and birds for the pet trade are some of the ornamental products. Regarding food production, the World Bank targets agricultural food production andwater management as an increasing global issue that is fostering an important and growing debate

In 2007, one third of the world's workers were employed in agriculture (ILO, 2007). The services sector has overtaken agriculture as the economic sector employing most people worldwide. Despite the size of its workforce, agricultural production accounts for less than five percent of the gross world products (ILO, 2007).

Onwuchekwa (2015) opines that beginning from the 1950s up till mid-1960, Nigeria remained the world largest producer of palm oil, with a market share of 43.0 percent supplying 645,000 metric tons (MT) of palm oil per annum across the globe. The total neglect of agriculture following the oil boom changed all of that. The land that is ideal for oil palm plantation totals approximately 24 million hectares in the whole of Nigeria. However, little over 3.0 million hectares of land is put to use, consequently, from being the largest producer of oil palm, Nigeria is today a net importer of palm oil.

According to IndexMundi (2014), the domestic palm oil produced totaled 850,000MTin 2012, while local consumption amounts to 1.0 million MT per annum. Nigeria today produces only 1.7 perent of the world's palm oil, which is insufficient to meet its domestic consumption, at 2.7 percent. Paradoxically, about 20.0 percent of the oil palm produced domestically is considered of high quality and clears all the 17 tests for being an exportable commodity.

Lipton (2005) argues that agricultural growth should reduce poverty through farming, agricultural growth results in increased demand for unskilled labour, thus creating jobs and tending to raise the rural wage rate, generates returns to land an asset that some of the poor have when they have few other assets than their labour power, and tends to push down the price of produce, including food, to the immense benefit of the majority of the poor who have to buy food staples. Wiggins (2006) submits that historical record has shown that no country

has ever seen rapid economic growth without sustainable growth of its agriculture. In many cases the increase in agricultural output has preceded the major expansions of manufacturing. This would be the case for the UK in the 17th Century, as well as manyof the recent East Asian growth stars, such as China, South Korea, Indonesia and Taiwan.

Agriculture's importance to poverty reduction transcends the direct impact on farmers' incomes. Evidence has shown that agricultural growth has benefited millions through higher incomes, abundant and cheaper food, and by generating pattern of development that are employment –intensive and benefit both rural and urban areas. Gallup, Radelet& Werner (1997) reported that for a percentage increase in per capita agricultural output led to a 1.61 percent increase in incomes of the poorest 20 percent of the populationin America.Thirtle, Irz, Lin, Mckenzie& Wiggins (2001) conclude from a major cross country analysis that on average percentage increase in agricultural yields reduced the number of people living on less than US$1 a day by 0.83 percent.

World Development Indicator (2007) observes that with about 70 percent of the Millennium Development Goals' target groups living in rural areas, particularly in Asia and Africa, and for most of the rural poor, agriculture is a critical component in the successful attainment of the Millennium Development Goals…which can lead to improvement in the poor household's welfare and can help the poor overcome some of the critical constraints they now face in meeting

their basic needs. In view of this, the government of Nigeria in 2011 launched an Agricultural Transformation Agenda (ATA) which was managed by the Federal Ministry of Agriculture and Rural Development. The intended outcome of the agenda is to promote agriculture as a business, integrate the agricultural value-chain and make agriculture a key driver of Nigeria's economic growth (Adesina, 2012). To achieve this agenda, the government put in place some new measures:

-New fiscal incentives to encourage domestic import substitution.

– Removal of restrictions on areas of investment and maximum equity ownership in investment by foreign investors.

-No currency exchange controls.

-Free transfer of Capital, Profits and Dividends

-Constitutional guarantees against nationalization/ expropriation of investments.

–Zero percent (0%) duty on agricultural machinery and equipment imports.

–Pioneer Tax holiday for agricultural investments.

–Duty waivers and other industry related incentives e.g, based on use of local raw materials, export orientation.

2.1.3 Agricultural Credit and Financing

Agricultural credit includes farm credit and non farm credit granted to farmers and ranch operators to assist in planting and harvesting of crops to support food supply, feeding and care of livestock., to build and maintain farm house and storage equipment use for operations Credit to agricultural sector could take the form of an overdraft, short-term, medium-term or long-term depending on the purpose and gestation period of the project. Such credits granted to farmers to purchase inputs paid directly to the suppliers who must furnish the bank with evidence of delivery, this is done to avert diversion of fund, which is common with Nigerian farmers (Adekanye, 1986, Nzotta, 2014). Investopedia(2015) explains agricultural credit as any credit-financing vehicle, such as loan, banker's acceptance or letter of credit that is designed specifically for agriculture producers. Typically, this financing is used to fund operations, purchase Agricultural equipment or acquire farm house.

While Farlex (2012) sees it as any loan, a bank gives for agricultural purposes. Such loans are meant to finance farmers or ranchers to buy equipment, or other things necessary for operations, which yields profit. The term of agricultural credit depends on how expensive the product or project it intends to finance. In its own view, Business Dictionary (2015) emphases as any of several credit vehicles used to finance agricultural transactions, including loans, notes, bills of exchange and bankers' acceptances. These types of financing are adapted

to the specific financial needs of farmers, which are determined by planting, harvesting and marketing cycles. Short-term credit finances operating expenses, intermediate-term credit is used for farm machinery, and long-term credit is used for real estate financing. According to Jugale (1991) agricultural credit is the amount of investment funds made available for agricultural production from resources outside the farm sector. Khandkar&Faruquee (2001) referred to agricultural finance as the means of acquiring and controlling of assets ownership by cash purchase or borrowing or leasing or custom-hiring. Warren, Boehije Nelson & Murray (1999) defined agricultural finance as the economic study of the acquisition and use of capital in agriculture. It deals with the supply of and demand for funds in the agricultural sector of an economy. While farm finance can also bedefined as the amount of funds obtained from off-farm sources for use on the farm repayable in future with an interest agreed to either explicitly or implicitly (Jugale,1991). IDS (2014) sees agricultural financing as the transfer of resources, assets, or wealth from persons who have(surplus unit) to others who do not have (deficit unit). While IFAD(2013) says more than money is needed. There must be a new technology, markets that can supply additional inputs and absorbs additional outputs, institutions willing to lend small-scale farmers to enhance efficient agricultural production.

Describing farm finance, Sparks (2015) sees it as:

- Is not meant merely for more production but also to raise the productivity of farm resources;

- Not a mere loan or advance, but an instrument to promote the wellbeingofthe farming community;

- Is not just a chance to manage the money, but is an applied science of allocating scarce resources to derive optimum output; and

- Not a mere social obligation on the society, but it is a lever with backward and forward linkages to the economic development both at the micro and macro levels.

At macro level, farm finance may be defined as the study of impact of finance (extended to the farmers by the intermediaries) on agricultural sector and also on the economy as a whole. At micro level farm finance may be defined as the study of these intermediaries who extend finance to the farming sector and obtain their loanable funds from financial markets.

Looking at the features of farm finance, Sparks (2015) observes that:

- Finance should be extended to farmers for farm activities;

-        Finance should stimulate the productivities of farm resources resulting

         in higher economic returns for the investment;

-        Finance should promote economic development of farm households; and

-        Finance should be provided by an external agency for strengthening the

         backward forward linkages with country's economic development.

         However, farmer and banker view farm finance in different ways as:

Farmer view:

-        Acquire finance for farm needs at proper time.

-        Try to get finance at a reasonable cost.

-        Ensure that their own assets are not exposed to high risk.

Lending Agencies View:

-        Extend finance, which can be easily collected.

-        Try to get a reasonable rate of return for capital.

-        Ensure proper degree of liquidity of securities for safety.

On public agricultural sector funding, Economic Community of West Africa Programme (ECOWAP) and Comprehensive Africa Agriculture Development Programme (CAADP), (2012) review that to achieve the objectives of the national food security programme(NFSP), funding will come from three major sources

namely: government, commercial banks, and development partner. Historical data from the Central Bank of Nigeria statistical bulletin shows that in the 2003-2007 periods an average of 2.9% of the federal budget was allocated to the agriculture and natural resource sectors. However, there are some indications that in 2008 and 2009 there had been improvement in this percentage. The federal government has also indicated its commitment to achieving and exceeding the 10% Maputo Declaration (2003) target. It has further designated it natural resources fund (i.e. 1.68% of the federation account) to the funding of the NFSP.

The government has floated ₦200 billion-naira bond (federal government intervention bond issued) to provide long term credit to private sector organizations entering into partnership with the federal ministry of agriculture and water resources (FMAWR) (ECOWAP & CAADP, 2012). The fund will be disbursed through commercial banks. Also, the agricultural development fund (ADF) which is a special intervention fund will finance short/medium term government obligation in areas such as to guarantee minimum pricing and other forms of price support. The ADF will also be utilized for the funding of micro finance institutions to provide cheap credit to small scale farmers. State governments will among other responsibilities subsidize theservices for medium and small scale farming, as well as provide cheap financing for small scale processors through banks/ financial institutions. On the other hand, Local

Government Areas will fund the provision of required infrastructure e.g. feeder roads, power distribution etc. to farming communities in rural areas.

The public investment projections show that 17.5% annual growth in real government agriculture expenditure would be required in the next 9 years in other to support the 9.45 percent agricultural growth necessary for having the 1996 poverty rate and thereby cut the 1990 poverty rate by one third by 2017 (ECOWAP and CAADP, 2012). Retrieving further, they maintained that private funding for agricultural development in Nigeria comes mainly from informal credit sources such as farmer organizations and co-operative associations community based organizations, non-governmentalOrganizations and private money lenders, these sources of funds are always very accessible to famersparticularly in the rural areas but at a very high cost. More than 60 percent of Nigerian famers rely on these sources

Alawode, (2015) maintains that commercial banks, which have hitherto hesitated in giving loans to cassava farmers, are somewhat more willing to provide financing to them and producers of other commodities. But issues of demand for collaterals by banks and high interest loans still linger. The single- digit interest loan opportunities provided by Bank of Agriculture and Bank of Industry are not adequate for the large number of seekers of credit financing. The Nigerian Incentive Based- Risk Sharing for Agricultural Lending (NIRSAL) also did not

adequately address the financing challenge credit to the Agricultural Sector, which has however increased beyond the five percent of bank portfolio as it was in 2013.

Other funding opportunities such as the fund for Agricultural financing (FAFIN), a private equity and quasi-equity and debt fund which will deploy$100 million in long term finance to agribusiness is also being floated by Federal government in collaboration with foreign lending institution. He explained further that, this increase food production is driven more by key private sector food Company such as Dangote, Olam, Stallon that made massive investment in farming / agribusinesses. QuotingAdesina, Alawode (2015) states that private sector investments in Nigeria's agriculture sector from 2012 to November 2014 have hit $5.6m. By estimation; as at the end of 2014, private sector investment in the sector is hovering at ₦1trn.

While rolling out some of the achievements of his policies in the agricultural sector, quotingAdesina,Fadimu(2015) notes that within the past three years, over 14.5million farmers have received their farm inputs directly through the e- wallet scheme. Many of which received subsidized farm inputs for the first time. The impact on food production has been massive as national food production expanded by an additional 21 million metric tons within the past three years. Nigeria's food imports bill decline from N3.9 trillion in 2011 to N635 billion in 2014, a decline of 408%.

On the regional scene, West Africa (2015) reports that the World Bank Group (WBG) approved on March 16 a total of $22 million to strengthen the management and governance of fisheries in Mauritania and Guinea. Mauritania also receives $12m from the International Development Association (IDA) and $7m in co-financing trust fund from the Global Environment Facility (GEF). In addition, Guinea will receive $30m among others to improve fishers' livelihoods and fight illegal, unregulated and unreported fishing.

To partner in agricultural project,Adesina, quoted by Disu (2015) expresses that one of it was Africa Development Bank (AFDB) $174.85 million financing of the Agricultural Transformation Support Programme (ATASP-1) in Nigeria. In her contribution, Edo State cooperative farmers Agency limited(ESCFA) reported by Momoh(2008) has advocated for an inclusion of input- financing into the agricultural sector, noting that input- financing was the best option to make agriculture work in Nigeria, thereby helping to stem the unpleasant experience of poor loans repayments. She opined that the model would entail that governments at all levels would stop the practice of giving physical cash to farmers, but mandated the banks to finance procurement of the needed farming inputs to farmers.

Okoroji (2015) affirms that bank reforms identified key priority sectors and developed a tailored intervention, which includes the establishment of the Nigeria Incentive –Based Risk Sharing System for Agricultural Lending (NIRSAL). The

programme is a demand – driven credit facility that would build the capacity of banks to engage and deliver loans to agriculture by providing technical assistance and reducing counterpart risk facing banks. It also seeks to pool the current resources under the CBN agricultural finance schemes into different components of the programme. This intervention is similar to the one introduced by Bank of England in 2012 under the funding for lending scheme which the Bank of England lent money at below market rates to the financial institutions for on lending to private sector to spur economic growth for businesses and households. The entrance of CBN into the race to save the nation's agriculture through the approval of ₦200 billion for on lending to large scale farmers have helped to boost agricultural production in the country (Shafi, 2017,Agronews,2016).

Prior to 1986, the CBN relied on the use of direct (non-market) monetary instruments such as credit ceilings on the deposit money banks, administered interest and exchange rates, as well as the prescription of cash reserves requirements in order to achieve its objectives of sustainable economic growth and employment. During this period the most popular instruments of monetary policy involved setting targets for aggregate credit to the domestic economy and prescription of low interest rates with these instruments, the CBN hoped to direct the flow of loanable funds with a view to promoting rapid development through the provision of finance to the preferred sectors of the economy such as the agricultural sector, manufacturing sector and residential housing.Okorafor (2018)

reveals that CBN has introduced revised guidelines for accessing Real Sector Support Facility (RSSDF) through Cash Reserves Requirement (CRR) or Corporate Bonds (CBs) were commercial banks would henceforth be incentivized to direct affordable, long-term bank credit to the real sector which include manufacturing, agriculture and other sectors considered by the CBN as employment and growth stimulating.

One of the major objectives of the local, state and federal Government has been that of credit provision and efficient management of agricultural credit. This objective was considered necessary by taking into recognition the important role banks play in the supply of funds to farmers for increased agricultural production. The commitment to prudent lending to agricultural sector is an important and crucial issue in the global banking sector today (Ejike, 2013).

2.1.4 Agricultural Credit Development Programmes

The low volume of business in the rural areas where poverty is most prevalent cannot guarantee sustainable business activities to encourage the establishment of commercial banks to provide the needed finance for production. In addition, the cost implication of processing agricultural loans in rural economy makes it unattractive for former established banks to channel their resources to farming.

Although, the commercial banks finance agricultural activities but their credits are urban based and so small that their impact cannot be felt in the rural areas where farming actually takes place. Lack of priority attention to rural population in credit delivering by commercial and other banks in the economy contributed to the depressed effects of the economic conditions in the rural economy, and this situation also affect the overall economic growth and development of the nation (Bamsisele, 2006).

Most governments have constantly emphasized that agricultural credit is highly important and necessary. All federal governments have come up with their own version of support services. Nigeria governments, supported by multi-lateral and bi- lateral aid agencies, have devoted considerable financial resources to supply cheap credit facilities to farmers and other rural entrepreneurs in a myriad of institutional settings (Nwaru, Onyenweaku, Nwagbo, and Nwosu, 2004). In respect of this, the federal government of Nigeria established many institutions programmes and schemes aimed at providing financial needs of the rural farmers. Each of these institutions has its own mandate that runs parallel to others.

The major institutions established to provide credit facilities for agricultural growth and development in Nigeria were the defunct Nigerian Agricultural and Co-operative Bank (NACB), 1973{became Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) now Bank of Agriculture (BOA)}. River Basin Development Authority (RBDA), 1977, Directorate of Food, Road

and Rural Infrastructure (DFRRI), 1986 then Fadama I, II,IIIprojects and Nigerian Agricultural Insurance Corporation (NAIC), 1987. The above institutions were complemented by the following programmes, AgriculturalDevelopmentProgramme (ADP), 1975, Operation Feed the Nation (OFN) 1976.Rural Banking Programme1977, Green Revolution,1980, defunct Family Economic Advancement Programme (FEAP), 1997 and the Nation Poverty Eradication Programme (NAPEP), 1999. The major agricultural financing scheme was the Agricultural Credit Guarantee Scheme Fund (ACGSF), 1978 and the Agricultural Credit Support Scheme (ACSS), 2006 (World Bank, 2009).

In 1986 government deemphasized the direct food production policy and adopted an integrated approach that combined real sector with rural development. As a result of this new agricultural development thrust, government established the Directorate for food, Road and Rural Infrastructure to construct and maintain feeder road. However, by 1988 government agricultural policy thrust was directed at providing support services while all aspects of agricultural production and marketing including input supply as well as agricultural mechanization were to be handled by the private sector.To enhance the provision of the support services in all parts of the country, government established the Agricultural Development Projects in all state of the federation and established the National Agricultural Land Development Authority. With the growth in the number of government agricultural development programmes, one expects meaningful agricultural output

growth, positive change in farm sizes and general development in the sector overtime.

The Agricultural Credit Guarantee Scheme Fund (ACGSF) established in 1977 was an agricultural programme that has special interest in facilitating supply of credit. The scheme was established to mobilize funds from the banking sector for rural development by guaranteeing loans by CBN through the deposit money banksfor investment in agriculture to minimize risk involved in financing the sector. Other formal sources of funds to agricultural sector include agricultural banks and microfinance banks. However, the vicissitudes of the financial sector appear to be inseparable from the performance of the ACGSFin meeting up with its goals of mobilizing adequate credit for the agricultural sector. According to the findings by Onoja, Onu, &Ajodo-Ohiemi (2013), immediate past (previous years) credit volume guaranteed by ACGSF (ACGSF past) exerted significant influence on the supply of current credit to the agricultural sector. This demonstrates the relevance of the ACGSF in improving agricultural finance level in Nigerian economy. Mandatory credit allocation to agriculture was abolished on October 1, 1996. Consequently, the volume of bank funds channeled to agricultural sector decreased forcing the federal government to introduce a new agricultural credit scheme in March 2006 in which tax waiver is given on interest earned by banks on loans to agricultural sector and reduction of interest rate to farmers through government subsidy (CBN,2006).

In a further bid to increase credit supply to agricultural sector the federal government in 2008 created the special fund tagged "The Commercial Agricultural Credit Scheme-CACS" in 2008 with an initial grant of N200 billion. This was part of the deal to make sure banks lend to farmers. The disbursement of the fund was to be handled by three apex banks under the supervision of the Central Bank of Nigeria (Asuquo,Ofem&Ajah, 2014). In order to solve the problem of agricultural financing so as to boost agricultural production and ensure food security especially in the rural areas, the Federal Government of Nigeria established the Nigeria Agricultural and Co-operative Bank (NACB) Limited on 24th of November, 1972 as an agricultural financing institution. In July, 2001, Nigerian Government finally established the Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) as an agricultural financing institution to facilitate agricultural production through the provision of affordable credit facilities to micro, small and medium scale farmers (Odi, 2013).

The Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) is the outcome of the merger of the defunct Nigerian Agricultural and Co-operative Bank (NACB), the defunct Peoples' Bank of Nigeria (PBN) and the risk assets of the erstwhile Family Economic Advancement Programme (FEAP) in 2000. The physical merger of the institutions took place in 2001 (Mustapha, 2006). NACRDB since inception functioned for over ten (10) years in Nigeria as rural financial intermediary with the primary objective of promoting grass root

self- reliant economic development through the provision of finance and banking services among others.

The capacity of financing agricultural sector in Nigeria would be significantly enhanced through the provision of NACRDB low interest credit facilities to enable farmers start, expand and modernize their farming activities and be self-reliant, self- employed, generate adequate income and investment (Odi, 2013). The Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) now Bank of Agriculture (BOA) is one of the government publicly sponsored credit institution established since 1973 (formerly called the Nigerian Agricultural and Co-operative Bank) to cater for the credit needs of the agricultural sector. Unfortunately, the performance of NACRDB has been rated low, mainly due to high default rate by beneficiaries (Zeller, 2001).

The Bank of Agriculture (BOA), is the principal institution involved in agricultural financing in Nigeria. The Bank has been playing prominent role and will continue to do so under a package of incentives.It is in realization of the fact that credit is a critical factor in agricultural development that for most government in developing countries, the channeling of bank lending to agriculture has increasingly become an important policy instrument for increasing agricultural output particularly among the rural poor (Egbe, 1990).

The purpose of the programmes is to reduce financing risk of deposit money banks, increase credit supply, expand and earn income in the agricultural

sector. These programmes did not achieve the intended result because agriculture being both labour and capital intensive business needs huge capital inflows for sustainable growth. This indicates that the real farmers were not properly targeted and exposed to the fund. Formal credit sources have not been able to recognize genuine farmers and work with their commitment in offering service to the sector.

2.1.5 Channels of Credit Transmission

Bernake&Gerther (1995) find that monetary policy does not only affect the interest rate but also the external finance premium and this brings to light the notion of credit channel of monetary transmission mechanism, the lending channel however is an extension of the credit channel and the main focus is on banks which was consistent with the finding that banks are the major conveyors of monetary policy impulses to the real sector of the economy. To understand how banks policy affects the credit economy is to apply the interest rate and credit effect of monetary transmission mechanism. According to Mbutor (2007) interest rate and credit effect are explained.

The interest rate Effect: the interest rate effect mechanism in the transmission of monetary policy is a key channel and it has also been the mainstay of teaching in macroeconomics. Using a model, the traditional Keynesian perception of how money is transmitted can be shown as follows:

$M\downarrow = i\uparrow = I\downarrow = Y\downarrow$

Where M↓ is a contractionary monetary policy which leads to a rise in domestic real interest rate (i↑). This in turn raises the cost of capital, thereby causing a fall in investment spending (l↓). The decline in investment result in a fall in aggregate demand and a decline in output (Y↓). This theory posits that an increase in real interest rate raises the price of currently purchased goods and thereby reduces aggregate demand and growth.

Credit Effect: this is discussed under the ebb of bank lending channel. The bank lending channel is based on the view that banks by their peculiar nature are best suited to deal with some categories of borrowers (small firms). Underthis channel, a contractionary monetary policy (m↓) leads to a fall in bank reserves and bank deposits (BD↓) and consequently leads to a decline in bank loans (BL ↓). A fall in bank loans as a result of declining bank deposit affects borrowers which inevitably causes decline in investment spending (I ↓) thereby leading to fall in output (Y ↓).

$M\downarrow = BD\downarrow = BI\downarrow = I\downarrow = Y\downarrow$

The banking lending channel stated that monetary policy also affects the external finance premium by shifting the supply of the intermediate credit especially loans from commercial banks. It indicated that if supply of bank loans is disrupted for some reason, bank dependent borrower may not be necessarily shut off but incur cost of finding lenders. Therefore, a reduction in the supply relative to other forms

of credit is most likely to increase external finance premium and reduce real activity.

Emphasizing the channels for injecting credit into the economy, Ajakaiye [1993] asserts that the banking sector has been more effective in mobilizing credit but not so effective in directing them to the desired sector. Conceivably, credit can be injected into the system through production (supply) channel or through consumption [demand] channel at any point in time, one of the sector channels may be predominant and public policy towards the banking sector and behaviours of the operation of the sector are influenced more by the imperative of the predominant channel. It is instrumental to sketch the making of the supply channel, since the supply channel is predominant in the Nigerian case when the bulk of credit is used to boost the production of goods and services, then the supply channel is predominant. The relationship can be specified as follows:

Q= F(K,L,M); Q'K,Q'L.Q'M>0

Where: Q= Output. K= Physical capital. L= Labour, M= Credit,

The equation says that output will increase if there is an increase in the supply of capital. labour and credit. Practically, the transmission mechanism is as follows: when there is an increase in supply of credit to the producers (farmers), part will be used to finance variable inputs (labour) while the remaining part will be used to finance increase in physical capital (investment) thereby increasing

production capacity. Through the process of transfer of real asset and payment for inputs, the increased credit is transmitted to income. Increase income will lead to increase in expenditure and savings. Meanwhile the increase in savings induced by increase in income will lead to an increase in the credit which can be mobilized by the banking sector.

Under the channel, an increase in the price of credit (interest rate) will lead to reduction in output as producers (farmers) reduce their demand for credit. In addition, cost of production will increase due to the increased cost of funds. Where feasible the cost increase will be passed on to prices.

Noting that the commercial banking failed to meet the targets specified in terms of allocating credits to agricultural and manufacturing sectors. The act of specifying target sectoral distribution of credit is an indication that the desired is to encourage the supply channel. This is in the spirit of the familiar Say's law in economies which Patrick in Ajakaiye (2002) has refers to as a "supply leading phenomenon," regardless of the technique employed, a reduction in supply of credit when the supply channel is predominant will restrict growth and development. If it is carried out through increase in interest rates, the process can be quite disruptive. Until recently, interest rates structure had been discriminatory with the intention of encouraging specific production activities especially agriculture and small scale industries. Mickinon (1973) argues that for the role of credit allocation to the industrial and commercial, real interest rate must be

positive to permit any amount of investment to generate a positive rate of return to the end of investment period.

The predominant supply channel to the economy presupposes that deposit money banks credit increase agriculture credit for sustainable growth in the agricultural sector. Study has established the strength of the growth linkages. Estimates show that on average in Asia, every $1 of additional farm income created a further $0.80 in non- farm income (Thelma, 2017; Hazell &Ramaswamy, 1991). Also in Africa estimates show that every additional $1 of farm income leads to a further income of between $0.96 in Niger and $1.88 in Burkina Faso (Delgado,Hopkins & Kelly, 1998). In Zambia estimates suggest that every $1 of additional farm income creates a further $1.50 of income outside agriculture (Hazell &Hojjati, 1995). Irz, Lin, Thirtle& Wiggins (2001) estimate that for every 10 percent increase in farm yields, there is a 7 percent reduction in poverty in Africa and a 5 percent reduction in Asia, while a growth in manufacturing and services had no such effect.

In a nutshell, interest rate and credit are synonymous and key to production in any economy. When credit targets the real farmers, the transmission effect of these variables- interest rate and credit comes to play in the sector. For the past two decades, we have experienced fluctuation in monetary policies, interest rate mostly negative and so constraint productivity in the sector.

2.1.6 Farmers' Management Problems of Deposit Money Banks' Credit

All over the country, farms are dotted here and there, at one time, sites are changed, and at the other lines, or they are closed down completely. The problem is that, farming culture connected with the flow or availability of funds is not cultivated. This has been the main failures of farmers. Such factors as land, labour, capital and organization are to be borne in mind when setting up and operating any farming business. These factors can exist or be preserved if available funds are managed (Thelma 2017, Akram, Hussian, Sabir & Hussain 2008). Attractiveness of the site, quality personnel, machinery and efficient management scaled around good cash or credit management flows.

Despite the injection of banks' agricultural credit into the economy, the agricultural sector has shown little or no remarkable improvement. The farm planner should understand that borrowed money (credit) is shown in the statement of financial position as a liability and must be paid back at specific periods, for this and other contingences, fund should always be available. Thelma (2017) asserts "the small business entrepreneur either has to start off with sufficient internally generated funds or learn how to live a hand- to- mouth existence. Since most entrepreneurs are not born rich, living in a constant state of financial under nourishment becomes a fact of life… this does not mean that small businesses have to starve to death, however." Credit has also been discovered to be a major constraint on the intensification of both large and small scale farming (Ayegba&Ikani, 2013).

Various reasons and problems have been given as the results of the ineffectiveness of current agricultural credit in Nigeria. But the most outstanding factors are:

- Record- Keeping System: Thelma (2017) explains that a review of the available literature on small farmers credit programmes reveal that record keeping device has been practiced in very restrictive instance. Stating that accounting framework involved the following activities:

(1) Current agricultural production account.

(2) Current non- agricultural production account.

(3) Income- expenditure account.

(4) Fixed capital production account.

(5) Saving –investment account, and

(6) Outside-of-household account.

IFAD (2013) noted in its study that record of uses and record of incremental impact in most small farmer agricultural credit projects have been missing. He pointed out that record keeping system can be used in:

(1) Capital asset description.

(2) Record of use such item as fertilizer, and

(3) Record of incremental impact.

The absence of record keeping system in agricultural credit projects has contributed to the failure of many credit programmes. Record keeping will help generate adequate data necessary to assess average borrower's behaviour.

Double entry system has been used to summarize the flows of goods and services. This involves two dimensions:

(1) Income, and

(2) Expenses.

It has been difficult to collect statistics that would enable the analysis of peasant complex in its entirety. Hayami,Picdad, Luisa,&Masad, (1977), attempted to document the complex of economic activities of rural households in the Philippines in terms of a set of accounts in double entry system. The sampling population consisted of a mix of large farmers, small farmers and landless (do not own land as property)workers who were chosen based on their ability to cooperate in the project. The record book comprised of:

(a) labour trends, and

(b) Transaction sheets.

The investigators checked cooperators records regularly twice a week (Tuesdays and Fridays). The record books were distributed and collected weekly every Friday.

The study shows that most of the small farmers are under share tenancy and the large farmers are under leasehold tenancy. This infers that record keeping system could be used to show any available disparity among farmers in income distribution.Diaz- cisneros (1973) proves that data can be systematically collected and documented at a village household level to be consistent with the framework of macro national accounts, which can be used in allocation of credit to farmers. This is one of the aspects most of Nigerian farmers are lacking.

Looking at the problem of credit management, Thelma (2017) disclosedthat:

(1)   There are no available statistics on previous credit use by large, medium and small farmers, thus the allocation and absorptive capacityof farmers to external credit become a matter of uncertainty.

(2)   There are no available data on how a given agricultural credit has been used for example whether such a loan has been directed in the procurement of agricultural inputs e.g., fertilizer, farm machines, etc., that might have a direct or indirect effect in increasing efficiency in production.

(3)   Also where there is some uncertainty surrounding capital generation in the farm sector and what are the desirable priority input factors, where scarcity of capital is a constraint.

The record system approach whereby implemented in agricultural credit programmes will assist us in the use of linear programming (LP) model to determine those factors that will yield optimum result in production with constraints such as capital, labour availability, fertilizer, and mechanization inputs. The LP model using a flow of funds approach will enable us also to project farm credit needs. So far high default rates are presented in most of the current agricultural credit programmes since there are no data system created through record keeping that will give direction on the better way to allocate funds. Thelma (2017) reaffirmed that high administrative costs and a desire to minimize risk makes it difficult for financial institution to justify any loan policy which would favour small farmers. As a result, credit has flowed to the wealthier farmers and thus has not been the key to income redistribution.

-Problems of Defaults: Paldula (2015) posited that high default rate in the repayment of agricultural credits have been observed with agricultural credit programmes to Sri Lanka small farmers (not only here even in Nigeria). Such high default rate has created some financial burdens to the government's budget and financial operations of the people's bank (no longer operational in Nigeria) which has been the main disbursing agency for credit. The main cause of the high default

rate has been associatedwith variability in income caused by seasonal factors, high land rentals and lack of interest and corruption of officials of lending institutions.

Education of the farmers is imperative to assist farmers to utilize insurance practices and adapt to better loan repayable attitude. The question of a change in attitude is very important since most banks believe that the farmers who come for loans are rational decision makers so the bank puts money into the hands of these individuals, trusting their judgment in the use of the credits (Thelma, 2017). VonPischike(1991), studies Some Causes and Effects of Poor Loan Collection Performance. Feels that procedures used to select borrowers often result in later loan repayment problems. His main point is that loans must be made on debt repayment capacity if loan repayment problems are to be resolved in most countries.

- Credit Organization Failures: Most credit organization focus superficially on two main factors:

(a) credit delivery and

(b) credit recovery.

These two factors have only intermediate effects and do not result to the success of credit programmes. This point out the importance of the creation of adequate data bank, which will offer the economic environments surrounding the useful employment of the credit into productive end.

Diaz- Cisneros (1973) noted that the major problem with small farmers is that they are poor, disorganized and face a technological ceiling that does not allow them to increase their productivity.Today, they have access to credit facilities, better organized with modern unlimited technological backup. Yet productivity cannot march the growing population as a result of inadequate lending.

-Personnel Problems: The poor influence of banks' officials has tremendously affected farmers' credit management. Roberts, (2014) reported that most training officers in charge of disbursement of agricultural loans have had little or no instruction in teaching methods and the materials on which they based their instruction have been deficient in many respects. They have been associated with lack of numerate skills involved in farm budget and cash flow preparation. Attitudinal weaknesses have been observed among most of the credit officers. From Pakistan came the comments with respect to junior staff that: "the job is held in the beginning as an interim arrangement and a search for a better job continues simultaneously, attacking concentration, discipline and morale".

- Borrowing Costs: these have been associated with the failure of agricultural credits to small farmers (Adams&Nehman, nd.) such expenditure include paper work costs, expenses visiting the bank a number of times to negotiate the loan and the probability that the loan application will be rejected increase small borrowers

expected loan transaction costs. In order to accomplish success re-examination of the characteristics and surroundings of the small farmer becomes important.

While Von Pischike (1977) states that the understanding of financial accounting will add to the success of credit lenders. The study outlines those criteria necessary to evaluate credit programme performance. Some of the criteria are:

(1) Collection ratio.

(2) Percentage of the Portfolio which is in Arrears.

(3) Ageing of areas.

(4) Average collection period.

(5) Proportion of borrowers meeting repayment obligations.

(6) Repayment Index

2.1.7 Deposit Money Banks' Credit to Private Sector

Credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of commercial bills, promissory notes and trade credits and other accounts receivable that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are

available, including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits (IndexMundi,2018).

Examples of other financialcorporations arefinanceandleasingcompanies, money lenders, insurance corporations, pension funds, foreign exchange companies. (Business Dictionary, 2016Jugale, 1991, IndexMundi, 2018). Credit to private sector, void of government control consists mainly of private companies, Small and Medium Enterprises (SMEs), individuals and households.

2.1.8 Microfinance Bank Credit

A microfinance bank is one devoted to extending small loans, referred to as microloans, to individuals, businesses, organizations in low-income regions, including under- developed countries where small amounts of money can go a long way to support their economic activities. Some financial institutions are devoted to microfinance, while others are part of large companies, such as global investment banks. Ultimately, this type of bank provides credit to those who would otherwise be unable to access this form of capital. These loans foster the development of small businesses and provide tools to entrepreneurs to follow their dreams, all in an attempt to alleviate global poverty in vulnerable regions.

In most cases, a microfinance bank is involved in social investing- that is, fostering the growth and economic development in a vulnerable region by extending loans to families, businesses, and entrepreneurs. These financial institutions still intend to generate profits from a microfinance investment, but also take an interest in social development of a poverty- stricken place. In the process, the bank lends its financial expertise, business resources, and relationship skills to underprivileged areas in addition to financial support.

Microfinance loans are designed for providing finance to the most underprivileged regions in the world, including sub-Sahara Africa and the Democratic Republic of Georgia, where pockets of the population might otherwise have no access to any sort of banking institution. In addition to small loans,

individuals gain support, including education and training for personal development, in addition to savings and insurance products. The purpose is to break the cycle of poverty in a region (Thelma, 2017).

2.1.9 Deposit Money Banks' Credit to Small and Medium Enterprises

An enterprise can be classified as small-scale, medium- scale or large- scale industries. A developing economy, like Nigeria is dominated by small-to medium –scale enterprises. Small and medium units are those enterprises that use small indivisible units of plant and equipment. The small- scale was the earliest form of business enterprise, and is still the most numerous, in spite of the development of large-scale enterprises. The small enterprise obtains its initial capital from its own savings; it may increase its capital by a loan from the bank, if it is able to offer acceptable security (Okafor,2000 & Nwanna,2011). Ikezue (2000) maintains that, the federal government of Nigeria defines small enterprises for the purpose of commercial bank loans as those with annual turnover not exceeding five hundred thousand naira (N500, 000) and for merchant bank loans those enterprises with capital investment not exceeding two million naira (N 2,000,000) excluding cost of land or a maximum of five million naira (N5, 000,000).Claims on this sector are in the form of loans and advances, commercial bills, trade credit and other Account receivables from various financial institutions.

2.2 Theoretical Framework

2.2.1Theories of Agricultural Credit and Financing

Economists had only debated the nature and relationship between financial institutions such as Central Banks, deposit money banks, brokerage houses and mutual funds use varieties of financial institutions to facilitate trade in goods and services. They channel resources from the savers to the investors, providing payment services, mobilizing savings, allocating credit, allocating resources and the management of funds. This is a way that promotes growth and industrial development (Odi, 2013; Greenwood & Jovanovich, 1990;Bencivenga& Smith, 1991).

The banking sector through provision of reliable payment system, mobilization of the savings, allocation of credit and diversification of borrowing roles enhance economic activities and promote industrial development. Allocationof financial institutions, facilitate its scope, nature of saving and the investment, whichhas positive impact on economic growthand industrial development. Various theories have been put forward by different economists in trying to explain the contribution of the banks' credit and the advance to growth (GDP) in the individual sector of the economy.

Werner (2005) notes that the central argument is a dichotomous equation of exchange distinguishing between money used for GDP- transactions

(determining nominal GDP) and money used for non-GDP transactions (determining the value of asset transactions).growth requires increased transactions that are part of GDP, which in turn requires a larger amount of money to be used for such transactions. The amount of money used for transactions can only rise if banks create more credit. This expands the money supply and it suggests that accurate way to measure this money is by bank credit. It can be disaggregated into credit for GDP transactions (CR) and credit for non-GDP (i.e. asset) transactions (CF).The former drives nominal GDP and the latter asset transaction values. Under further conditions, they determine consumer and asset prices:

$$C= CR+ CF$$

$$\Delta(CRVR)=\Delta (PR\ Y)$$

$$\Delta (CF\ VF)=\Delta (PFQ\ F)$$

So the effect of bank credit depends on its quantity and quality- the latter defined by whether it is used for unproductive transactions (credit for consumption or asset transactions, producing unsustainable consumer or asset inflation, respectively) or productive transactions (delivering non-inflationary growth). Credit used for productive transactions aims at income growth and is sustainable; credit for asset transactions aims at capital gains and is unsustainable. When credit creation slows after an asset bubble driven by credit for asset transactions, the ensuing fall in asset prices capital losses and non- performing loans can easily trigger a banking

crisis (banks have less than 10 percent of equity; a drop of their asset values by little more than 10 percent implies bank insolvency).

A monetarist like Friedman, in Articles ng (2014) emphasizes money supply as the key factor affecting the wellbeing of the economy. Thus in order to promote steady growth rate, the money supply should grow at a fixed rate instead of being regulated and altered by the monetary authority (ies). Keynes, in Article ng(2014) on the other hand, maintains that monetary policy alone is ineffective in stimulating economic activities because monetary policy works through indirect interest rate mechanism. Friedman equally argues that since money supply is substitutive not just for bonds but also for many goods and services, changes in money supply will therefore have both direct and indirect effects on spending and investment respectively.

Waheed (2009) analyzes that to improve the wellbeing of rural poor, micro finance is proposed to be primarily essential for investment in rural productive activities. The study concluded that per capita credit to non-poor was better than per capital credit to poor farmer. More credit was largely taken by non-poor and the poor have little access to micro credits.

To sum, Oachan (1977) emphasizes the credit need of Thai farmers, insisted that there is need to estimate the current and future credit needs for both short - and long-term purposes. He said that any sound policy requires reliable

estimates and information regarding the nature and magnitude of the needs under alternative conditions.

2.2.2: **Theories of Economic Growth and Production**: There are numerous growth models in literature. However, there is no consensus as to which model will achieve the best success. The achievement of sustainable growth requires minimum levels of skills and literacy on the part of the population, a shift from personal or family organization to large scale unit (Nnanna, 2014). The growth models relevant for this study are Neo- Classical Model of Growth and Endogenous Growth Theory. This is because they explain the situation in developing economies such as Nigeria, Ghana, Cameroun, etc.

2.2.2.1 Neo- Classical Model of Growth: The Neo- classical Model of Growth was first devised by Robert Solow (1956). The model believes that a sustainable increase in capital investment increases the growth rate only temporarily. This is because the ratio of capital to labour goes up (there is more capital available for each worker to use) but the marginal product of additional units of capital is assumed to decline and the economy eventually moves back to a long- term growth path, with real GDP growing at the same rate as the workforce plus a factor to reflect improving "productivity". A "steady- state growth path" is reached when output, capital and labour are all growing at the same rate, so output per worker and capital per worker are constant. Neo-Classical economists believe that to raise an economy's long term trend rate of growth requires an increase in

the labour supply and an improvement in the productivity of labour and capital. Differences in the rate of technological change are said to explain much of the variation in economic growth between developed countries. The Neo- Classical model treats productivity improvements as an exogenous variable meaning that productivity is assumed to be independent of capital investment (IMF, 2001).

Nnanna, Englama,&Odoko (2004), report, based on Solow's analysis of the American data from 1909 to 1949, showed that 87.5% of economic growth within the period was attributed to technological change and 12.5% to the increased use of capital. The result of the growth model was that financial institutions had only minor influence on the rate of investment in physical capital and the changes in investment are viewed as having only minor effects on economic growth.

2.2.2.2 Endogenous Growth Theory: Endogenous Growth Theory or new growth theory was developed in the 1980's by Romer Lucas &Rebelo, among other economists as a response to critics of the neo- classical growth model. The endogenous growth theory holds that policy measures can have an impact on the long-run growth of an economy (Sparks, 2014). The growth model is one in which the long-run growth rate is determined by variables within the model, not an exogenous rate of technological progress as in a neo- classical growth model. Jhingan (2006) explains that the endogenous growth model emphasizes technical progress resulting from the rate of investment, the size of the capital stock of human capital.

In an endogenous growth model, Nnanna, Englama&Odoko (2004) observed that financial development can affect growth in three ways which are raising the efficiency of financial intermediation, increasing the social marginal productivity of capital and influencing the private savings rate. This means that a financial institution can affect economic growth by efficiently carrying out its functions, among which is the provision of credit.

In a **Cobb- Douglas production function**, Were, Nzomoi&Rutto(2012) expressed $Qit = A^\lambda K^\alpha it L^\beta it$, where Qit = real output for industry i at time t; Lit = units of labour utilized by industry i at time t; α, β. represent the factor share coefficients, whereas λ Allows for factors changing the efficiency of the production process. We assumed that the technical efficiency of the production process is correlated with availability of credit, implying that the parameter A in the production function varies with credit access. Access to credit help boost the rate of technological innovation and hence output (Trew, 2006). In other words, credit constraints limit business expansion and can constrain production processes to economically inefficient scales.

However, this study is anchored on the Endogenous growth theory, otherwise known as the new growth theory to build the study. This theory focuses on developing economy including Nigeria and explains the intention of the study. The theory establishes that policy measures can have an effect on the long-run growth of the sector; while the growth is determined by variables within the

model, whichestablished relationship. All things being equal, the provision of credit by formal sources will go a long way to grow the sector. Hence, this model is theoretically in line with the study.

2.3 Empirical Review

An important point to note is the major problem of getting the public to understand the extent to which monetary systems are debt based; this explains that the economy is run mostly on credit. This is the challenge in persuading the public that things are not the way they seem (Jugale, 1991). Empirical evidenceshows that a close relationship is found to exist between deposit money banks' credit and agricultural production in all countries. A review of existing empirical studies indicated that for a middle-income economy, monetary policy shocks have some modest effects in economic parameters.

Iwedi, Igbanibo&Onuegbu (2015) studied Bank Domestic Credits and Economic Growth Nexus in Nigeria (1980-2013). Using ordinary least square regression, variables employed are Gross Domestic Product, Credit to Government sector and Contingent liabilities. Found that credit to private sector and credit to government sector positively and significantly correlate with GDP in the short run.

Obilor (2013) studied the Impact of Commercial Bank Credit to Agricultural Development in Nigeria. Using linear regression model, variables employed are Agricultural production index, Commercial banks credit to the

Agricultural Sector, Agricultural Credit Guarantee Scheme loan by purpose, Government Fund Allocation to Agricultural Sector and Agricultural Product Price. Result revealed that Agricultural Credit Guarantee Scheme Fund and Government Fund Allocation to Agricultural sector produced a significant positive effect on Agricultural Productivity, while the other variables produced a significant negative effect.

Odi (2013) examined Agricultural Financing in Nigeria: An Empirical study: 1990-2010. Using ordinary least square method and quantitative research design; variables are: agricultural loan, interest rate cost of loan, repayment rate and agricultural output. The study observed that there is significant relationship between agricultural financing and the growth of Nigeria economy and that the level of loan repayment rate over the years has indeed negatively impacted significantly on the growth of Nigerian economy.

Ogbonna&Osondu (2015) studiedthe determinant of supply of funds to Agricultural sector from formal sources in Nigeria from 1992 to 2012. Using descriptive statistics and two stage least square regression technique; variables are: total credit accessed by farmers from commercial banks, NigerianAgriculturalCo-operative and Rural Development bank (NACRDB) and microfinance banks, index of Agricultural Gross Domestic Product, Foreign Private Investment in Agriculture, Exchange rate, Government expenditure in Agriculture, Interest rate, Rate of inflation, Index of World Agricultural commodity price, Liquidity Ratio of

commercial banks, Cash Reserve Ratio of commercial banks, Minimum Rediscount (Policy) Rate of commercial banks and Time trend variable in years. The volume of funds supplied to agricultural production from formal sources was affected positively by interest rate and commercial banks' liquidity ratio and negatively by banks' cash reserve ratio (CRR) and index of World Agricultural commodity prices. These variables were statistically significant at 1.0 % level of probability except the index of World Agricultural commodity prices which was significant at 5.0 % alpha level.

Awe (2013) investigatedthe mobilization of domestic financial resources for agricultural productivity in Nigeria. Using Vector Auto Regressive Model (VAR) to analyze time series data from (1980-2009); variables are: subsidy and agricultural credit policies that were financedthrough the Nigerian Agricultural Credit Bank (NACB), credit facilities from Nigeria Bank for Commerce and industries at the state level credit through commercial and merchant banks and provision of agricultural credit to defunct Commodity Board by the Central Bank of Nigeria. The result revealed positive relationships between the variables and the variance decomposition measured the proportion of forecast error.

Idoko, Sunday & Sheri (2012) examined the impact of Government Expenditure on Agricultural Output in Nigeria (1975-2010). Using the linearized Cob- Douglas function by employing ordinary least squares econometric technique; variables of the model include Government Expenditure on

Agricultural sector, Commercial banks loans and advances to the Agricultural sector, foreign direct investment on the Agricultural sector, Annual rainfall, Agricultural credit guarantee scheme fund and Agricultural output. The result of the estimated model revealed a positive but insignificant relationship between Government expenditure to the agricultural sector and Agricultural output.

Okulegu, Ewno&Okoro (2014) examined Banking sector credit and the performance of the Agricultural sector in Nigeria: 1981-2011. Using the econometric tests such as unit root co-integration, Error correction model and Grange causality test; variables are: Agricultural Gross Domestic Product, Commercial bank credit to agriculture, agricultural credit guarantee scheme and government expenditure on agriculture. The result showed that the total money stated as Government Expenditure on agriculture in Nigeria was not statistically significant and not theoretical in line. Also found that Commercial bank credit to agriculture (CBCA) granger caused Agricultural sector contribution to Gross Domestic Product.

Agunuwa,Inaya&Proso (2015). Studied the Impact of Commercial Banks' Credit on Agricultural Productivity in Nigeria, Using Time Series Analysis 1980-2013. Using ordinary least squares techniques; variables are: Agricultural productivity, Commercial banks credit to the agricultural sector, interest on Commercial banks' credit to agriculture and Government spending on the agricultural sector. The result showed a positive relationship between commercial

banks' credit and agricultural productivity. A negative relationship between interest rate and agricultural productivity and also, a significant positive relationship between government spending and agricultural productivity in Nigeria.

Iganiga&Unemhilin (2011) investigated the impact of federal government agricultural expenditure on agricultural output in Nigeria. Using the Cobb-Douglas model; variables are: total commercial credit to agriculture, consumer price index, annual average rainfall, population growth rate, food importation and GDP growth rate. It was found that federal government agricultural expenditure was positively related to agricultural output.

Toby &Peterside (2014) analyzed the role of banks in financing the agriculture and manufacturing sectors in Nigeria from 1981-2010. Using both descriptive and inferential techniques; variables are: commercial bank lending to agriculture and manufacturing, merchant bank lending to agriculture and manufacturing, agricultural output and GDP. The descriptive results showed that Nigeria's commercial and merchant banks lagged behind in financing agriculture when compared to manufacturing. The inferential results showed a significant weak correlation between commercial bank lending and contribution of agriculture to GDP. However, there was a significantly positive correlation between merchant bank lending and agricultural contribution to GDP.

King&Levine(1993) studied the relationship between financial system with long run growth in across section of the countries between 1960 and 1989, using graph correlation and the regression to gauge the robustness of the partial correlation between growth and financial system indicators found to be significantly correlated with growth through investment and efficacy.

Emmanuel (2008) studied the impact of macroeconomics environment on agricultural sector growth in Nigeria, using multiple regression analytical technique (ordinary least square). Variables are credits to the agricultural sector, nominal interest rates, exchange rate, world price of agricultural produce, foreign private investment, government expenditure and inflation rate. Found nominal interest rate is positively related to the index of agricultural production. The index of agricultural production was positively related to government expenditure on agriculture. The index of agricultural production is negatively related to the level of inflation.

Oboh&Ekpebu (2010) examined the determinants of formal agricultural credit allocation to the farm sector in Nigeria; using ordinary least square. The study found out that there is the need to critically assess factors affecting the rate of credit allocation by beneficiaries of NACRDB.

Mbata (1991) investigated the impact of the Supervised Agricultural Credit Scheme (SACS) and non-Supervised Agricultural Credit Scheme: As a tool for Agricultural Development in Rivers state, Nigeria. Variables are farmers who

borrowed from formal sources and those who borrowed from informal sources, data covered the 1998/99 cropping season. A comparative analysis of the production of the two groups was carried out. The findings of the study revealed that farmers who had access to the SACS consumed more inputs, obtained higher yields and thus realized greater farm profit per hectare than their counterparts who obtained credit from informal sources. This was direct impact of the SACS on small scale farmers.

Mbutor (2007), studied the lending channel of monetary policy transmission in Nigeria, using GDP as dependable variable on the explanatory variables which includes domestic prices proxied by consumer price index, treasury bill rates as a proxy for minimum rediscount rate (monetary policy rate), broad money (M2), exchange rate, total quantity of loan and maximum lending rate as a proxied for the price of loans. Using Vector Auto regressive (VAR)-Standard Cholesky decomposition. He found that an increase in the monetary policy rate by 0.25 percentage points will have the quantity of loans by the banks unaffected in the first period. Lagged fall on the quantity of loans is consistence with expectations that loan contracts take some time to be adjusted. This evidence confirms that an increase in the monetary policy rate (MPR) causes banks to reduce the quantity of loans, which they extend to their customers. A lending channel exists in Nigeria. However, the GDP does not respond appropriately

evidencing the weak nature of the link between monetary (credit) policy actions and real sector of the economy.

Werner (2005) in his book expressed A Quantity Theory of Credit proposed in 1992. In the study, credit creation is disaggregated into credit for GDP and non-GDP (financial circulation), using a general-to-specific econometric time series model. He found that bank credit creation for GDP transaction Granger causes nominal GDP growth, while credit creation for financial transactions explains asset prices and banking crises.

Starr (2005) studied the real effects of monetary policy in five common wealth independent states (CIS)., using a Structural Vector Autoregressive (SVAR) model with orthogonaized identification. Found little evidence with notable exception that is changes in interest rate have a significant impact on output.

Oboh (2008) investigated Farmers' allocation behavior in credit utilization in Benue State; using error correction model. The study reveals the usefulness of any agricultural credit programme does not only depend on its availability, accessibility and affordability, but also on its proper and efficient allocation and utilization for intended uses by beneficiaries. In spite of the importance of credit in agricultural production, its acquisition, management and repayment are replete with a number of problems.

Araujp (1967) in an Economic Studied of Factors Affecting the Demand for Agricultural Credit of the Farm Level; examined the impact of credit use on economic performance of 132 farmers in Southern Brazil in 1965. From their study, they found that judicious credit use was associated with higher average economic performance and that most of the credit use dwells among relatively high income farmers.

Argarwal&Kumawat (1974) studied the Potentialities of Increasing Farm Income through Credit and New Technology in Agricultural Situation in India. Examine the returns from new technology and additional credit use among representative semi-arid farms in Rajastan. Study is based on interview with 60 farmers covering the 1971-72 crop years. Through the use of linear programming, authors estimate farm incomes under various technology and credit availability assumptions. They conclude that most farmers are short of credit and that the average household's income could be increased by 73 percent if new technologies were applied and adequate credit was available.

Adams & Tommy (1974) in Financing Small Farms: The Brazilian Experience 1965-69. Outlined the results of credit use in a given sample of 338 farmers in Southern Brazil between 1965 and 1969. The analysis of this study showed ¾ of the farmers had less than 30 hectares of land. In spite of increase made in amounts of credit made to farmers, there was no significant increase to new formal borrowers. Eleven of the largest farms absorbed almost 2/3 of the

increases in institutional loans were concessional interest rates applied to formal loans.

Udih (2014) investigated bank credit and agricultural development. A simple random sampling technique through the lottery method was adopted to select the sample. The data were analyzed using percentage mean and standard deviation and Pearson product moment correlation to test the hypotheses. Variables are primary and secondary sources of information that were extracted from five (5) banks and ten (10) agricultural enterprises in Delta State. found that banks' credit and advances to agricultural entrepreneurs promotes agricultural development and productivity, and that regulated banks' credits to the agricultural entrepreneurs has no or little impact on the entrepreneurship performance.

Cuesta, Edmeadu& Madrigal (2011) studied Food insecurity and public agricultural spending in Bolivia. Using supply side approach and an econometric to analyze. Variables are agricultural spending, welfare outcomes, weather conditions and agricultural potentials for all 327 municipalities. Found that levels of public agricultural spending are positively associated with high vulnerability.

Armas, Osorio & Blanca (2012) studied Agricultural public spending and Growth (1976-2006): The Example of Indonesia Economic Premise. Using trends and evolution with disaggregate approach. Variables are public spending, on agriculture and irrigation, public spending on fertilizer subsidies, agricultural output. Found that public spending on agriculture and irrigation had a positive

impact on agricultural output, whereas public spending on fertilizer subsidies had an opposite effect.

Olajide, Akinlabi& Tijani (2012) studied Agricultural Resources and Economic growth in Nigeria. Using ordinary least square regression method. Variables are gross domestic product and agricultural output.found that a positive cause and effect relationship exist between GDP and agricultural output.

Adofu, Abula& Agama (2012) studied the effects of government budgetary allocation to agricultural output in Nigeria. Using the OLS regression technique. Found that the government budgetary allocation to agricultural sector has a strong positive and significant impact in agricultural production.

Udo (2011) studied an Examination of public expenditure, private sector investment and agricultural output growth in Nigeria: 1970-2008. Bound testing approach. Using error correction model. Variables are public expenditure, private investment and agricultural output growth. Found that increase in public expenditure has a positive influence on the growth of the agricultural output.

Habibullah&Eng Yoke-Kee (2006) studied the effect of financial development on economic growth: a panel data dynamic analysis for the Asian Developing Countries. Using the GMM technique, conducted causality testing analysis. Variables are 13 Asian developing countries. Found that financial development promotes growth.

Orji (2012) studied Banking Savings and Bank credit in Nigeria. Determinants and impact on Economic Growth. Using ordinary least square technique. Variables are total savings, private sector credit, public sector credit, interest rate spread, exchange rates and economic growth. Found that a positive relationship exists between the lagged values of the dependent variable and the explanatory variables.

Nnanna (2004) studied Financial Sector Development and Economic Growth in Nigeria: An Empirical Investigation. Using regression analysis from cross country. Variables are deposit money banks'credit, domestic credit and economic growth. Found positive effect of deposit money banks' credit and domestic credit on economic growth.

Akpan (1999) studied Public Expenditure and Economic Growth in a Petroleum Based Economic: Nigeria (1960-1992). Using time series data to analyze. Variables are government expenditure, agricultural expenditure and investment. Found that government's capital expenditure on agriculture though not statistically significant had positive influence on investment.

Kareem, Bakare, Raheem, Olagumela, Alawole&Ademoyewa (2013) studied the analysis of factors influencing agricultural output in Nigeria: Micro-economic perspectives. Using regression analysis, descriptive statistics and the granger causality tests. Variables are food import value, interest rate, commercial banks loans to agriculture, GDP growth rate and foreign direct investment. Found

fluctuations in the trend of variables in relation to the period under review. The result further shows that foreign direct investment, commercial bank loan, interest rate and food import value have positive relationship with Agricultural output.

Rahman, Hussain &Taqi (2014) studied impact of Agricultural Credit on Agricultural Productivity in Pakistan: An Empirical Analysis. Using logit regression analysis. Variables are household size, income of the household, education of the farmers, agricultural credit, short term and long term loans. Found that household size, income of the household, education of the farmers, agricultural credit, short term and long term loans have significant positive impact on agricultural yield per acre.

Qureshi & Shah (1992) studied a Critical Review of Rural Credit Policy in Pakistan. Using per hectare series of annual data from 1959-1990 in log form and equations were estimated by using the ordinary least square (OLS) method. Variables are the subsidization of production, development of credit and fixation of quota for the credit supply to the agricultural sector for the small farmers. Found that the coefficient of credit, labour force and fertilizer were highly significant.

Nuryartono, Zeeler&Schwarze (2005) studied Credit Rationing of Farm Household and Agricultural Productivity: Empirical Evidence Rural areas of Central Sulawesi Indonesia. Using econometric test analysis method. Variables are household credit, credit rationing and agricultural profitability. Found that almost

46% of total households are considered as poor, there is a positive relationship between access to credit and agricultural production.

Fayaz,Jan, Jan & Hussain (2006) studied Effect of Short term credit advanced by Zaria Taraqiatibamk limited (ZTBL) for enhancement of crop productivity in income of grower. Using regression technique method. Variables are ZTBL's credit scheme, agricultural product and income of the farmers. Found that ZTBL's credit scheme had significant impact on agricultural product and income of the farmers and it is most effective tool for the agricultural development.

Akram, Hussain, Sabir & Hussain (2008) studied Impact of Agricultural credit on growth and poverty in Pakistan. Using time series analysis and the borrow behavior of farmers estimated through logit regression model. Variables are complicated procedure, unnecessary delay in disbursement, unlawful demand of official and collateral due. Found that effect of agricultural credit is very low due to unfavourable credit policy.

Udoka, Mbat& Duke (2016) studied Effect of Commercial banks' credit on Agricultural Output in Nigeria. Using ordinary least squares regression technique. Variables are commercial banks' credit to agriculture, interest rate, government expenditure on agriculture, agricultural credit guarantee scheme fund and agricultural output. Found that there was a positive and significant relationship between Agricultural Credit Guarantee Fund and Agricultural Production. There

was a positive and significant relationship between banks' credit to the agricultural sector and Agricultural Production. There was a positive and significant relationship between government expenditure on agriculture and Agricultural Production. A negative and no significant relationship between interest rate and Agricultural Production.

Kolawale (2013) studied Institutional Reforms, interest rate policy and the financing of agricultural sector in Nigeria. Using co-integration and error correction mechanism (ECM) technique with annual time series data covering the period 1980-2011. Variables are agricultural value added, interest rate spread, and inflation. Found that there was a negative relationship between agricultural value added, interest rate spread and inflation.

Muftaudeen&Hussainatu (2014) studied Macroeconomic policy and agricultural output in Nigeria: Implications for food security. Using Multivariate Vector Error Correction approach to examine both short run and long run relationship between the series over the period of 1978-2011. Variables are agricultural output, government expenditure, agricultural credit, inflation, interest and exchange rates. Found that in the long run, agricultural output was responsive to changes in government spending, agricultural credit, inflation rate, interest rate and exchange rate.

Agunuwa, Proso&Okieruovo (2016a) studied the Impact of Government Expenditure on the Agricultural sector on the growth of Agricultural output in

Nigeria. Using ordinary least squares. Variables are Agricultural output, Government expenditure on the agricultural sector, commercial banks' loan to the agricultural sector and interest rate. Found that government expenditure to agricultural sector has a significant and positive impact on the growth of agricultural output. Commercial banks' loans to the agricultural sector has a significant and positive impact on the growth of agricultural output, however, interest rate on agricultural loan has a negative and significant impact on agricultural output.

Agunuwa, Proso&Okieruovo (2016b) studied the Impact of Real Sector Finance on the Economic Growth of the Nigeria (A Time Series Analysis 1980-2013). Using cointegration and its implied Error Correction Model (ECM). Variables are banks' credit to Mining and Quarry, banks' credit to Agriculture, banks' credit to Manufacturing, and banks' credit to Small and Medium Scale Enterprises. The result shows that banks' credit to Mining and Quarry, Agriculture and Manufacturing have a significant impact on economic growth. However, banks' credit to Small and Medium Scale Enterprises are not statistically significant.

Ebere,&Osundima (2014) studied Government Expenditure and Economic Growth in Nigeria. Using ordinary least square (OLS) technique. Variables are GDP, agricultural output and government expenditure on agriculture. Found that agricultural output, government expenditure and GDP are positively related. It was

found that a significant relationship exists between government expenditure on the agricultural sector and economic growth.

Okezie, Nwosu&Nujoku (2013) studiedan Assessment of Nigeria Expenditure on the Agricultural sector: it's Relationship with Agricultural output (1980-2011). Using the Engle-Granger two step modeling (EGM) procedure to co-integration based on unrestricted Error Correction Model and pair wise Granger Causality tests. Variables are Agricultural contribution to GDP and total government expenditure on agriculture. Found that agricultural contribution to GDP and total government expenditure on agriculture are co-integrated.

Oyekhilomen, Abdulasam&Zibah (2012) studied Agricultural Budgetary Allocation and Economic growth in Nigeria. Using econometric perspective. Variables are agricultural budgetary allocation and economic growth. Found that relationship between agricultural budgetary allocation and economic growth is positive but not significant in the long run. While the relationship is positive and significant only for the two- year lagged value of agricultural budgetary allocation.

Ishola, Olaleye, Ajayi& Femi (2013) studied Government Expenditure on Agricultural sector and Economic Growth in Nigeria. Using the unit root test and co-integration. Variables are government expenditure on agriculture and economic growth. Found that a significant relationship exists between government expenditure on the agricultural sector and economic growth.

Wahab, &Lawal (2011) studiedan Analysis of Government spending on Agricultural sector and the contribution to GDP in Nigeria. Using econometric technique. Variables are government spending on agriculture and the contribution of the agricultural sector to the GDP (AGDP). Found that the contribution of the agricultural sector to the GDP is in direct relationship with government funding to the sector.

Francis, Clam,Omo-Erigbe&Olumide (2006) studied agricultural credit as a panacea to increasing the income of small-scale Rubber farmers in Edo state, Nigeria. Using multiple regression model. Variables are farm income, age of farmers, farm size, volume of credit, educational attainment and leadership role. Found that in case of borrowers, the farmer size, volume of credit and leadership role were positively significant while with non-borrowers, only farm size was positively significant.

Alajekwu& Obi (2011) studied the Impact of Government Expenditure on Economic Growth in Nigeria, 1990-2007. Using ordinary least square (OLS) multiple regression techniques. Variables are total government expenditure, total capital, total recurrent expenditure, GDP. Found that government expenditure has no impact on economic growth in Nigeria within the period under review.

Bagdigen&Cetintas (2003) studied the causality between Public Expenditure and Economic Growth: Turkish case, 1965-2000. Using the co-

integration test and the granger causality test. Variables are public expenditure and GDP. Found that no causality in both directions.

Chi-Hung &Chiehwen (2008) studied the association between Government Expenditure and Economic Growth:1947-2002. Using aggregate data and disaggregate data with the sub- categories of five Federal expenditures. Variables are national defense, human resources expenditure, physical resources expenditure, net interest payment and other expenditure. Found that total Federal government expenditure is more consistent with Keynesian's theory while there are diversified causal relationships among five sub-categories of Federal expenditure.

Loizides&Vamroukas (2005) studied Government Expenditure and Economic Growth. Evidence from Trivariate Causality Testing. Using a bivariate error correction model within a granger causality framework and creating a simple trivariate analysis for additional two variables. Data is on Greece, UK and Ireland. Variables are size of government, (total expenditure in GNP), unemployment, inflation and GDP. Found that (i) government size granger causes economic growth in all countries of the sample in the short run and in the long run for Ireland and the UK. (ii) economic growth granger causes increases in the relative size of government in Greece and when inflation is included in the UK.

Maku (2009) studied the effect of Government spending on Economic Growth in Nigeria?1977-2006. Using time series data, applying the Ram (1986)

and error correction models to analyze the data. Variables are private investment, human capital investment, government investment and consumption spending at absolute level, real output, growth rate real output and real GDP. Found that private and public investments have insignificant effect on economic growth. Public expenditure and economic growth are co-integrated. The result shows that any distortion in the short-run, the error term restores the relationship back in its original equilibrium by a unit.

Ujuju&Oboro (2015) studied Dynamics of Monetary Variables and Deposit Money Bank Lending in Nigeria (1975-2013). using econometric data analysis technique of multiple regression variant of ordinary least square (OLS). Variables are GDP, exchange rate, consumer price index, commercial banks credit lending to the public and interest rate. Found that positive and insignificant relationship between GDP and commercial banks credit lending to the public. Positive and significant relationship between exchange rate, consumer price index and commercial banks credit lending to the public while negative and significant relationship exist between interest rate and commercial banks credit lending to the public.

Enoma (2010). Studied Agricultural Credit and Economic Growth in Nigeria: empirical Analysis. Using ordinary least square (OLS). Variables are credit, interest rate, labour and GDP. Found that credit and interest rate to be some of the important factors in influencing economic growth in Nigeria.

Agu&Chukwu(2008). StudiedToda and Yamamoto Causality Test between Bank- Based Financial Deepening and Economic Growth in Nigeria (1970-2005). Using econometric analysis technique. Variables are financial deepening and GDP. The result reveals that bank-based financial deepening and economic growth are positively co-integrated.

In summary, most of the studies examined the relationship between deposit money banks' credit and agricultural production in Nigeria for the periods between 1970s, to 2000s and empirically employed variables as: peoples banks' lending to agriculture, community banks' lending to agriculture, commercial banks' lending to agriculture, interest rate, Government expenditure in agriculture, consumers' price index, ACGSF loan by purpose to farmers, price on agricultural products, foreign private investment in agriculture, agricultural output or agricultural GDP. The studies applied various econometric time series model in their analyses. The findings of the studies are that Government expenditure in agriculture and ACGSF loan by purpose have positive and significant effect on agriculture. The effect of commercial banks' credit to agriculture and commercial banks' total credit on the sector are either positive or negative in relationship and significant or insignificant at a given probability level. Period covered by the studies took into consideration thelong old age of the sector.

However, the results of the studies have not assisted in moderating the financial crises of banks and problems associated with lending to the agricultural

sector. Applying relevant variables such as this study for further investigation in this area cannot be overemphasized, as it will aid to finding solution to the credit crises in the sector.

2.3.1 Gap in the Empirical Literature

Extant studies on the relationship between Deposit Money Banks' lending and Agricultural production have shown conflicting results. Deposit money banks' lending has various degrees of effects on Agricultural production. Some studies reveal positive and significant relationship; others find negative significant relationship. There is need to examine the long run effects of the relationship in this study. Various studies have solely been on commercial banks' credit to agriculture for output, employing interest rate alongside with bank credit, exchange rate; inflation while others employed government expenditure and consumers price index as variables. To the best of my knowledge, very few have been able to determine the effect of deposit money banks' credit on agricultural production but did not take into consideration other relevant internal credit variables such as SMEs credit, Private sector credit and microfinance banks' credit in a single study. This study will apply microfinance banks' credit as in DMBs, credit to SMEs and total credit to private sector.

To the best of my knowledge, most studies used old data from1970s, to1990s, which have created misunderstanding. We intend to include current data. This was what informed our choice of data from 1995-2017 to reflect the true and

current dispensation. Most studies did not determine the various credit effects of current formal sources on agricultural productivity. More so, studies on Deposit Money Banks' lending and Agricultural production in Nigeria are common to large-scale farmers; this study will include examination of small-scale farmers. This study intends to fill the gap by including relevant internal credit and microfinance banks' credit circulating in the Nigerian economy to present a comprehensive and holistic result. The study intends to usea wide spectrum of deposit money banks' credit and Agricultural production variables for a better report. This variable must be controlled alongside with other internal credit to achieve the objectives of this sector.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

This focuses on the research method that is adopted. In attempt to achieve and actualize the objectives of this research work, this study adopted the *ex-post facto* research design. Time series data spanning from 1995 to 2017 were generated. This research design attempts to explore cause and effect relationships where causes already exist and cannot be manipulated. It uses what already existed and looks backward to explain why. The researcher chooses regression analysis based on the classical linear regression model, otherwise known as ordinary least square (OLS) technique. The researcher's choice of technique is based not only on its computational simplicity but also as a result of its parameter estimates with optimal properties such as unbiasedness, minimum variance, zero mean value of the random terms, and thereby making the parameter estimate best linear and unbiased (BLUE), (Gujarati, 2004, Koutsoyiannis, 2001) and it is also an essential component of most other estimation techniques. It has been used in wide of economics relationship and produces satisfactory results. Modern economic analysis involves the useofeconometric method where appropriate statistical and accurate test can be conducted to ensure the validity and reliability of the data and result, for accurate projection and prediction of the effect of deposit money banks' lending on Agricultural production in Nigeria 1995-2017.

In this study, we apply the ordinary least square method, using the multiple linear regression analysis; with Agricultural Production (AP) proxy by AGDP as the dependent variable while Deposit Money Banks' Credit to Agriculture (DBCA), Deposit Money Banks' Small and Medium Enterprises (DSME) sub-sector credit, Deposit Money Banks' total Credit to Private Sector (DCPS) and Deposit Money Banks' Total Credit (DBTC) as the explanatory variables. The method is applied using the E-view 9.5.

3.2 Sources of Data

The data for the study were obtained mainly from secondary sources, particularly from Central Bank of Nigeria (CBN) and National Bureau of Statistics publication, then journals and magazines, textbooks, financial Newspapers and publications. This study makes use of econometric approach in estimating the relationship between selected monetary policy components and major growth components.

3.3 Model Specification

We adapted the long-run model of Nnamocha& Eke (2015). – AGO=f(PSC, BLR, IDO).This is in order to establish the long-run relationship between Deposit Money Banks' Lending and Agricultural production in Nigeria.

Thus, the model as represented in a functional form is shown below:

AGDP = f (DBCA, DSME, DCPS, DBTC) ………………………… (1)

94

Where:

AGDP=Agricultural Gross Domestic Production

DBCA= Deposit Money Banks' Credit toAgriculture

DSME=Deposit MoneyBanks' Small and Medium Enterprises sub-sector credit

DCPS= Deposit Money Banks' total Credit to Private Sector

DBTC= Deposit Money Banks' Total Credit

In a linear function, it is represented as follows,

$$AGDP = a_0 + a_1 \, DBCA + a_2 DSME + a_3 DCPS + a_4 DBTC + Ut \ldots\ldots (2)$$

Where: a_0=Constant term

a_1 = Regression coefficient of DBCA

a_2 = Regression coefficient of DSME

a_3 = Regression coefficient of DCPS

a_4 = Regression coefficient of DBTC

U_t = Error Term

However, to have the variables normally distributed the model is again specified in a log-linear form as shown below:

$$LogAGDP = a_0 + a_1 logDBCA_+ a_2 \, logDSME + a_3 logDCPS + a_4 \, log \, DBTC + Ut \ldots(3)$$

The economic criteria involve examining the economic significance of the model with regards to meeting the "a priori" expected sign of the parameters to ensure that the model conforms to economic theoretical expectation.

The "a priori" expectation of the estimated co efficient is: $\alpha_0 > 0$, $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 > 0$, $\alpha_4 > 0$.

3.4   Diagnostic Test Procedure

3.4.1 STATISTICAL TEST(FIRST ORDER TEST)

The statistical test is based on the individual and the overall significant of the model using the t – test statistics and the f-test statistics respectively. The R^2 is also used to determine the level at which the depended variable is explained by the independent variables.

3.4.2 ECONOMETRIC TEST (SECOND ORDER TEST)

The econometric test is performed to see if the underlying assumptions of ordinary least square (OLS) are violated. These tests include Durbin Watson test statistics for auto – correlation, test for multi-co-linearity, unit root test, co-integration test and Pairwise Granger Casualty test.

3.4.2.1 Unit Root Tests

The unit root test was employed in this sub-chapter in order to ascertain the stationary state of our time series variables. This is imperative since we are ignorant of the data generating process. They are based on null hypothesis that Ho: p= 1 against the alternative H_1: p<1. They are called unit root tests because under the null hypothesis the characteristics polynomial has a root equal to unity. On the other hand, stationarity tests take the null hypothesis that Y_t is trend stationary. The Augmented Dickey-Fuller (ADF) test was employed and the results shown.

Decision rule:

If t* > ADF critical value = not reject null hypothesis, i.e., unit root exists.

If t* < ADF critical value = reject null hypothesis, i.e., unit root does not exist.

3.4.2.2 Co-Integration Test

After determining the stationarity of the variables, the study conducted the Johansen multivariable co-integration test by first determining the number of co-integrating vectors in the model. The variables are said to be co integrated if a long-run meaningful relationship exist among them; hence, when co integration is present, it means that agricultural production, deposit money banks' credit to agriculture, deposit money banks' credit to small and medium enterprises sub-sector, deposit money banks' total credit to private sector and deposit money banks' total credit share a common trend and long-run equilibrium as suggested in

theory. The Johansen's co-integration test using both trace statistics and maximum Eigen value are presented.

3.4.2.2 Pairwise Granger Causality Test

To ascertain the nature of causality among all the time series variables particularly between AP and the various deposit money banks' credit indices, we employ the Pair Wise Granger Causality Tests.

3.4.2.4 Autocorrelation Test

Following the classical regression model (CLRM) assumption of no auto correlation, among the disturbance M; that is E. (M., M.i)=0

Where i = 1. The Durbin Watson t-statistics is used to check for the presence of auto correlation. One of the advantages of t-statistics is that it is based on the estimated residual which are routinely applied in regression analysis (Gujarati, 2003).

3.5 Method of Data Analyses

Data represent all the observations or raw facts recorded as results of a study. It is described as raw prior to analysis (Ibenta, 2012).

At the end of the field work, the raw data were duly edited for completeness, legibility and consistency. They were further tabulated for analyses and discussions, to answer the research question raised.

The procedures followed in the analyses of data by the researcher are:

(i) Placing each item in its appropriate category reflective of the hypotheses to be tested.

(ii) Tabulating the data and

(iii) Performing statistical computation on dependent variable – agricultural production (AP) proxy AGDP was regressed on Deposit money banks' credit to agriculture (DBCA), Deposit money banks' Small and Medium Enterprises (DSME) sub-sector credit, Deposit money banks' total credit to private sector (DCPS) and Deposit money banks' total credit (DBTC). The report of findings and recommendations were written.

3.6   Method of Hypotheses Testing

This study makes use of econometric approach in estimating the relationship between selected monetary policy components and major growth components. We seek to test the hypotheses in chapter one. The researcher is to compare the data from agricultural production, Deposit money banks' credit to agriculture, Deposit money banks' credit to small and medium Enterprises sub-sector, Deposit money banks' total Credit to Private Sector and Deposit money banks' total credit.

In the hypotheses, we seek to test whether.

(1) Deposit money banks' agriculture lending has significant effect onAgricultural production (proxy by AGDP) in Nigeria

(2) Deposit money banks' small and medium Enterprises sub- sector lending has significantly boosted Agricultural production (proxy by AGDP) in Nigeria

(3) Deposit money banks'total private sector lending has significant effect on Agricultural production (proxy by AGDP) in Nigeria.

(4) Deposit money banks' total lending has significantly enhanced Agricultural production (proxy by AGDP) in Nigeria.

In the analyses, the t- test used was 5% level of significance. Computed level of significance was compared with the critical value.

3.7 Operationalization of the Variables

The variables as used in the study are defined below:

1 Agricultural Production (AP): Proxy by AGDP-GDP coming from the agricultural sector- is a dependent variable. This is the value (tones) in naira of major agricultural products. According to the classification by the United Nations foods and agricultural organization (FAO) production year-Book, agriculture includes cereals, starchy roots, sugar, pulses, edible oil crops, nuts, fruits, vegetables wine, cocoa, tea, coffee, livestock and livestock products. Also included in the group are industrial oilseeds, tobacco, fibres, vegetable and rubber. But National Bureau of statistics grouped all these into, staples, livestock, fishery

and forestry. However, an increase in these products will bring better economic growth (GDP).

2 Deposit Money Banks' Credit to Agriculture (DBCA): Is an independent or explanatory variable. Farmers from commercialand microfinance banks in naira to the agricultural production can access the credit.

3 Deposit Money Banks' Credit to Small and Medium Enterprises (DSME):Is an independent or explanatory variable. It is Proxy by commercial and microfinance banks' Credit to SMEs sub-sector in proportion to agricultural production in naira.

4 Deposit Money Banks' Total Credit to Private Sector (DCPS): Is an independent or explanatory variable. It is Proxy by commercial and microfinance totalbanks' credit to private sector in proportion to agricultural production in naira.

5 Deposit Money Banks' total Credit (DBTC): Is an independent or explanatory variable. It is the commercial and microfinance banks' total credit in naira supply to the economy.

3.8 A priori Expectations

This is determined by the principles of the economic theory and refers to the sign and magnitude of the parameter estimate. That is, whether the parameter estimates conform to the dictates of the economic theory.

Table 3.1: A priori Expectations

Variable	Meaning	Expected Sign
Constant	These are other indicators outside the model that can affect the dependent variables at a constant basis.	The result will show a positive sign to conform to the "a priori" expectation.
DBCA	This is the value (amount) of money disbursed for agricultural development by commercial and microfinance banks in form of credit or loan and advance. An equal increase in this is expected to bring Nigeria agricultural productivity to its desired level that will bring about needed growth in the entire economy.	The result will show that the elasticity coefficient has a positive sign to conform to the "a priori" expectation and this size is appreciable.
DSME	Proxy by commercial and microfinance banks' credit to small and medium enterprises (% of AP). They are the dominant units in the Nigerian economy.They are those enterprises that use small indivisible units of plant and equipment.It may increase its capital by a loan from the bank, if it is able to offer acceptable security. Claims on this sector are in the form of loans and advances, commercial bills, trade credit and other account receivables from various financial institutions.	The result will show a positive coefficient to conform to the "a priori" expectation
DCPS	Proxy by commercial and microfinance banks'total credit to private sector (% of AP). Deposit money banks' credit to private sector refers to total financial resources provided to the private sector. Such as through loans, purchases of commercial bills, promissory notes and trade credits and other accounts receivable, that establishes a claim for repayment.	The result will show a positive coefficient to conform to the "a priori" expectation
DBTC	This is the total value (amount) of money disbursed by commercial and microfinance banks in form of credit or loan and advance. An appreciable increase in this is expected to bring Nigeria economic activities to a level that will bring about needed growth in the entire economy.	The result will show that the elasticity coefficient has a positive sign to conform to the "a priori" expectation and this size is appreciable.

The researcher based his judgment from the result of the regression on whether the

sign and sizes of each parameter estimates conform to the established theory.

CHAPTER FOUR

DATA PRESENTATION, ANALYSES AND INTERPRETATION

This chapter contains the presentation, analysis and interpretation of the data collected for purpose of this research work. The graphical description of the data was presented in figure 4.2, followed by the result of the relevant pre-estimation tests. Thereafter, the unit root test, Johansen co-integration test, Pairwise Granger Causality Tests and the multiple regression analysis were conducted. The results are presented and analyzed below:

4.1   Data Presentation and Analysis

The raw data are presented in table 4.1. The compact forms are presented here to facilitate ease of interpretation. The models adequately explained agricultural production, which is the dependent variable.

Analysis represents the treatment of a set of data in order to highlight the trends, patterns and relationships embedded in it. After processing the raw data, the relationship or trends were X-rayed so that logical inferences or deductions canbe drawn from them (Ibenta, 2012).

Table 4.1: Data on Agricultural Production (proxy by AGDP), Deposit money banks' credit to agriculture, Deposit money banks' credit to small and mediumenterprises, Deposit money banks' total credit to private sector and Deposit money banks' total credit 1995-2017.

YEARS	AGDP	DBCA	DSME	DCPS	DBTC
1995	619,806.83	25,377.30	33,195.50	204,300.30	145,699.40
1996	841,457.06	33,493.50	43,262.80	255,063.20	183,439.10
1997	953,547.37	28,306.70	41,907.90	311,546.20	387,168.30
1998	1,057,583.91	28,143.40	43,700.90	366,668.00	275,422.30
1999	1,127,693.12	32,052.90	48,664.20	449,165.20	325,723.20
2000	1,192,910.00	42,277.30	46,823.10	588,137.35	511,968.80
2001	1,594,895.53	56,293.50	53,245.80	844,535.46	797,478.80
2002	3,357,062.95	61,317.10	85,050.00	948,625.71	958,939.70
2003	3,624,579.48	65,492.10	96,368.80	1,203,572.81	1,219,987.90
2004	3,903,758.70	71,604.20	62,043.70	1,509,668.30	1,530,596.50
2005	4,773,198.38	58,266.40	68,403.90	1,992,214.98	2,005,215.40
2006	5,940,236.97	49,898.60	34,292.70	2,616,660.31	2,540,748.10
2007	6,757,867.30	150,280.70	53,010.20	4,830,934.28	4,836,339
2008	7,981,397.32	109,708.10	42,032.60	7,810,278.50	7,842,153.20
2009	9,186,306.05	140,438.20	49,947.20	9,687,775.36	8,970,358.80
2010	10,310,655.64	133,508.90	43,476.90	9,215,129.96	7,759,297.90
2011	11,510,120.10	259,884.50	55,510.40	9,620,796.26	7,363,654.30
2012	15,816,000.00	321,420.80	74,828.20	19,449,023.60	8,240,452.50
2013	16,816,550.00	348,503.10	74,919.60	11,573,336.40	10,099,655.60
2014	18,018,600.00	486,635.70	83,721.30	13,216,320.70	13,001,510.10
2015	19,636,970.00	461,061.50	139,690.90	13,617,288.20	13,273,447.30
2016	21,523,510.00	540,312.30	145,455.50	16,547,225.40	16,313,395
2017	23,952,550.00	544,789.95	158,219.66	16,220,286.64	15,431,090.05

Source: Computed from CBN Statistical bulletin 2017 and Annual reports various years

NB: The data used here include:

AGDP   Agricultural gross domestic product

DBCADeposit money banks' credit to Agriculture

DSMEDeposit money banks' credit to SMEs

DCPS   Deposit money banks' total credit to Private Sector

DBTC Deposit money banks'Total Credit

Deposit Money Banks' credit comprises of Commercial and Microfinance banks' credit; which fall within the period 1995-2017. The data is presented in table 4.1

4.2   Presentation and Analysis of Result

Figure 4.1: Graphical and Histogram Description of Data on DBCA

Source: Researcher's Computation via Excel (2019)

 In figures 4.1 above, the graph and histogram on the deposit money bank's credit to agriculture, as depicted in the DBCA here was a slight minimal increasing trend between 1995 to year 2010, and a drastic upward trend post 2010. With this rising trend, the agricultural sector is receiving attention from DMBs to grow.
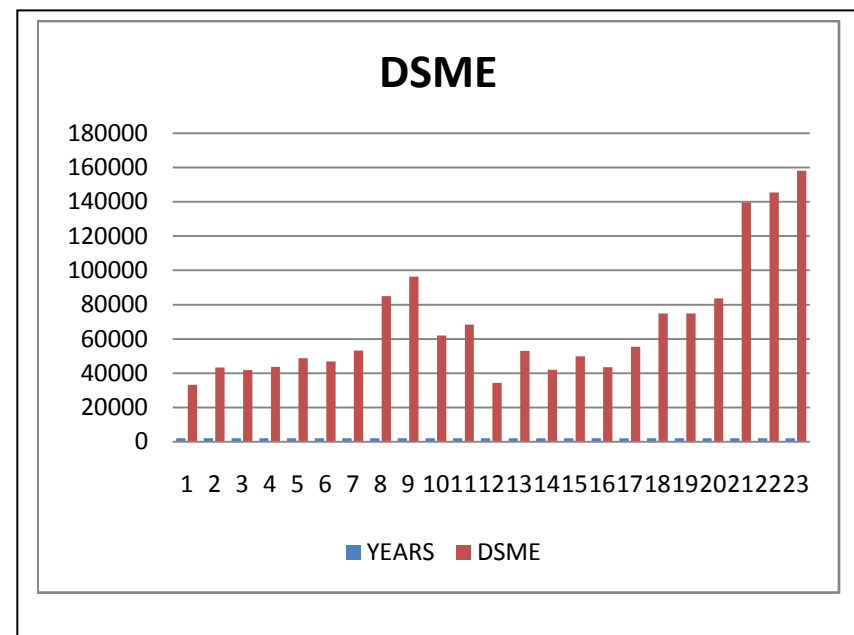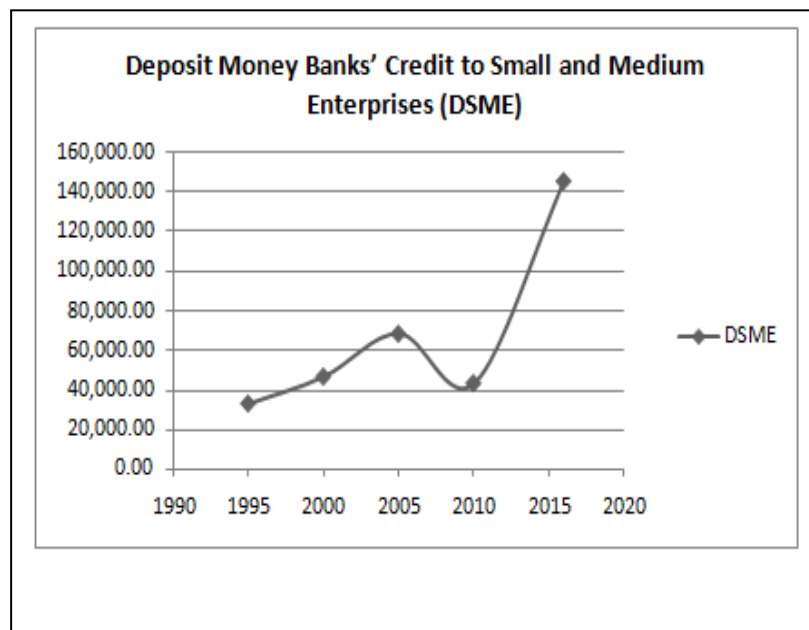
Figure 4.2: Graphical and Histogram Description of Data on DSME

Source: Researcher's Computation via Excel (2019)

In figures 4.2 above, DSME sub-sector appears to be characterised with severe fluctuations over the study horizon depicting both increases and declines over the period, especially between years 2000 to 2010. The instability of DSME sub-sector is a pointer of inconsistent credits to SMEs by deposit money banks over the periods. However, periods after year 2010 showed significant upwards increasing trend up to the end year of the study, and a possibility of an upward movement going forward. The fluctuating trend made it impossible for SMEs to match their limited credit to farm needs. This could reduce productivity in the sector.
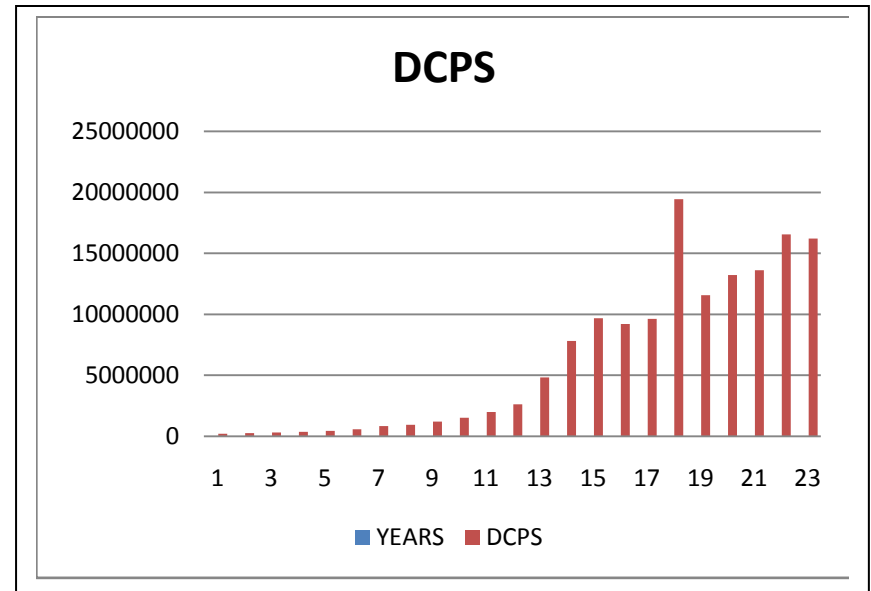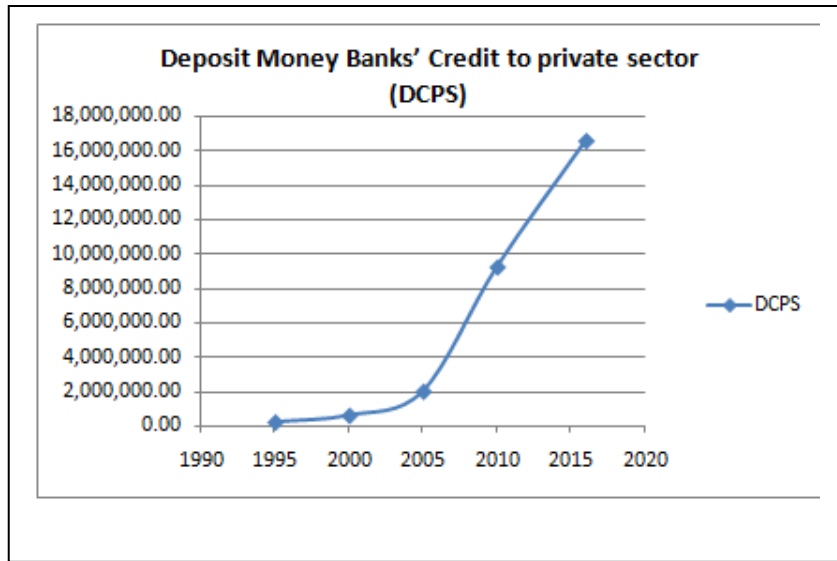
Figure 4.3: Graphical and Histogram Description of Data on DCPS

Source: Researcher's Computation via Excel (2019)

In figures 4.3 above, on the deposit money bank's total credit to the private sector (DCPS), the graph and histogram showed minimal increasing trend between 1995 and 2005, and thereafter, a significant upward movement post 2005 period suggesting stability of available lending credit over the horizon. With this rising trend, the private sector is well taken care of by DMBs. This credit if used for agricultural sector may increase production.
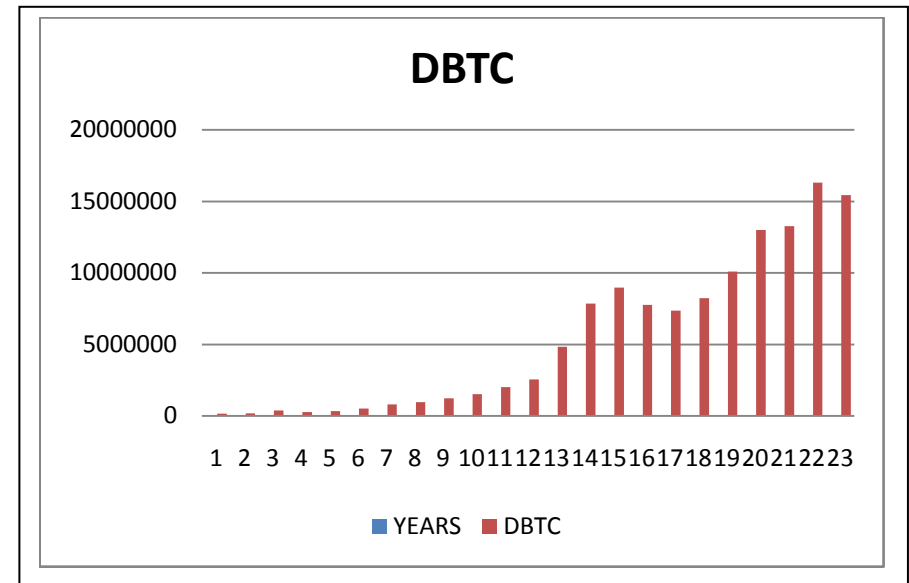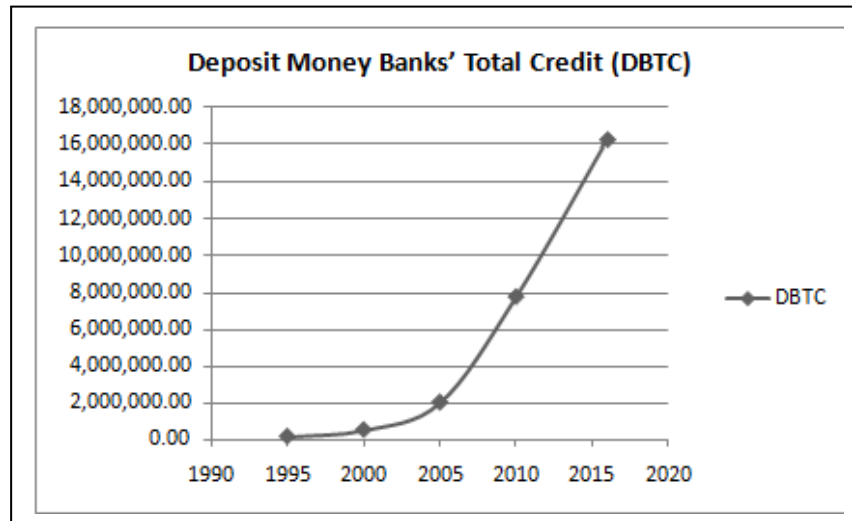
Figure 4.4: Graphical and Histogram Description of Data on DBTC

Source: Researcher's Computation via Excel (2019)

In figures 4.4 above, the DBTC appears to be on the increase from year 2000 and beyond with a minimum level of stability on year preceding year 2005. This indicates that one of the objectives of capitalization of the sectorin 2005 is being achieved.
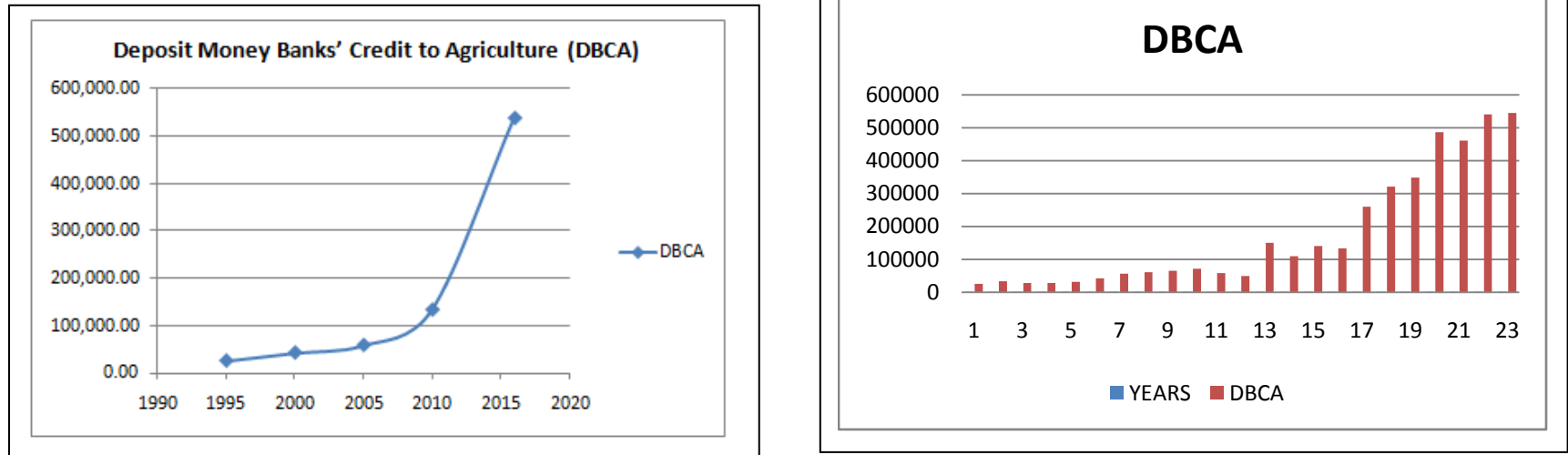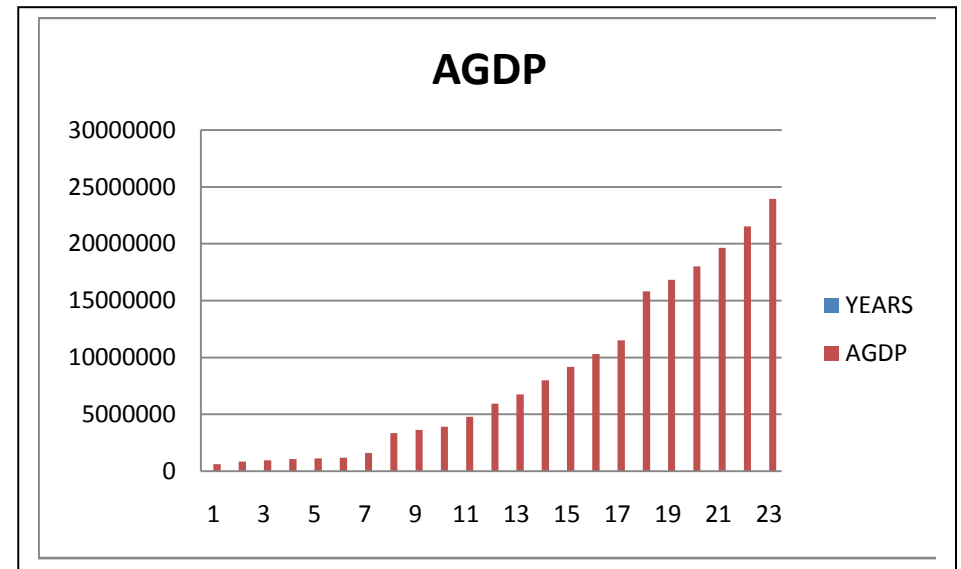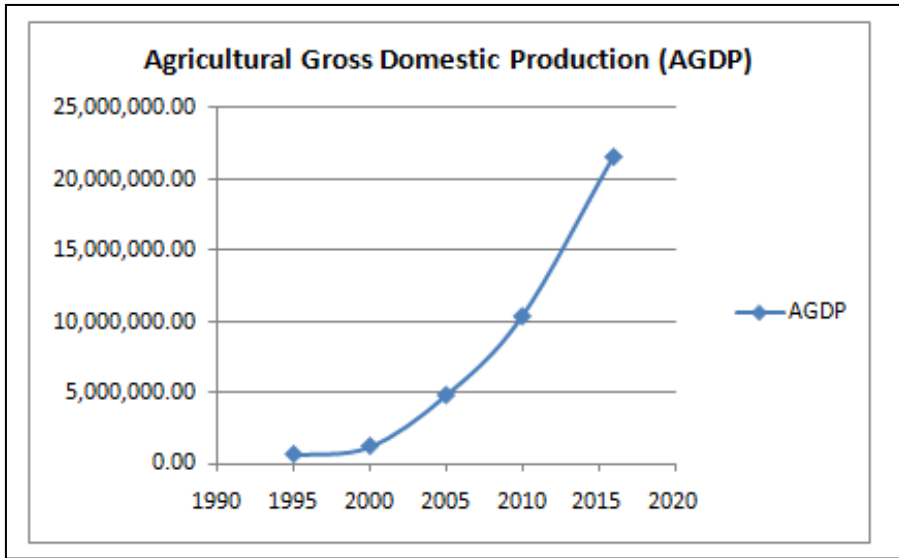
Figure 4.5: **Graphical and Histogram Description of Data on AGDP**

Source: Researcher's Computation via Excel (2019)

In figure 4.5above, the total GDP attributable to agriculture (AGDP) appears to have been on the increase from the beginning of year 2000 and beyond with minimal level of stability on years preceding year 2000

Overall, all the indexes (except DSME) exhibited upwards increases in post 2005 over the remainder of the study horizon.

4.2.1 Descriptive Statistics

The study focused on conducting and presenting the results of the relevant pre-estimation tests. The tests are the basic requirements of time series analysis that ensures credibility of the estimation results and provide a basis for further adjustments of the data where certain violations are observed.

Table 4.2   Descriptive Statistics

	AGDP	DBCA	DSME	DCPS	DBTC
Mean	8282489.	176046.4	68598.77	6220807.	5391902.
Median	5940237.	71604.20	53245.80	2616660.	2540748.
Maximum	23952550	544789.9	158219.7	19449024	16313395
Minimum	619806.8	25377.30	33195.50	204300.3	145699.4
Std. Dev.	7510733.	180677.9	35672.81	6367049.	5423040.
Skewness	0.727192	1.043526	1.390545	0.641362	0.666150
Kurtosis	2.182885	2.547617	3.858178	1.991581	2.087129
Jarque-Bera	2.666956	4.370420	8.117973	2.551362	2.499678
Probability	0.263559	0.112454	0.017267	0.279241	0.286551
Sum	1.90E+08	4049067.	1577772.	1.43E+08	1.24E+08
Sum Sq. Dev.	1.24E+15	7.18E+11	2.80E+10	8.92E+14	6.47E+14
Observations	23	23	23	23	23

Source: Researcher's Compilation via E-views 9.5 output

The descriptive statistics is presented for all the variables as shown in table 4.1 above. As observed, AGDP has a mean value of about ₦8.3bn with minimum and maximum values of ₦620m and ₦24bn respectively. The average deposit money banks' credit to agriculture (DBCA) for the entire period is about ₦176m and a maximum value of ₦544.8m. The DSME (deposit money banks' credit to

small and medium enterprises) has the least mean value among the log (68598.77) indicating that deposit money banks' lending to SMEs received minimal attention during the periods covered by the study, compared to other sectors included in the study. Apart from the mean dependent variable (AGDP), the DCPS (Deposit Money Banks' total Credit to private sector) has the highest mean value at ₦6.22bn, and a maximum of ₦19.45bn. This indicates that the largest proportion of the deposit money banks' credits were made available to the private sector during the period covered by the study, as against agriculture and SMEs. This can be considered strategic and favorable on a long run towards enhancing the overall GDP of the country because the basic assumption is that providing more credit assessments to the private sector would most likely trigger sustainable economic development than focusing on the public sector. It is also observable from the table that all the Jargue-Bera values (except that of DSME) are significantly higher than the 5%, which is an indication that the issue of endogeneity arising from the heterogeneous nature of the data are not completely absent. Further checks for normality are conducted as presented in the figure below:

Figure 4.3   Normality Test

Series: Residuals
Sample 1995 2017
Observations 23

Mean	2.99e-09
Median	-386060.2
Maximum	2513225.
Minimum	-1629374.
Std. Dev.	992944.4
Skewness	0.949368
Kurtosis	3.498847
Jarque-Bera	3.693461
Probability	0.157752
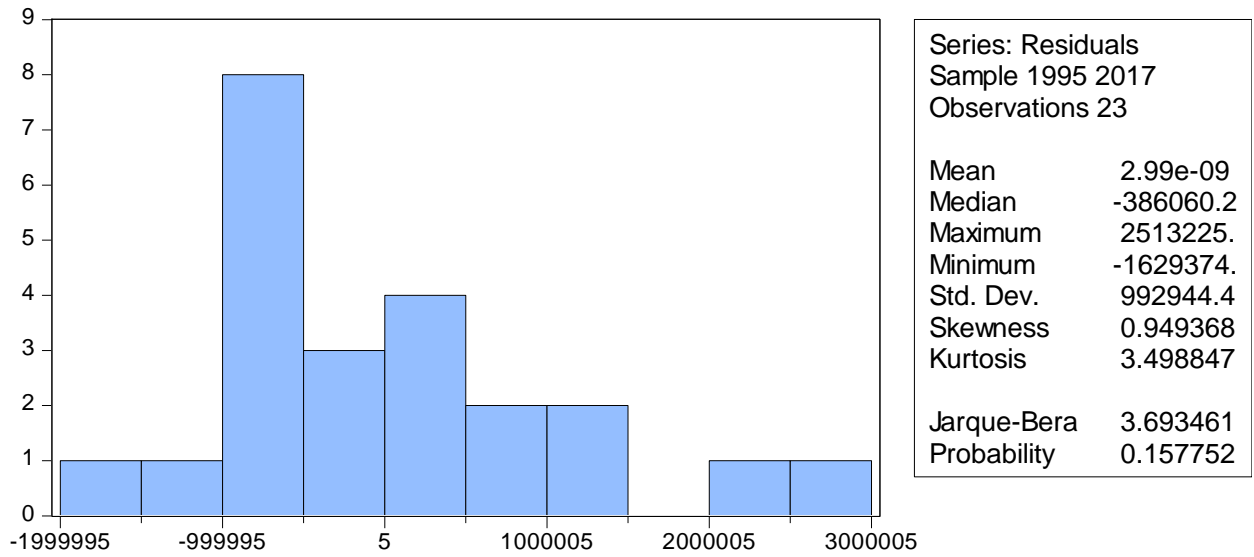
Source: E-Views 9.5

Normality is a condition in which the used variables follow the standard normal distribution. A normally distributed data set has a probability density function. The Jarque-Bera (J-B) statistic was used to test for normality. The Jarque-Bera statistic tests whether the series is normally distributed by measuring the difference of the skewness and kurtosis of the series with those from the normal distribution. It thus follows that a series will be normally distributed if the probability of the J-B statistic is greater than 0.05. The following hypotheses are applicable to this test:

Null Hypothesis: Residuals (u) are normally distributed

Alternative Hypothesis: Residuals are not normally distributed

Decision Rule: accept the null hypothesis when p-value is greater than 0.05 (5%).

As observed from figure 4.2 above, the probability value for the J-B statistics (0.157752 or 15.8%) is greater than 0.05 and hence the null hypothesis that the series is normally distributed is accepted.

4.2.2 Regression Diagnostics

Other underlying diagnostic tests were conducted to ensure that the basic regression analysis assumptions are not violated. The tests conducted in this sub-chapter include Breusch-Pagan-Godfrey Heteroskedasticity test, LM test for autocorrelation and the Ramsey reset test for model (mis)specification which helps to show if the model is rightly or correctly specified prior to undertaking the econometric analysis.

Table 4.3   Result of the Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.485623	Prob. F(4,18)	0.7461
Obs*R-squared	2.240306	Prob. Chi-Square(4)	0.6917
Scaled explained SS	1.714378	Prob. Chi-Square(4)	0.7881

Source: E-views 9.5

The test for Heteroscedasticity, which is the constant variance assumption of the Ordinary Least Square estimator, is presented above in table 4.3. It checks for the presence of non-constant variance leading to the breakdown of the BLUE properties in which the efficiency and consistency property may be lost. Using the Autoregressive conditional Heteroskedasticity (ARCH) test, the decision rule is to conclude that there is no heteroscedasticity if the F-statistic values are respectively greater than the critical values at 5% level. In the absence of this (i.e if the critical

values at 5% is greater than the F-statistic and observed R-square value), we conclude that there is homoscedasticity. As shown in Table 4.3, the p-value (74.6%) of the corresponding observed chi-square value is greater than 5%. Hence, we accept the null hypothesis of homoskedastic error term, which is desirable. The implication of this is that the regression results can be applied reliably.

Table 4.4   Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.125580	Prob. F(2,16)	0.8828
Obs*R-squared	0.355464	Prob. Chi-Square(2)	0.8372

Source: E-views 9.5

The Breusch-Godfrey Serial Correlation LM test was also conducted to ascertain whether or not there is higher order Serial correlation in the data series. In the presence of serial correlation, ordinary least squares estimators are no longer Best Linear Unbiased Estimators (BLUE). Moreover, the coefficient may be overestimated, standard errors underestimated and t-statistics overestimated. Here the null hypothesis is "no serial correlation" while the alternative implies the opposite. From the result in table 4.4, the Breusch-Godfrey Lagrange Multiplier (LM) test for higher order autocorrelation reveals that the hypotheses of zero autocorrelation in the residuals were not rejected. This is because the probability (Prob. F, Prob. Chi-Square) values are greater than 0.05 (0.8828 and 0.8372)

meaning that the LM test did not reveal serial correlation problems for the model.

Hence, the null hypothesis of no serial correlation can be accepted.

Table 4.5   Ramsey Reset Test

Ramsey RESET Test
Equation: UNTITLED
Specification: AGDP DBCA DSME DCPS DBTC C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.508089	17	0.1499
F-statistic	2.274332	(1, 17)	0.1499
Likelihood ratio	2.887902	1	0.0892

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	2.56E+12	1	2.56E+12
Restricted SSR	2.17E+13	18	1.21E+12
Unrestricted SSR	1.91E+13	17	1.13E+12

LR test summary:

	Value	df
Restricted LogL	-349.7183	18
Unrestricted LogL	-348.2743	17

Source: E-views 9.5

In order to check for possible error of functional model misspecification, the study applied the Ramsey Reset test as shown in table 4.5. The result of the test reported an F-statistic of 0.547 and an insignificant probability value of 0.84. The conclusion is that the performance of the Ramsey RESET test showed high probability value (14.99%) which is greater than 5% signifying no notable evidence of miss-specification. This implies that the test could not sustain the null hypothesis of wrongly specified model which means there is no possible nonlinearity in the data.

4.2.3 Unit root test

The standard practice in time series studies is to first determine whether the individual variables are non-stationary (exhibit unit roots) and if they are related to one another in a stable long-run (co-integrated) relationship. Generally, unit root test involves the test for stationarity of the variables used in the regression analysis. The importance of stationarity of time series used in regression borders on the fact that with a non-stationary time series, it is not possible to generalize to other time periods apart from the present. This makes forecasting based on such time series to be of little practical value. Moreover, regression of a non-stationary time series on another non-stationary time series may produce spurious result. The Augmented -Dickey Fuller (ADF) test is thus employed in order to analyse the unit roots. This is imperative since it is assumed we are ignorant of the data generating process. The results are extracted and presented in 'levels' and at 'first differencing' (see appendix ii for full results). This enables us to determine in comparative terms, the unit root among the time series and also to obtain more robust results. The following hypothesis applies:

Null hypothesis = Unit root exists, meaning variable is not stationary (Not desirable)

Alternative hypothesis = Unit root does not exist, meaning variable is stationary (Desirable)

Decision rule:

If absolute t-stat is greater than critical value (ADF) = accept alternative hypothesis

If absolute t-stat is less than critical value (ADF) = accept null hypothesis

Table 4.6   Augmented Dicky-Fuller (ADF) Unit Root Test Results

	AT LEVELS			AT FIRST DIFFERENCE			
Variables	ADF	Prob.	Decision	Variables	ADF	Prob.	Decision
AGDP	-0.69	0.96	Non-stationary	AGDP	-5.30	0.0019	Stationary
DBCA	1.97	0.99	Non-stationary	DBCA	-5.58	0.0002	Stationary
DSME	-0.07	0.94	Non-stationary	DSME	-4.87	0.0009	Stationary
DCPS	0.07	0.95	Non-stationary	DCPS	-7.35	0.0000	Stationary
DBTC	0.82	0.99	Non-stationary	DBTC	-3.48	0.0195	Stationary

Source: E-views 9.5

From Table 4.6, the result indicates that all the time-series variables were non-stationary at levels as earlier assumed prior to the tests. Moving forward, we take the first differences of the respective variables and perform the unit root test on each of the resultant time series. The rationale behind this procedure is that according to Box and Jenkins (1976), differencing non-stationary time series will enable it attain stationarity. Thus, when further tested at 1st differencing, all the variables became stationary which is desirable. With these result, these variables are adjudged stationary. Hence, we accept the hypothesis that the variables possess

unit roots. It could thus be said that all the variables have an order of integration of one i.e. I(1) at same order.

4.2.4 Co-integration Testing

Once the stationarity properties of the individual series are established, linear combinations of the integrated series are tested for co-integration. Should a linear combination of individual non-stationary series produce a stationary data series, then the variables are co-integrated and hence they describe equilibrium relationships. If a linear combination of variables is stationary, then, the relationship between the dependent variable and a linear combination among these variables can be thought to be co- integrated. The equation is interpreted as a long run steady and proportional relationship among the variables (Enders, 2004). Generally, the co-integrated relations between variables are interpreted as their long run equilibrium. The study utilizes both *trace statistics* and *maximum Eigen value* under the Johansen co-integration methodology in conducting the co-integrating properties of the data as presented in the table below:

Table 4.7a Unrestricted Co-Integration Rank Test (Trace)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.871705	107.0456	69.81889	0.0000
At most 1 *	0.742800	63.92376	47.85613	0.0008
At most 2 *	0.607837	35.40787	29.79707	0.0102
At most 3 *	0.490699	15.75021	15.49471	0.0458
At most 4	0.072529	1.581179	3.841466	0.2086

Trace test indicates 4 cointegratingeqn(s) at the 0.05 level

The co-integration result above in table 4.7a (based on the Trace test) indicates that the variables are co-integrated at the 5% level as the probability value is significantly lower than 0.05. The result for the test rejects the null hypothesis that there is no co-integrated vector and hence the variables are co-integrated. This implies that there is a long-run relationship between the variables in the model.

Table 4.7b Unrestricted Co-Integration Rank Test (Maximum Eigen value)

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.871705	43.12188	33.87687	0.0030
At most 1 *	0.742800	28.51589	27.58434	0.0379
At most 2	0.607837	19.65766	21.13162	0.0793
At most 3	0.490699	14.16903	14.26460	0.0518
At most 4	0.072529	1.581179	3.841466	0.2086

Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The above co-integration result was based on the maximum Eigen value and indicates that the variables are co-integrated at the 5% level since there is one co-integrating vector. Thus, a long-run meaningful relationship exists among the variables.

4.2.5 Pairwise Granger Causality

To ascertain the nature of causality among all the time series variables particularly between agricultural GDP and the various avenues of deposit money banks' lending, we employ the pairwise granger causality test. The results are shown in table 4.8 below:

Table 4.8   Causality Tests

Pairwise Granger Causality Tests
Date: 05/13/19   Time: 22:56
Sample: 1995 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DBCA does not Granger Cause AGDP	21	2.36464	0.1260
AGDP does not Granger Cause DBCA		5.25900	0.0176
DSME does not Granger Cause AGDP	21	0.31126	0.7369
AGDP does not Granger Cause DSME		2.22597	0.1403
DCPS does not Granger Cause AGDP	21	0.11722	0.8901
AGDP does not Granger Cause DCPS		1.39467	0.2765
DBTC does not Granger Cause AGDP	21	0.57027	0.5765
AGDP does not Granger Cause DBTC		4.71775	0.0245
DSME does not Granger Cause DBCA	21	2.59399	0.1057
DBCA does not Granger Cause DSME		4.71459	0.0246
DCPS does not Granger Cause DBCA	21	10.7591	0.0011
DBCA does not Granger Cause DCPS		1.38741	0.2782
DBTC does not Granger Cause DBCA	21	3.37112	0.0600
DBCA does not Granger Cause DBTC		0.96582	0.4018
DCPS does not Granger Cause DSME	21	1.35511	0.2860
DSME does not Granger Cause DCPS		0.12100	0.8868
DBTC does not Granger Cause DSME	21	1.96102	0.1731
DSME does not Granger Cause DBTC		0.38681	0.6854
DBTC does not Granger Cause DCPS	21	2.20623	0.1425
DCPS does not Granger Cause DBTC		1.78064	0.2003

Source: E-views 9.5

In table 4.8, the pair wise Granger causality test shows that the probability value of DBCA, being 0.126, passed the critical test of 0.05 level, hence we reject the null hypothesis that DBCA does not granger cause AGDP, hence deposit money banks' credit to agriculture granger causes agricultural gross domestic production since the p-value is greater than the critical value of 0.05. The implication is that DBCA and AGDP causes one another and same could be said of all other pairs of the variables, except for the pairs of AGDP vs DBCA, AGDP vs DBTC and DBCA vs DSME which causalities are uni-directional.

4.3   Economic criteria (a priori expectation)

In this stage, we check whether the parameters estimated in the model conforms to the "a priori" expectation of the existing theories. The variables: -

(i)   Constant- the result shows a Positive sign which conformed to the "a priori" expectation.

(ii)   DBCA-the result shows Positive coefficient, which conformed to the "a priori" expectation

(iii)   DCPS-the result shows Positive coefficient, which conformed to the "a priori" expectation.

(iv)   DSME-the result shows Positive coefficient, which conformed to the "a priori" expectation.

(v)   DBTC-the result shows Positive coefficient, which conformed to the "a priori" expectation

Nevertheless, all the variables conformed to the "a priori" expectation.

4.4 Results of Analysis

In this section, the mathematical relationships between the variables are established. Multiple regression models were formed to capture the assumed relationship between the dependent and independent variables. The results obtained are expressed below in Table 4.9:

Table 4.9: Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	96558.70	618330.8	0.156160	0.8776
LOG_DBCA	13.70031	5.285594	2.592009	0.0184
LOG_DSME	16.78587	12.33857	1.360438	0.1905
LOG_DCPS	0.340104	0.109920	3.094114	0.0063
LOG_DBTC	0.464925	0.162232	2.865803	0.0103
R-squared	0.982522			
Adjusted R-squared	0.978638			
S.E. of regression	1097741.			
F-statistic	252.9704			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.875292			

Source: E-Views 9.5

The estimation equation in table 4.9 can be written as summarized below:

AGDP = 96558.7 + 13.70*DBCA + 16.79*DSME + 0.34*DCPS + 0.46*DBTC

(2.592)   (1.360)   (3.094)   (2.866)

*. The t-stats are in parentheses

4.5.   Test of Hypotheses

The regression results of table 4.9 are used for the hypotheses testing. The t-statistics from the regression results were used to test the hypotheses. The study adopted 5% level of significance under the two-tailed test.

Decision Rule: The null hypothesis shall be rejected if the calculated t-ratio is greater than the t-critical value, otherwise the null shall be accepted and the alternative rejected. The t-critical/table distribution value is 1.717 at 22 degree of freedom (2-tailed) at 0.05 level of significance. This means n-1 degree of freedom.

Hypothesis one:

Ho: Deposit money banks' agricultural (DBA) lending has no significant effect on

Agricultural production (proxy by AGDP) in Nigeria.

H_1: Deposit money banks' agricultural (DBA) lending has significant effect on

Agricultural production (proxy by AGDP) in Nigeria.

The findings revealed that DBA lending with a calculated t-value of 2.59 (approximately) is greater than the critical t-value of 1.72 at 5% level of significance under the two-tailed test. Hence, we reject the null hypothesis and accept the alternate. This implies that deposit money banks' lending to agriculture has significant effect on agricultural production (proxy by AGDP) in Nigeria.

Hypothesis two:

Ho: Deposit money banks' small and medium Enterprises sub- sector (DSME) lending has no significant boost on agricultural production (proxy by AGDP) in Nigeria.

H_1: Deposit money banks' small and medium Enterprises sub- sector (DSME) lending has significant boost on agricultural production (proxy by AGDP) in Nigeria.

It was observed that DSME lending with a calculated t-value of 1.36 is lower than the critical t-value of 1.72 at 5% level of significance under the two-tailed test. Hence, we accept the null hypothesis and reject the alternate hypothesis. It can be concluded therefore that deposit money banks' lending to small and medium enterprises sub-sector has no significant boost on agricultural production (proxy by AGDP) in Nigeria.

Hypothesis three:

Ho: Deposit money banks' total private sector (DPS) lendinghas no significant

 effect on Agricultural production (proxy by AGDP) in Nigeria.

H_1: Deposit money banks' total private sector (DPS) lendinghas significant

 effect on Agricultural production (proxy by AGDP) in Nigeria.

From the regression results, it was observed that DPSlending with a calculated t-value of 3.094 is greater than the critical t-value of 1.72 at 5% level of

significance under the two-tailed test. Hence, we reject the null hypothesis and accept the alternate. This implies that deposit money banks' lending to total private sector has significant effect on agricultural production(proxy by AGDP) in Nigeria.

Hypothesis four:

Ho: Deposit money banks' total(DBT) lending has not significantly enhanced

Agricultural production (proxy by AGDP) in Nigeria.

H_1:   Deposit money banks' total(DBT) lending has significantly enhanced

Agricultural production (proxy by AGDP) in Nigeria.

It was observed that DBT lending with a calculated t-value of 2.865 is greater than the critical t-value of 1.72 at 5% level of significance under the two-tailed test. Hence, we reject the null hypothesis and accept the alternate hypothesis. This implies that deposit money banks' total lending has significantlyenhanced agricultural production(proxy by AGDP) in Nigeria.

The outcome of the hypotheses testing is summarized in Table 4.10 below:

Table 4.10   Summary of the Hypotheses Testing

	Independent Variables	**Expected Sign**	**Reported Sign**	**Significant or Not Significant**	**Accept or Reject Null**
Ho1	DBCA	+	+	Significant	Null Rejected**
Ho2	DSME	+	+	Not Significant	Null Accepted
Ho3	DCPS	+	+	Significant	Null Rejected**
Ho4	DBTC	+	+	Significant	Null Rejected**

Source: Researchers Compilation (2019)

**. Significant at the 5% levels

4.6 Research Findings

From table 4.9, the coefficient of determination value stood at 0.982522, showing that the various deposit money banks' lending proxies taken together have explained about 98.3% of the systematic variation in agricultural gross domestic product (AGDP). After adjusting for the degrees of freedom, the model still shows an explanatory power of 97.9%, leaving out only about 2.1% of the variances unexplained. Thus, judging by value of the R^2 and adjusted R^2, the estimated model showed high explanatory power and commendable goodness of fit. On the overall statistical significance of the model, the F-statistic has a value of 252.97 with a corresponding probability value of 0.00000 which is statistically significant at 1% (99% level of confidence), this suggests that all the independent

variables, taken together, jointly influenced AGDP under the period examined. Furthermore, the Durbin Watson statistics showed a value of 1.875 which is an indication of incomplete absence of first order auto correlation in the series.

On the basis of the individual coefficient signs and statistical significance level of the variables, it was observed that all the independent variables are positively signed as expected signifying positive effect of deposit money banks' lending on agricultural production in Nigeria. However, irrespective of the positive coefficient signs as observed, only DBCA (p-value= 0.0184), DCPS (p-value= 0.0063) and DBTC (p-value= 0.0103) passed the significance test at 5%. This is due to their probability values, which are within the benchmark of 0.05 (5%). Thus, a 1% increase in DCPS will lead to about 34% increases in AGDP. Similarly, a 1% increase in DBTC will trigger a corresponding significant increase in AGDP by up to 46.5%. On the other hand, a unit change in DSME is observed to insignificantly increase the degree of AGDP by about 16.79 units, while increases in DBCA will significantly increase AGDPbyabout 13.7 units. This means that DBCA, DCPS and DBTC are all significant contributors to changes in overall agricultural production in Nigeria, while DSME (although a positive contributor) was not statistically significant for the period covered by the study.

4.7   Discussion of Findings

The regression results in table 4.9 show the effect of the four (4) deposit money banking lending proxies on agricultural production (proxies here using agricultural contribution to gross domestic product).Commenting on the performance of the structural coefficients, the coefficient and p-values of the four independent variables DBCA, DSME, DCPS and DBTC are given as follows; 13.70031{0.0184}, 16.78587{0.0159}, 0.340104 {0.0063} and 0.464925{0.0103} respectively. The estimates reveal that three of the deposit money banking lending (DBCA, DCPS and DBTC) exerts significant impact on agricultural production at 5% level. However, DSMEpossesses the expected positive coefficient sign but failed to reject the null hypotheses that deposit money banks' small and medium enterprises sub-sector credit (DSME) does not significantlyaffectthe agricultural production in Nigeria. The observed apriori signs conform to the dictates of the economic theory, because the underlining assumption is that the higher the value (amount) of money disbursed for agricultural development by commercial and microfinance banks in form of credit or loan and advance, the larger the increases in agricultural productivity; and implicationally an increase in overall growth in the entire economy. Research-wise, however, the significant nature of the variables of deposit money banks' credit to agriculture (DBCA) and deposit money banks' total credit (DBTC) support the study of Agunuwa, Proso&Okieruovo (2016) and Udoka, Mbat& Duke (2016)which revealed that commercial banks' loans to the agricultural sector has a significant and positive

130

impact on the growth of agricultural output. It negates the study of Idoko, Sunday & Sheri (2012) and Okulegu, Ewno&Okoro (2014), both of which revealed positive and insignificant relationship between government expenditure to the agricultural sector and overall agricultural output. It however supports the outcomes of Iganiga&Unemhilin (2011); Iwedi, Igbanibo&Onuegbu (2015) which found that credit to private sector positively correlate with GDP, meaning that an increase in one triggers corresponding increase in the other.

On the other hand, despite maintaining the expected coefficient sign, the result of DSME agrees with the outcome ofAgunuwa, Proso&Okieruovo (2016) which found that banks' credit to SMEs are not statistically significant. The insignificant nature of the variable of DSME is a pointer that even though greater credit supply to agriculture has the tendency of boosting the overall GDP agricultural output, there is likelihood that the small and medium scale enterprises have not received adequate attention (credit-wise) than other sectors. This position supports the outcome of a recent study by Toby &Peterside (2014), whose descriptive statistics showed that Nigeria's commercial and merchant banks lagged behind in financing small-scale agricultural sector when compared to the manufacturing sector. There results also showed significant weak correlation between commercial bank lending and contribution of agriculture to GDP, which is in tandem with our current finding.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1   Summary of Findings

This study has shown positive relationship between the deposit money banks' credit and agricultural production in the Nigeria economy, using the Regression analysis on historical dat**a** during the period 1995 to 2017. The result from this study as extracted from chapter four shows:

(1) That Deposit Money Banks' lending (DMBL) to agriculture has significant effect on Agricultural production (proxy by AGDP) in Nigeria.

(**2**) That the Deposit Money Banks' Lending (DMBL) to Small and Medium Enterprises (SMEs) sub- sector has no significant boost on Agricultural production(proxy by AGDP)in Nigeria.

(**3**) That the Deposit Money Banks' lending (DMBL) to total Private Sector has significant effect on Agricultural production(proxy by AGDP) in Nigeria.

(**4**) That Deposit Money Banks' total lending (DMBTL**)** has significantly enhanced Agricultural production (proxy by AGDP) in Nigeria.

5.2 Conclusion

The model is significant for the study. All variables conform to the apriori expectation. The tested explanatory variables-DBCA, DCPSand DBTCare positive and signi**fi**cant in the model having a significant effect on the dependent variable-AGDP. While the other tested explanatory variable-DSME sub-sectorispositive and significant but has no significant effect on the dependent variable-AGDP for

the period under study. This study has justified the misappropriationof agricultural credit in Nigeria**.** This tells more about the sources of credit to the sector. DMBs' credit, which is the major source of funding, has a positive relationship with the sector financing; this explains the need to monitor this major source of credit t**o** boost agricultural production. Direct substantial percentage of their credit as indicated in the recent Deposit/ Lending ratio (minimum 65%, maximum 80%) if to the agricultural sector could enhance agricultural productivity.

We can postulate that credit to agricultural sector has not received the required attention to stimulate the desired production in the sector. This could be as a result of the negative attitude of our banks toward the sector, and the farmers' negative disposition to agricultural credit. While the vulnerability of the sector, scares the potential creditors.

The inability to identify the promising farmers had made it possible to grant credit to those who are not genuine farmers; this had resulted to misapplication of credit met for the sector. Any person(s), whether classified as farmers or not had access to designated loan for agriculture, which they of course use for other purposes. Policy coordination and implementation as regards the prudential guidelines have not shown understanding of the necessity to monitor credit funding for the sector.

The fear of default in loan repayment by the sector has resulted in the diversification of funds met for it to other use. Professionals who can manage

funds are scarce in this sector; this has made it, an all comer's business.We conclude that deposit Money Banks' lending could boost agricultural production level.

5.3 Recommendations

Based on the findings made in the course of this study, the following recommendations are made:

1 Deposit Money Banks' total credit should focus their finances on agricultural sector to achieve desired results.While Deposit Money Banks' creditto agriculture should be increased and channeled to fund the real farmers to minimize the problems of inadequate funding in the agricultural sector. This can be done by ensuring that the priority sector of the economy like agricultural sector credit percentage allocation is increased while the regulatory body – CBN, reduces the monetary policy rate (MPR). This will make the prudential guidelines for banks to be more sensitive to funding of agriculture.

2 The CBN should apply moral suasion to persuade the private sectorto commit more of their funds to develop the agricultural sector. Banks should be encouraged toform a consortium to pool adequate capital and risk sharing to finance mega farming. The combination of various sources of funding is to ensure that necessary and adequate capital are supplied and applied in the sector.

3 CBN should reduce the interest rate as component of the DMBs' Credit to encourage borrowing. In this era of deregulation, discount rate should be

reducing. A low interest rate will serve as an incentive and will motivate farmers to use the facility. In this period of the collapse of oil price and rise in price of commodities (inflation); interest rate should be guided reasonably, this will be beneficial to both big and small borrower farmers.

4 A stable, consistent and complementary policy on credit supply is required for domestic output expansion to meet the ever-growing food demand in Nigeria. The beneficiaries of government incentives and credit facilities should be small farmers and cooperatives in farming, since they are most neglected and fraught with high risk of investment. Policies formulated should encourage the deposit money banks to give loans to SMSEs and farmers at a concessionary interest rate. While non-interest banks can be encouraged to channel their funds to grow the agricultural sector.

5 The most important sector of the economy, like agriculture should be favoured in terms of granting credit by the private sector. Private sector should increase its credit to the agricultural sector in particular as its contributions to the sector havesignificant effect for the period of study. In order to improve on their relationship, better and strong credit culture should be promoted and sustained. Although ACGSF has contributed much to the sector, its influence is not much compare to the capital requirement. Therefore, CBN should make deliberate effort to expand agricultural production by increasing its credit support programmes and incentives to agricultural sector and small and medium scale farmers.

6 There should be strong and comprehensive legal framework that will continue to aid in monitoring the performance of credit to agricultural sector and recovering of debts owed to banks. CBN should design a pragmatic model to implement its policy for the agricultural sector to grow.

5.4 Contribution to Knowledge

This study in its contribution to knowledge derived an estimation model, that is,

AGDP = 96558.7 + 13.70*DBCA + 16.79*DSME + 0.34*DCPS + 0.46*DBTC

The main contribution is that lending to agricultural sector proxy by DBCA, DSME, DCPS and DBTCwith their positive coefficient and magnitude can influence the level of Agricultural productionproxy by AGDP in Nigeria to perform better. These variables share a common trend and long run equilibrium as suggested in the theory. This is theoretically in line. To the best of my knowledge, contributors to this subject matter have not appliedthe same variables in a single study.

5.5 Areas of Further Research

This study has assessed the effect of Deposit Money Bank Lending (DMBL) on Agricultural Production (AP, proxy AGDP) and the relationship to performance and failure. DBCA, DSME, DCPS, DBTC and AGDP were the point of focus. For further research, first, it is necessary that studies be carried out to examine the actual contribution of each identified credit sectors in the study to

agricultural production in Nigeria. Second, identify the effect of the size and composition of DMBL on the economy. Third, examine the effect of agricultural lending on economic growth.

Final, research should be carried out on the implementation strategy of policy measure on DMBL alongside the interest rate.

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APPENDIX i

RESULTS

Descriptive

	AGDP	DBCA	DSME	DCPS	DBTC
Mean	8282489.	176046.4	68598.77	6220807.	5391902.
Median	5940237.	71604.20	53245.80	2616660.	2540748.
Maximum	23952550	544789.9	158219.7	19449024	16313395
Minimum	619806.8	25377.30	33195.50	204300.3	145699.4
Std. Dev.	7510733.	180677.9	35672.81	6367049.	5423040.
Skewness	0.727192	1.043526	1.390545	0.641362	0.666150
Kurtosis	2.182885	2.547617	3.858178	1.991581	2.087129
Jarque-Bera	2.666956	4.370420	8.117973	2.551362	2.499678
Probability	0.263559	0.112454	0.017267	0.279241	0.286551
Sum	1.90E+08	4049067.	1577772.	1.43E+08	1.24E+08
Sum Sq. Dev.	1.24E+15	7.18E+11	2.80E+10	8.92E+14	6.47E+14
Observations	23	23	23	23	23

Normality

Series: Residuals
Sample 1995 2017
Observations 23

Mean	2.99e-09
Median	-386060.2
Maximum	2513225.
Minimum	-1629374.
Std. Dev.	992944.4
Skewness	0.949368
Kurtosis	3.498847
Jarque-Bera	3.693461
Probability	0.157752

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.125580	Prob. F(2,16)	0.8828
Obs*R-squared	0.355464	Prob. Chi-Square(2)	0.8372

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/12/19   Time: 21:21
Sample: 1995 2017
Included observations: 23
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DBCA	0.576951	6.461191	0.089295	0.9300
DSME	0.077890	14.94418	0.005212	0.9959
DCPS	-0.007851	0.119472	-0.065717	0.9484
DBTC	-0.016314	0.177749	-0.091781	0.9280
C	26782.86	721960.1	0.037097	0.9709
RESID(-1)	0.012766	0.300235	0.042519	0.9666
RESID(-2)	0.145322	0.303426	0.478937	0.6385

R-squared	0.015455	Mean dependent var	2.99E-09
Adjusted R-squared	-0.353749	S.D. dependent var	992944.4
S.E. of regression	1155298.	Akaike info criterion	31.00341
Sum squared resid	2.14E+13	Schwarz criterion	31.34899
Log likelihood	-349.5392	Hannan-Quinn criter.	31.09032
F-statistic	0.041860	Durbin-Watson stat	1.844697
Prob(F-statistic)	0.999592		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.485623	Prob. F(4,18)	0.7461
Obs*R-squared	2.240306	Prob. Chi-Square(4)	0.6917
Scaled explained SS	1.714378	Prob. Chi-Square(4)	0.7881

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/12/19   Time: 21:21
Sample: 1995 2017
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.28E+12	9.02E+11	1.422095	0.1721
DBCA	545633.2	7708725.	0.070781	0.9444
DSME	-13994824	17995075	-0.777703	0.4468
DCPS	-104164.9	160311.2	-0.649767	0.5240
DBTC	217472.3	236605.8	0.919133	0.3702

R-squared	0.097405	Mean dependent var	9.43E+11
Adjusted R-squared	-0.103172	S.D. dependent var	1.52E+12
S.E. of regression	1.60E+12	Akaike info criterion	59.23082
Sum squared resid	4.61E+25	Schwarz criterion	59.47767
Log likelihood	-676.1545	Hannan-Quinn criter.	59.29291
F-statistic	0.485623	Durbin-Watson stat	2.107661
Prob(F-statistic)	0.746138		

APPENDIX ii

Unit Root Tests

NB: All the variables were not stationary at levels,

but stationarity was achieved at 1st differencing.

UNIT ROOT

Null Hypothesis: D(AGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.296703	0.0019
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AGDP,2)
Method: Least Squares
Date: 05/12/19   Time: 21:32
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AGDP(-1))	-1.219036	0.230150	-5.296703	0.0000
C	-235664.1	365789.7	-0.644261	0.5275
@TREND("1995")	129518.7	35473.92	3.651097	0.0018

R-squared	0.609829	Mean dependent var	105113.8
Adjusted R-squared	0.566477	S.D. dependent var	1137328.
S.E. of regression	748844.9	Akaike info criterion	30.02201
Sum squared resid	1.01E+13	Schwarz criterion	30.17123
Log likelihood	-312.2312	Hannan-Quinn criter.	30.05440
F-statistic	14.06682	Durbin-Watson stat	2.149874
Prob(F-statistic)	0.000210		

Null Hypothesis: D(DBCA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.579261	0.0002
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DBCA,2)
Method: Least Squares
Date: 05/12/19   Time: 21:33
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DBCA(-1))	-1.243336	0.222850	-5.579261	0.0000
C	30314.21	11907.68	2.545771	0.0197

R-squared	0.620971	Mean dependent var	-173.2643
Adjusted R-squared	0.601023	S.D. dependent var	76756.31
S.E. of regression	48482.86	Akaike info criterion	24.50620
Sum squared resid	4.47E+10	Schwarz criterion	24.60568
Log likelihood	-255.3151	Hannan-Quinn criter.	24.52779
F-statistic	31.12815	Durbin-Watson stat	1.844768
Prob(F-statistic)	0.000022		

Null Hypothesis: D(DSME) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.870771	0.0009
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DSME,2)
Method: Least Squares
Date: 05/12/19   Time: 21:35
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DSME(-1))	-1.112753	0.228455	-4.870771	0.0001
C	6076.882	4468.506	1.359936	0.1898

R-squared	0.555289	Mean dependent var	128.4219
Adjusted R-squared	0.531883	S.D. dependent var	28789.73
S.E. of regression	19697.66	Akaike info criterion	22.70478
Sum squared resid	7.37E+09	Schwarz criterion	22.80426
Log likelihood	-236.4002	Hannan-Quinn criter.	22.72637
F-statistic	23.72441	Durbin-Watson stat	1.945359
Prob(F-statistic)	0.000106		

Null Hypothesis: D(DCPS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.352822	0.0000
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DCPS,2)
Method: Least Squares
Date: 05/12/19   Time: 21:36
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DCPS(-1))	-1.481853	0.201535	-7.352822	0.0000
C	1135244.	604046.9	1.879397	0.0756

R-squared	0.739954	Mean dependent var	-17985.79
Adjusted R-squared	0.726267	S.D. dependent var	5109287.
S.E. of regression	2673152.	Akaike info criterion	32.52581
Sum squared resid	1.36E+14	Schwarz criterion	32.62529
Log likelihood	-339.5210	Hannan-Quinn criter.	32.54740
F-statistic	54.06399	Durbin-Watson stat	2.242114
Prob(F-statistic)	0.000001		

Ramsey RESET Test
Equation: UNTITLED
Specification: AGDP DBCA DSME DCPS DBTC C
Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	1.508089	17	0.1499
F-statistic	2.274332	(1, 17)	0.1499
Likelihood ratio	2.887902	1	0.0892

F-test summary:

	Sum of Sq.	Df	Mean Squares
Test SSR	2.56E+12	1	2.56E+12
Restricted SSR	2.17E+13	18	1.21E+12
Unrestricted SSR	1.91E+13	17	1.13E+12

LR test summary:

	Value	Df	
Restricted LogL	-349.7183	18	
Unrestricted LogL	-348.2743	17	

Unrestricted Test Equation:
Dependent Variable: AGDP
Method: Least Squares
Date: 05/12/19   Time: 21:40
Sample: 1995 2017
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DBCA	20.39236	6.766184	3.013864	0.0078
DSME	28.62085	14.27448	2.005036	0.0611
DCPS	0.363904	0.107390	3.388631	0.0035
DBTC	0.523470	0.161512	3.241056	0.0048
C	-921448.6	901511.0	-1.022116	0.3211
FITTED^2	-1.18E-08	7.83E-09	-1.508089	0.1499

R-squared	0.984585	Mean dependent var	8282489.
Adjusted R-squared	0.980051	S.D. dependent var	7510733.
S.E. of regression	1060832.	Akaike info criterion	30.80646
Sum squared resid	1.91E+13	Schwarz criterion	31.10268
Log likelihood	-348.2743	Hannan-Quinn criter.	30.88096
F-statistic	217.1587	Durbin-Watson stat	1.991227
Prob(F-statistic)	0.000000		

APPENDIX iii

Co-integration

Date: 05/12/19   Time: 21:42
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments
Trend assumption: Linear deterministic trend
Series: AGDP DBCA DSME DCPS DBTC
Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.871705	107.0456	69.81889	0.0000
At most 1 *	0.742800	63.92376	47.85613	0.0008
At most 2 *	0.607837	35.40787	29.79707	0.0102
At most 3 *	0.490699	15.75021	15.49471	0.0458
At most 4	0.072529	1.581179	3.841466	0.2086

 Trace test indicates 4 co-integrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.871705	43.12188	33.87687	0.0030
At most 1 *	0.742800	28.51589	27.58434	0.0379
At most 2	0.607837	19.65766	21.13162	0.0793
At most 3	0.490699	14.16903	14.26460	0.0518
At most 4	0.072529	1.581179	3.841466	0.2086

 Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integrating Coefficients (normalized by b'*S11*b=I):

AGDP	DBCA	DSME	DCPS	DBTC
1.37E-06	-3.26E-05	1.51E-05	4.11E-07	-1.23E-06
-3.02E-07	-1.88E-05	5.63E-05	6.86E-07	2.24E-07
2.37E-07	1.62E-05	-4.44E-05	1.54E-07	-4.89E-07
1.05E-06	-2.05E-05	-3.24E-05	-6.82E-07	1.88E-07
-4.33E-07	-4.31E-07	-2.45E-05	3.74E-07	1.46E-07

Unrestricted Adjustment Coefficients (alpha):

D(AGDP)	-158791.0	225344.9	115315.6	290075.4	-139760.1
D(DBCA)	-20.22250	5140.174	14611.37	11404.84	1262.632
D(DSME)	-12093.16	-5692.460	6150.977	-73.10719	-126.0806

D(DCPS)	-189329.7	-35670.87	-95892.61	1473080.	-231148.3
D(DBTC)	627568.7	-513976.4	287064.3	257964.1	-41786.15

1 Co-integrating Equation(s):	Log likelihood	-1410.590

Normalized co-integrating coefficients (standard error in parentheses)

AGDP	DBCA	DSME	DCPS	DBTC
1.000000	-23.83444	11.04210	0.300843	-0.899423
	(2.53116)	(6.16269)	(0.08205)	(0.07329)

Adjustment coefficients (standard error in parentheses)

D(AGDP)	-0.217023
	(0.26711)
D(DBCA)	-2.76E-05
	(0.00948)
D(DSME)	-0.016528
	(0.00413)
D(DCPS)	-0.258761
	(0.83142)
D(DBTC)	0.857713
	(0.30754)

2 Co-integrating Equation(s):	Log likelihood	-1396.333

Normalized co-integrating coefficients (standard error in parentheses)

AGDP	DBCA	DSME	DCPS	DBTC
1.000000	0.000000	-43.55207	-0.410285	-0.855912
		(8.17037)	(0.14601)	(0.14815)
0.000000	1.000000	-2.290558	-0.029836	0.001826
		(0.32408)	(0.00579)	(0.00588)

Adjustment coefficients (standard error in parentheses)

D(AGDP)	-0.285167	0.927585
	(0.26025)	(6.99636)
D(DBCA)	-0.001582	-0.096172
	(0.00952)	(0.25590)
D(DSME)	-0.014807	0.501170
	(0.00365)	(0.09814)
D(DCPS)	-0.247975	6.839398
	(0.85143)	(22.8887)
D(DBTC)	1.013138	-10.76082
	(0.24947)	(6.70657)

3 Co-integrating Equation(s):	Log likelihood	-1386.504

Normalized co-integrating coefficients (standard error in parentheses)

AGDP	DBCA	DSME	DCPS	DBTC
1.000000	0.000000	0.000000	10.46695	-5.539344
			(3.36989)	(3.24807)
0.000000	1.000000	0.000000	0.542236	-0.244493
			(0.17790)	(0.17147)
0.000000	0.000000	1.000000	0.249752	-0.107536
			(0.07891)	(0.07606)

Adjustment coefficients (standard error in parentheses)

D(AGDP)	-0.257842	2.793612	5.169324
	(0.26031)	(7.51048)	(13.4429)
D(DBCA)	0.001880	0.140268	-0.360267
	(0.00790)	(0.22805)	(0.40818)
D(DSME)	-0.013349	0.600705	-0.776503
	(0.00287)	(0.08293)	(0.14843)
D(DCPS)	-0.270698	5.287673	-0.603948
	(0.86277)	(24.8932)	(44.5558)
D(DBTC)	1.081162	-6.115571	-32.23558
	(0.22838)	(6.58934)	(11.7941)

4 Co-integrating Equation(s): Log likelihood -1379.419

Normalized co-integrating coefficients (standard error in parentheses)

AGDP	DBCA	DSME	DCPS	DBTC
1.000000	0.000000	0.000000	0.000000	-2.080669
				(0.19060)
0.000000	1.000000	0.000000	0.000000	-0.065317
				(0.00873)
0.000000	0.000000	1.000000	0.000000	-0.025009
				(0.00465)
0.000000	0.000000	0.000000	1.000000	-0.330438
				(0.12914)

Adjustment coefficients (standard error in parentheses)

D(AGDP)	0.047337	-3.162524	-4.237630	-0.090673
	(0.29360)	(7.61333)	(13.3206)	(0.17647)
D(DBCA)	0.013879	-0.093908	-0.730118	-0.002011
	(0.00823)	(0.21347)	(0.37349)	(0.00495)
D(DSME)	-0.013426	0.602206	-0.774132	-0.007884
	(0.00358)	(0.09276)	(0.16230)	(0.00215)
D(DCPS)	1.279082	-24.95918	-48.37498	-1.121050
	(0.81805)	(21.2124)	(37.1141)	(0.49168)
D(DBTC)	1.352557	-11.41236	-40.60118	-0.226352
	(0.25682)	(6.65961)	(11.6519)	(0.15436)

APPENDIX iv

Pairwise Granger Causality Tests
Date: 05/13/19   Time: 22:56
Sample: 1995 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DBCA does not Granger Cause AGDP	21	2.36464	0.1260
AGDP does not Granger Cause DBCA		5.25900	0.0176
DSME does not Granger Cause AGDP	21	0.31126	0.7369
AGDP does not Granger Cause DSME		2.22597	0.1403
DCPS does not Granger Cause AGDP	21	0.11722	0.8901
AGDP does not Granger Cause DCPS		1.39467	0.2765
DBTC does not Granger Cause AGDP	21	0.57027	0.5765
AGDP does not Granger Cause DBTC		4.71775	0.0245
DSME does not Granger Cause DBCA	21	2.59399	0.1057
DBCA does not Granger Cause DSME		4.71459	0.0246
DCPS does not Granger Cause DBCA	21	10.7591	0.0011
DBCA does not Granger Cause DCPS		1.38741	0.2782
DBTC does not Granger Cause DBCA	21	3.37112	0.0600
DBCA does not Granger Cause DBTC		0.96582	0.4018
DCPS does not Granger Cause DSME	21	1.35511	0.2860
DSME does not Granger Cause DCPS		0.12100	0.8868
DBTC does not Granger Cause DSME	21	1.96102	0.1731
DSME does not Granger Cause DBTC		0.38681	0.6854
DBTC does not Granger Cause DCPS	21	2.20623	0.1425
DCPS does not Granger Cause DBTC		1.78064	0.2003

APPENDIX v

Regression Result

OLS

Dependent Variable: AGDP
Method: Least Squares
Date: 05/12/19   Time: 21:53
Sample: 1995 2017
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	96558.70	618330.8	0.156160	0.8776
DBCA	13.70031	5.285594	2.592009	0.0184
DSME	16.78587	12.33857	1.360438	0.1905
DCPS	0.340104	0.109920	3.094114	0.0063
DBTC	0.464925	0.162232	2.865803	0.0103

R-squared	0.982522	Mean dependent var	8282489.
Adjusted R-squared	0.978638	S.D. dependent var	7510733.
S.E. of regression	1097741.	Akaike info criterion	30.84507
Sum squared resid	2.17E+13	Schwarz criterion	31.09191
Log likelihood	-349.7183	Hannan-Quinn criter.	30.90715
F-statistic	252.9704	Durbin-Watson stat	1.875292
Prob(F-statistic)	0.000000		