

Effects of Bank Credit on Industrial Performance in Nigeria

Tawose J.O.B.^{[a],*}

^[a] Ph.D, ACA, Department of Economics, Ekiti State University, Ado-Ekiti, Nigeria

*Corresponding Author

Address: Department of Economics, Ekiti State University, Ado-Ekiti, Nigeria

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Abstract

This paper investigates the effect of bank loans and advances on industrial performance in Nigeria between 1975 and 2009. Co-integration and Error Correction technique was adopted for the analysis. The results showed that industrial performance co-integrated with all the identified explanatory variables. Industrial sector as dependent variable is proxied by real GDP, while Commercial Banks' Loan and Advances to Industrial Sector (BLM), Aggregate Saving (SAV), Interest rate (INT), Inflation Rate (INF) are the independent variables. This suggests that the behavior of real Gross Domestic Product contributed by industrial sector in Nigeria is significantly explained by the commercial banks' loan and advances to industrial sector, aggregate saving, interest rate and inflation rate. The findings implies that every action towards infrastructural development, strengthening of commercial banks, deregulation of interest rate, encouragement of saving among rural dwellers and reduction of inflation rate will boost the performance of industrial sector significantly.

Key words: Bank credit; Industrial performance; Nigeria

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INTRODUCTION

Bank credit to industrial sector can be regarded as bank loans and advances provided by the financial institutions to industrial sector in order to enhance industrial productivity which by implication leads to economic development. However, some key factors that bring sustained industrial finance must be efficiently and effectively studied as the case of bank credit which is considered to be a blood stream of an economy so as to bridge the gap between the borrower and lender, particularly in a developing economy like Nigeria. Therefore, credit management constitutes a sensitive variable to be managed by the monetary authority under the overall platform of the Central Bank of Nigeria (CBN).

The credits granted by Nigerian commercial banks are predominantly of a short-term nature. This perhaps, is to be expected in view of the fact that the activities of commercial banks over time concentrated in the financing of foreign trade. With the growth of the economy and the wider outlets for bank funds which this has brought about, there has been a change in the pattern of bank lending. In particular, the rapid growth of industrial production has increased the demand for bank credit on the part of industrial firms. Financial institutions such as commercial banks and merchant banks have increasingly been providing finances for industries, some of which are managed by a rapidly growing number of indigenous entrepreneurs. Indeed, under the credit guidelines prescribed by the Central Bank since 1964, the banks have been encouraged to reallocate credit and re-channel it to the productive sectors of the economy.

Historically, in 1986, Structural Adjustment Programme (SAP) was introduced in Nigeria which led to the deregulation of financial sector and interest rate was deregulated. SAP was recommended by the International Monetary Fund (IMF) and World Bank. SAP was planned to run for two years, that is, 1986 to 1988, but it extends till today. The Primary focus of SAP is to relieve

government of her financial burden, but also includes sustaining growth in the industrial sector and productivity of the economy.

Nigeria still exhibits a number of feature that classify her as a developing country which include: economic dualism, low per capita income due to rapid rise in her population, low industrial capacity utilization, low savings, high inflation rate, low investment and over-dependency on a single commodity (oil).

Bank credit can be described as a process of making fund available to another sector of the economy based on some agreed terms in respect of repayment with interest. Loan may be simple, fixed payment, coupon bond and discount bond.

It is important to observe that Nigerian government's effort to industrialize her economy has made her to obtain series of bank credit (loan) from outside world like Paris Club, London Club, World Bank, International Bank for reconstruction and Development (IBRD). Therefore, it would be scholarly acknowledged to study the effect of bank credit on industrial performance in Nigeria.

It is obvious that industrial sector needs fund for either working capital or for business expansion in order to boost its productivity. Dualism in the Nigerian financial market inhibits proper channel of funds for investment that to augment industrial output. The prevalence of the informal financial market such as daily contribution, esusu and nsusu) may be attributed to the traditional structure of the economy thereby retarding industrial performance in terms of its productivity and efficiency to engender economy growth.

Another argument against bank credit is stringent conditions and requirements that must be met before bank credit could be granted. Muhammed Yunus (2011) opined that lack of access to credit on the part of the poor was one of the key constraints on their economy progress, a conclusion that has been supported by later studies from around the developing world. The conditions of lending such as character, capability, collateral, and confidence made bank credit not to be accessible by the industrialists.

It is also observed that the cost of bank credit to the industrialist is so enormous as a result of poor infrastructure and inadequate intermediate goods in Nigeria. Hence, the industrialists end up without achieving corporate primary target of maximizing profit. Also, government policies on the bank credit have failed to achieve their set targets.

The broad objective of this research work is to investigate the impact of the bank credit on industrial sector performance in Nigeria. While the specific objectives are to: find out the effectiveness of interest rate on accessibility of loanable fund; investigate the accessibility to bank credits; find out the response of saving to industrial performance; and examine the effect of inflation on industrial performance. The research hypothesis that, bank credit has no significant effect on

the performance of industrial sector.

The findings of this paper would be of importance to industrialists, government and researchers on the relationship between bank credit and industrial performance. It was discovered from literature that productivity is a direct function of capital and most of the loan to industrial sector in Nigeria comes from banks. It was also discovered that both individual industrialists and government parastals financed their businesses with bank credit. Then, it is necessary to find out the reaction of productivity of industries to the policy of bank credit.

The study covers a period of thirty five years between 1975 and 2009. Also, the research concentrates on all forms of loans issued out to industrial sector through financial institution during the period of study.

Data were of secondary obtained from various publications such as publication from the Central Bank of Nigeria (CBN), Federal Office of Statistic (FOS), CBN monthly report, bullions, annual report statement of account, seminar paper etc.

1. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

1.1 Empirical Literature Review

According to Nzotta (2002), he identified the factors that determine a lending in Nigeria to include contact position of the bank, risk and profitability of various types of bank credit, sterility of deposit, economic condition, monetary policies, ability and exposure of bank personnel, credit need of the area served and the nature of the source of bank. Nzotta said bank credit is said to mean the act of a bank giving out advances to a debtor after considering the risk and profitability that must follow such lending decision.

Anuolam (2000) defined bank credit as a process where a bank or financial house provides loan or advance to a single borrower or group of individual or client. It is believed that bank credit contributes significantly to banks' profitability, with its disparities explained by the difference in their lending rates, lending policies and unavoidable competition that may be between banks.

The usual operational definition of a bank is an "institution whose current operations consist in granting loans and receiving deposit from the public. Banking activity has dramatically changed over the last two decades, due in part to financial liberalization embedded in the Structural Adjustment Programme (SAP). The major role of banks precisely consists of screening the demand for loans and monitoring firms indebted to them. Consideration shall be given to the service provision as a bank activity.

One of the difficulties concerning the multi product provision of banking services is that the pricing of

services has been the subject of government interference/regulation. For example, Klein (1971), and Barro and Santomero (1972) have pointed out in their respective articles that when the government imposes an interest rate ceiling on current and saving accounts, bank pay an implicit interest rate by setting charges for services below the competitive price. As Saunders and Schmacher (2000) show in their empirical study over the 1988-1995 period, the implicit interest rate (under charged services) has a significant and positive impact on net interest rates on current and saving accounts has tended to disappear. As a consequence of deregulation, banks have increased the share of the costs of services provision they charge to clients (Jacolin and Paquier, 1995).

According to Ben Patterson and Kristina Lyguerud (2001) in their book titled "interest rates practice and the determination of interest rates"; the charging of interest for lending has not always been an acceptable practice. "usury" is specifically condemned in both the Bible and Sharia law and Modern Islamic Bank operates only on the basis of profit.

Fell, John (1999) has expressed the view that in unregulated financial markets, long-term interest rates are driven by the interaction of market expectations concerning future development, inflation, exchange rate, the real economy, monetary policy strategy.

International Monetary Fund (2001), in its bulletin on world economic outlook noted that national economies are increasingly open to the influences of international financial markets. Consequently, short-term capital can move rapidly between currency areas in search of higher returns, disrupting the operation of domestic monetary policy. Internal monetary conditions can be strongly influenced by external factors. The volume of flow of such funds affects economies in at least two ways. An inflow/ out flow of investment into / out of the financial markets will result in a rise/ fall in long-term interest rates and such flows will also affect the exchange rate, and domestic monetary policy. This can lead to conflict of the kind which faced the UK in-September 1992, when higher interest rates were required to avoid a sterling depreciation and to keep it within the European monetary system's exchange rate mechanism, lower rates to avoid recession.

According to Bofinger (1999), the existence of global financial markets ensures that real long-term interest rates tend to move together in different economies. Nominal long-term rates, however, reflect inflationary expectations in the separate economies which in turn reflect the credibility of domestic monetary policy.

The general aim of financial sector is interpersonal transfer of resources (Winkler 1998). More specifically, financial sector helps firms to overcome the problems of moral hazard and adverse selection and this reduces the costs of external financing (Rajan, Zingales 1998) and transaction costs in general (Levine 1997).

Jappelli and Pagano (1994) have laid the ground for the theory that describes negative relationship between financial sector development and economic growth. The reasoning for relation comes straightforward from the endogenous growth model. If agents cannot borrow the desired amount, aggregate saving will be higher in the presence of the perfect capital markets. In more detail, Jappelli and Pagano look at the credit rationing towards households. Being liquidity- constrained households cannot borrow effectively against their future earnings, hence they save more. Increased savings means growing investment, which in the framework of endogenous growth leads to higher growth rate.

Ogunleye (2007) stated that along trade cycle, the rise and fall in interest rate during boom and slump respectively does not determine investment but expectation. He stated further that funds for investment may be allocated by rationing and this is evident in Nigerian banking industry where Central Bank of Nigeria (CBN) would give directive on sector of economy to which much of commercial banks' loan and advances must go.

Ajayi (2007) empirically tests, the impact of bank credit on industrial performance in Nigeria between 1975-2003. He confirmed that bank credit and inflation have positive and negative effects respectively on industrial performance.

Rama (1996) investigated the theoretical and empirical determinants of private investment in developing countries and identified macroeconomic and institutional factors such as financial repression, foreign exchange shortage, and lack of infrastructure, economic and political instability as important variables that explained private investment. Rama noted that the empirical result accuracies were diminished by errors in measurement variables and research methodology.

De Gregorio and Graidotti proved that in the simple of Latin American countries there is a robust and significant negative correlation between financial intermediation and economic growth. They explain this relationship with the fact that in the absence of proper regulation, more financial development may be associated with a lower efficiency of investment. They conclude that the positive relationship between financial intermediation and economic growth may be reversed in the presence of unregulated financial liberalization and expectations of government bailouts (De Gregorio and Guidotti, 1992). The empirical results of De Gregorio and Guidotti are consistent with the views of the schools, which propose that financial development hurt growth. Negative relationship has found confirming empirical evidence by some other studies (Bayomi 1993, Liu, Woo 1994).

Andrus Oks (2001) confirms statistically significant positive relationship between industrial production index and loans to the private sector. Vuyyuri (2005) investigated

the co-integrating relationship and the causality between the financial and the real sectors of the Indian economy using monthly observations from 1992 through December 2002. The financial variables used were interest rates, inflation rate, exchange rate, stock return and real sector was proxied by industrial productivity. Johansen (1988) multivariate co-integration test supported the long-run equilibrium relationship between the financial sector and the real sector, and the Granger test showed unidirectional Granger causality between the financial sector and real sector of the economy.

1.2 Conceptual Issues

Traditionally, commercial banks are short-term and medium term lenders. But in the recent decades they now give long-term credit especially through loan syndication. Merchant banks are used to giving loans to individual or group of individual that have the objective of building houses or financing a long-term project. The functions performed by banks vary from country to country and from one institution to another. For example, special banks are known to have been created to deal specifically with certain problems of economic development. Examples of other banks are: Nigerian Agricultural and Co-operative Bank Limited, Nigerian Industrial Development Bank (NIDB), Nigerian Bank for Commerce and Industry etc.

According to Adekanye, (1983) the cannon of lending can be summarized into 6 C's credit. They are:

- a. Character – Intention, Willingness to repay, honesty
- b. Capacity – management experience, ability to repay
- c. Capital – money, security, financial commitment
- d. Collateral – asset pledged as security
- e. Condition – prevailing economic condition in the economy
- f. Confidence – faith of lender in the above

In practice, each financial institution has its own credit policy guidelines tailored to meet its market target and risk acceptance criteria, but fall within the framework of CBN monetary and credit policy guideline.

1.2.1 Bank Credit, Small and Medium Enterprise (SMES) in Nigeria

The lending by the Nigerian banking industry to SME's increased by 600% due to favourable business condition, low interest rates and arrival of new technologies in the industry. Professor Chukwuma Soludo, former CBN Governor, said that the banks credit in Nigeria for SMEs has increased by 600% from N35 billion (US \$ 0.30 billion) in 2003 to N204 billion (US \$1.73 billion) in 2007, as reported by "All Africa". According to Professor Soludo, the growth in credit in the Nigerian banks showed that the consolidation of banks had a very positively influence on the core private and real sector. The Nigerian banks' credit to the private sector has gone up from about ₦1,191.5 billion (US \$10.12 billion) in 2003 to ₦1,150.9 billion (US \$ 9.77 billion) in 2004, and then to ₦1,950.4 billion (US \$ 16.56 billion) in 2005, ₦2490.4 billion (US

\$21.15 billion) in 2006, and ₦4,941.5 billion (US \$ 41.97 billion) in 2007, recording year on year growth rates of 26.6%, 29.3% 27.7% and 98.4% correspondingly.

The primary reason for the growth of the Nigerian banking industry is attributed to the growing economy of the nation along with the development of infrastructure in the Nigerian banking sector. A number of attractive policies like low interest rate, together with easy availability of loans, are also responsible for incredible growth in the Nigerian banking industry.

Besides, the various innovative technologies in the banking industry, like mobile banking, payment through credit and debit cards as well as net banking are also drawing a number of customers towards the banks.

In addition, CBN increased its loan rates or monetary policy rate (MPR) from 10% to 10.25% on June 3, 2008 to control the high inflation sparked off by mounting food prices all over the world. Inflation in Nigeria stood at 7.8% in April 2007, but shoot up to 8.2% in March 2008.

1.2.2 Monetary Policy Guidelines And Small Scale Industries

Before the promulgation of the Nigeria Enterprises Promotion Decree in 1972, the government had found it necessary to direct financial institutions through the Central Bank of Nigeria's (CBN) credit guidelines and extend a certain percentage of their total loans and advances to indigenous borrowers i.e business in which Nigerian equity participation is not less than 50%. The percentage allocation increased progressive from 35% in the late sixties to 90% for fiscal year 1984.

As a result of the indigenization decree, most business became at least 60 percent owned by Nigerians. It was therefore possible for banks to activate full compliance with the directive on lending to indigenous borrowers without necessarily extending facilities to small scale enterprises, which the policy was originally designed for.

1.2.3 Self-Help Groups (SHGs) Linkage Program

Self-Help Groups (SHGs) are voluntary grass-root organizations at the group, community or local level. They have functioned for centuries in Nigeria, meeting a variety of people's needs for goods and services. The SHG in Nigeria include credit associations like the 'Esusu' or "Adashi" which works through small savers-borrowers to make small loans available to members.

In 1991, however, the CBN formalized the SHGs to promote group synergy, cross guarantees, peer-group pressure and more importantly, allow loan applicants under the ACGSF to overcome the problem of collateral often demanded by banks. This initiative was also introduced to raise the level of bank credit channeled to the rural sector of the economy, inculcate the habit of savings by the rural poor, reduce the cost of loan administration as well as ensure the viability and sustainability of agricultural credit delivery. A total of 413 SHGs was formed in the first 12 years of the program, while a total of N12.52 million was

mobilized as savings (CBN, 2009). Apart from the target of increasing agricultural support especially for the rural poor, the program has some direct bearings on poverty alleviation and wealth creation.

1.2.4 Trust Fund Model (TFM)

The TFM was introduced in 2001 as a strategy for reducing the exposure of banks that grant agricultural loans to small scale farmers without collateral. The process involves the intermediation by some parties willing to pledge funds in the bank as cash or treasury instruments as security for loans to target borrowers. The parties could be Federal or State or Local Government, religious bodies, Non-governmental organizations (NGOs), companies, especially those in the oil sector etc. For instance, the total amount placed under the scheme by the various stakeholders as at end-December, 2008 stood at N4.887 billion, with the Government Ministries, Departments and agencies having the highest of N2.361 billion. As a scheme managed by the CBN, it shows the impact of the Bank on the 7-point agenda of government in creating income and wealth for the rural poor.

1.2.5 Interest Drawback Program (IDP)

Following the high incidence of loan default under the ACGSF, the IDP was introduced in 2003 to reduce the effective borrowing rate under the scheme without the complication of introducing dual interest rates. The objective of the program is to encourage prompt loan repayment as well as reduce the cost of loan recovery. The IDP is funded by the Federal Government and the CBN in the ratio of 60:40 with capital base of N2 billion. The operation of the program is such that farmers could borrow from the lending banks at a market-determined rates, while the program pays interest rebate of a determined percentage of 40 per cent of interest repayment to farmers who were to repay their loans as at when due. As at end-December 2008, a total of 71,981 IDP claims valued at N275.2 million had been paid to the eligible farmers (CBN, 2009). To this end, this is another major contribution of the CBN in encouraging agricultural production as well as wealth creation.

1.2.6 Small and Medium Enterprises Scheme (SMEs)

The growth of the small and medium scale enterprises have been recognized as effective vehicles for the promotion of accelerated industrial development, employment, income generation and poverty reduction in Nigeria. For this reason, the Federal Government launched a programme to enhance the allocation of credit to SMEs, in addition to some of the measures taken by the CBN in acting as growth catalyst for the SMEs,

The Federal Government of Nigeria secured a loan from the African Development Bank (AFDB) known as SME I in an initial attempt to use the SMEs model as a framework to stimulate growth, generate employment and create wealth. The scheme during the period, however did not achieve its stated objectives. The scheme

was managed by the defunct Bank for Commerce and Industries. For this reason, the CBN secured a World Bank facility known as the SME II, for on-lending to small scale enterprises, while the loan had tenure of 15 years. Disbursements commenced in 1990 and the bank was responsible for loan recoveries and remittance of same to the World Bank. By the time operations of the scheme stopped in 1996, the sum of ₦2.0 billion (USD \$ 107.2 million) had been disbursed to 194 projects through 27 participating banks (CBN, 2009). Following the transfer of the debt management function from the CBN to the newly-established Debt Management Office, in 2000, the Federal Ministry of finance assumed responsibility for servicing the facility with effect from that year.

1.2.7 Small and Medium Enterprises Equity Investment Scheme (SMEEIS)

The SMEEIS, formerly known as Small and Medium Industries Equity Investment Scheme (SMIEIS) was an initiative of the CBN, and the Bankers' committee. The scheme commenced operations on 1st August, 2001 under the supervision of the CBN. The objective of the scheme was to transform the small and medium scale industries in Nigeria into becoming a growth catalyst by inculcating in them the technical know-how in finance and management. Under the scheme, all the deposit money banks were required to set aside ten (10) per cent of their profits before tax for equity investment in the small and medium enterprises. Activities covered by the scheme included; manufacturing, solid minerals, construction, information technology and telecommunication, education as well as tourism and services it was initially designed for equity participation and not a loan. However, in a bid to encourage greater utilization of SMEEIS funds, the Bankers' committee approved a micro-credit window for micro entrepreneurs under the scheme in 2003. The window opened 10 percent of the funds set aside by the participating banks specifically for developing microfinance institutions.

In addition, the operating guidelines of the scheme were amended in 2005 to increase accessibility of the fund to farmers. In the first place, the scope was expanded to accommodate non-industrial enterprises, making all business activities, with the exception of general commerce and financial services, eligible for equity investment under the scheme. This opened the scheme further to strategic sectors of the economy, such as agriculture, housing, transport and utilities. Also, the cap on a bank's equity investment in a single enterprise was raised by 150 per cent from N200 to N500 million. As a result of expansion of enterprises to be covered by the scheme, the name was modified to small and medium enterprises equity investment scheme (SMEEIS).

In April 2006, a further review of the SMEEIS guidelines was undertaken. Consequently, SME was defined as any enterprises with a maximum asset base of

₦1.5 billion (excluding land and working capital), and with no lower or upper limit of staff. Besides, invested by participating banks in eligible enterprises could take the form of loan or equity investment or a combination of both. Furthermore, the maximum investible amount in any enterprise by banks was limited to 20 per cent of the banks' aggregate funds set aside annually, subject to a maximum of ₦500 million. By December 2008, funds set aside by banks under the scheme had risen to ₦42.0 billion up from ₦13.1 billion in 2002. However, actual investments grew from ₦2.2 billion in 2002 to ₦28.9 billion in December, 2008, being 77.11 percent of the total funds set aside (CBN, 2009). Also, the ₦28.9 billion investment, the service-oriented sector of the economy gulped the highest of ₦15.5 billion, representing 53.84 percent. ₦13.3 billion, indicating 46.16 percent was invested in the real sector/ enterprise. It shows the usual apathy of Deposit Money banks in investing in the real sector. This may not be unconnected with the risks associated in the sector/ mainly due to infrastructural problems.

1.2.8 Microfinance

Recent studies have shown that long-term microfinance programme have enormous potential for national economic growth and development. It has had some positive impacts on the individual households' budget and changes the quality of life of millions of people in the developing countries, especially in South East Asia, the pacific and Latin America regions. As important as finance is an economy, the majority of the economically active poor still have limited access to basic financial services: credit, savings opportunities, money transfers, among others, availability of which would significantly raise their standard of living. The latent capacity of the poor for entrepreneurship would be significantly enhanced through the provision of microfinance services to enable them engage in economic activities and be more self-reliant; increase employment opportunities, enhance household income and create wealth.

In Nigeria, however, the formal financial system provides services to about 35 percent of economically poor, while the remaining 65 percent are excluded from having access to financial services (CBN, 2006-2007). This 65 per cent are often served by the informal financial sector, through the NGO microfinance institutions, money lenders, friends, relations and credit associations. The non-regulation of these activities have some serious implications for the Central Bank of Nigeria's ability to exercise one aspect of its mandate of promoting monetary stability and a sound financial system.

2. THEORETICAL FRAMEWORK

There are some relevant theories that relate bank credit to industrial performance and they are reviewed below.

2.1 Simple Accelerator Principle

In 1917, acceleration principle is formulated by American economist John Maurice Clark (1884-1963). Acceleration principle is a theory of investment in modern macroeconomics. It asserts that the level of investment is accelerated only through the rate of increase in output, which is the gross domestic product. Since the acceleration principle links investment to output, it has explanatory value also in understanding the development of business cycles.

According to the acceleration principle, each level of output needs a specific amount of capital. Therefore, if output and the capital required to procure the necessary machinery are expected to rise, the amount of capital within an economic will also increase. The acceleration channel is shown below.

$$\Delta Q \longrightarrow \Delta PC \longrightarrow \Delta K \longrightarrow \Delta I$$

ΔQ = Change in output
 ΔPC = Change in productive capacity
 ΔK = Change in stock of capital
 ΔI = Investment

The accelerator equation is $I = A\Delta t$

I is investment, A is the accelerator coefficient, and Δt is the annual change in income.

The relevance of this theory to the study is found through direct link that exists between output and investment. It must be emphasized that investment is determined by bank credit (loan), interest rate and saving.

2.2 Marginal Efficiency of Capital (MEC)

It is also known as Internal Rate of Returns (IRR) which is defined as a discount factor or discount rate that will equate the present value of the stream of income with its initial cost outlay. In other words, MEC is a discount factor that will make the net present value of project to be equal to zero.

$$NPV = -Co + [n \sum \frac{Ri}{(1+p)^i}]$$

NPV = Net present value

Co = Initial Cost outlay

\wedge = Number of economic useful life of project

Ri = return from project

P = MEC

Decision rule Under MEC

I) $p > r$ = The project is feasible or profitable

II) $p < r$ = The project is not feasible or profitable

III) $p = r$ = it is indeterminate because MEC is equal to market rate of interest.

r = market rate of interest

MEC is used to appraise investment by comparing MEC with market rate of interest (cost of obtaining fund).

2.3 Marginal Efficiency of Investment (MEI)

This shows a logical relationship between the interest rate and economy's level of investment, when changes in the prices of factor inputs or projects are taken into

consideration. This postulates that a fall in interest rates makes all firms to mount pressure on limited available factor inputs in the factor market which leads to increase in the prices of factor inputs. This portrays inflation that may be caused by a downward fall in the rate of interest thereby reducing industrial performance.

2.4 Classical Theory of Interest Rate

This theory is associated with David Ricardo Marshall, Pigou, Cassels, Walras, Tausing and knight. According to the classical theory, rate of interest is determined by the demand and supply of capital or to be more precise by the intersection of the investment demand schedule and the supply/saving schedule. Interest rate is determined by the equality of saving and investment under conditions of perfect competition. According to this theory, there is an inverse relationship between the rate of interest and the demand for capital. As the rate of interest rises, investment falls and vice versa. While the relationship between the interest rate and saving is positive. This explains two of the variables that determine industrial performance—saving and interest rate on loanable fund.

2.5 The Neo-Classical Theory of Interest Rate

The neo-classical or the loanable fund theory of interest was first propounded by the Swedish economist Wicksell and later developed and supported by several leading American and Swedish economists including Professor Robertson, Bertil Ohlin, Lindhal and Myrdal. However, the theory in its present form is associated with professor Robertson. According to this theory the rate of interest is determined by the demand and supply of loanable funds. In the market, there are those who supply loanable funds and those who borrow them. The rate of interest will be such as shall bring about equilibrium between the demand and supply of loanable funds.

The loanable funds theory is a distinct improvement on the old classical theory of interest because the term “supply of loanable funds” is wider in scope and includes not only savings out of current income but also bank credit, dis-hoarding and dis-investment. Actually, bank loans represent important funds, which are available on payment of interest by the borrower. Likewise, loaned wealth can also become available for purpose of investment. Dis-invested wealth is another sources of funds available to the borrowers. Since loanable funds theory is more comprehensive, it is often referred to as real as well as monetary theory of interest. This theory is just the of the two general approaches that have been followed in developing the modern monetary theory of the rate of interest. The loanable funds theory can be illustrated by means of a diagram given below:

2.6 Monetarist Theory of Interest

The monetarists led by Milton Friedman accept that interest rate is a monetary phenomenon. They add and emphasize another factor—the price expectations/

anticipations factor together with money supply and money demand.

An increase in money stock, according to the monetarists has three major effects namely: liquidity effect, income effect and the price / expectation effect. To them, an increase in money supply initially (immediate observational impact) reduces interest rate, that is the Keynesian liquidity preference effect. Due to increase in liquidity position people go to the market to increase demand resulting in the expansion of the economy (the income effect). This increase in income will put pressures on goods and services, and hence price will rise. As prices increase due to expectation effects, people will build up an inflationary effect and future supplies will expand their investment outlet to supply more and this expansionary investment demand will make prices to rise further.

3. METHODOLOGY

3.1 Model Specification

The Real Gross Domestic Product Manufacture (RGDPM) is employed as proxy for industrial performance which is the dependent variable, while the commercial banks' loan and advances to industrial sector (BLM), aggregate savings (SAV), interest rate (INT) and inflation rate (INF) are the independent variables.

Therefore, industrial performance (Real Gross Domestic Product Manufacture) is a multivariate function of aggregate savings, banks' loan and advances to industrial sector, interest rate, inflation rate and random variable. Taking the linear expression the model is specified below:

$$RGDPM = f (BLM, SAV, INT, INF)$$

$$RGDMP = \lambda_0 + \lambda_1 BLM + \lambda_2 SAV + \lambda_3 INT + \lambda_4 INF + U_t$$

WHERE:

RGDPM = Real Gross Domestic Product Manufacture

BLM = Commercial Bank's Loan and Advances to Industrial Sector.

SAV = Aggregate Saving

INT = Interest Rate

INF = Inflation Rate

$\lambda_1, \lambda_2, \lambda_3$ and λ_4 = slopes

λ_0 = Intercept

U_t = Random Variable

3.2 Justification of Variables

Real Gross Domestic Product Manufacture (RGDPM): Gross Domestic Product (GDP) is the monetary value of goods and services produce in a country in a given period of time, usually a year irrespective of their nationality. Therefore, real gross domestic product manufacture is the proportion of GDP manufactured and deflated by the general price level.

Commercial Banks' Loan and Advances to

Industrial Sector (BLM). This is the total funds granted in term of loan and advances by the commercial banks to industrial sector annually.

Aggregate Saving (SAV): This is also known as Gross National Savings (GNS) and it is defined as total value of consumption postponed and therefore saved in a country at a given period of time, usually a year, irrespective of their nationality. Basically, it is total value saved out of current income.

Interest rate (INT): It is defined as payment for use of capital. In monetary economics, it is regarded as reward for parting with liquidity. This is taken as the rate at which commercial banks lend to industrial sector.

Inflation Rate (INF): This is defined as continuing increase in general price level.

3.3 Apriori Expectation

$$F'(BLM) > 0$$

This implies that there is a positive relationship between real gross domestic product manufacture and commercial bank's loan and advances to industrial sector.

$$F'(SAV) > 0$$

There exists positive relationship between real gross domestic product manufacture and aggregate saving.

$$F'(INT) < 0$$

This indicates that there exists negative relationship between real gross domestic products manufacture and interest rate.

$$F'(INF) < 0$$

Real gross domestic product manufacture is negatively related to inflation rate.

3.4 Analysis Technique

The techniques adopted in this study include co-integration, unit root test, Error Correction Model (ECM) and Parsimonious Error Correction Model (ECM). Co-integration analyses assists to test the long run equilibrium relationships among a set of non-stationary variables. The first step in co-integration is the stationary test or

unit root test. A unit root test shall be carried out to obtain results of stationary of the variable. That is, to verify whether the assumptions of ordinary least square (OLS) are violated or not (e.g minimum variance). The error term of the long-run relationship is used to create a dynamic error correction model. According to Engle and Granger (1987), this error correction model produces consistent results even when the right hand side variables are not completely exogenous. The selection of the final vector error correction model (ECM) is based on economic as well as statistical criteria of evaluation. The normalized co-integrating equation will be checked to ensure that they correspond to what seems to be long-run relationship among the variables. The parsimonious error correction model (ECM₂) introduces dynamism into the model. The ECM₂ is subject to economic and stochastic of evaluation considering only those variables that are statistically significant. The ECM₂ model using the framework established by Johansen (1991) is used to investigate a group of non-stationary time series to see if they are co-integrated. The econometric criteria looked at the coefficient of multiple determination (R²), adjusted R², Durbin-Watson Test, etc and their evaluation at 5% level of significance.

4. DATA PRESENTATION AND RESULTS INTERPRETATION

4.1 Unit Root Test

The unit root test is carried out to know if the variables are stationary with respect to time using the following hypothesis.

$$H_0 : X_t - 1(1) \text{ (Non Stationary)}$$

$$H_1 : X_t - 1(1) \text{ (Stationary)}$$

Augmented Dickney Fuller value is compared with the Mackinnon critical value (in absolute term)

Table 1
Stationary of Variables at Level 1(0)

VARIABLES	ADF STATISTICS	MACK (5%) CRITICAL VALUE	ORDER OF INTEGRATION	REMARKS
RGDPM	0.529226	-2.9527	1(0)	NS
BLM	-1.364818	-2.9527	1(0)	NS
SAV	1.642815	-2.9527	1(0)	NS
INT	-1.862305	-2.9527	1(0)	NS
INF	-3.205378	-2.9527	1(0)	S

Source: Computer's Output
 NS: Non Stationary
 S: Stationary

From the above, the hypothesis of the presence of a unit root (Stationary in each of the variable) series was tested at 5 percent Mackinnon Critical value. Based on this result, only

inflation rate (INF) is stationary at level 1(0).

Then order of integration of the variables whether 1(1) or 1(2) series is now established in table 2.

Table 2
Stationarity of Variables at First and Second Difference

Variables	ADF Statistics	Mack (5%) Critical Value	Order of Integration	Remarks
RGDPM	-3.376875	-2.9627	1(2)	S
BLM	-5.521316	-2.9558	1(1)	S
SAV	-7.201497	-2.9591	1(2)	S
INT	-6.711197	-2.9558	1(1)	S
INF	-	-	-	-

Source: Computer's Output

NS: Non Stationary

S: Stationary

In order to correct the problem of the presence of unit root in the variables, they were differenced once or twice.

It is shown in the table 3 that real Gross Domestic Product manufacture (RGDPM) and aggregate saving (SAV) were stationary at second difference (1(2), while

commercial banks' loan and advances to industrial sector (BLM) and interest rate were stationary at first difference (1(1)). Recall that inflation rate (INF) was stationary at zero level [1(0)].

4.2 Johansen Co-Integration Test

Table 3
Result of Johansen Co-Integration Test

EIGEN VALUE	LIKELIHOOD RATIO	5 PERCENT CRITICAL V.	1PERCENT CRITICAL V	HYPOTHESIS NO OF CE(S)
0.951936	185.2979	68.52	76.07	NONE**
0.731727	85.13563	47.21	54.46	At Most1**
0.479419	41.71588	29.68	35.65	At most2**
0.457326	20.17315	15.41	20.04	At most 3**
6.08E-05	0.002008	3.76	6.65	At most 4

* (**) denotes rejection of the hypothesis at 5% (1%) significance level. L.R. test indicates 4 (four) co integrating equation(s) at 5% significance level.

Source: Computer's Output

The result in the table 3 shows 4 (four) co-integrating equations at 5% critical value based on the fact that the likelihood ratio is greater than the critical value at 5%. The long-run relationship between the variables

in the model will be determined by the normalized co-integrating coefficients with the highest log likelihood in absolute term.

Table 4
Normalized Co-Integrating Coefficients: 1Cointegrating Education

RGDPM	BLM	INF	INT	SAV	C
1.000000	-1.282581 (0.53703)	-4030.503 (2674.95)	1212.556 (3007.12)	3.032330 (1.49821)	-1036833

Log likelihood -1430.609

Source: computer's Output

The BLM commercial banks' loan and advances to industrial sector (BLM) and INF (Inflation rate) have negative long-run coefficients of -1.282581 and -4030.503 respectively meaning that they are inversely related to RGDMP in the long run and they will pull down the RGDPM by -1.282581 and -4030.503 in the long-run.

However, INT (Interest Rate) and SAV (Aggregate Saving) will raise the value of RGDPM by 1212.556 and 3.032330 respectively simply because of the positive

coefficients of these variable. Since long-run relationship among these variables has been established, then the next step here is error correction mechanism.

4.3 Error Correction Mechanism

The short-run adjustment dynamics is specified by the Error Correction Mechanism (ECM). The anti-regression distributed lag (A.R.D.L) techniques are employed. The ECM involves two tests. These are overparameterized and parsimonious tests.

Table 5
Over Parameterized Error Correction Model (ECM)
Dependent Variable: RGDMP

Variables	Coefficient	Std. error	T-statistics	Probability
C	-3.39E-10	2.98E-10	-1.137078	0.2672
RGDMP	1.000000	1.33E-14	7.50E+13	0.0000
BLM	9.30E-16	5.5E-16	1.688985	0.1047
BLM(-1)	1.11E-14	2.54E-15	4.385596	0.0002
INF	1.86E-11	7.94E-12	2.341699	0.0282
INF(-1)	6.28E-13	7.15E-12	0.087838	0.9308
INT	-1.35E-11	2.07E-11	-0.651055	0.5215
INT(-1)	1.16E-10	3.37E-11	3.454354	0.0022
SAV	2.44E-15	8.09E-16	3.010011	0.0062
SAV(-1)	4.88E-15	1.02E-15	4.769649	0.00001
ECM(-1)	6.33E-14	1.37E-14	4.623253	0.0001

Source: Computer's Output
R – Squared = 1.000000
Adjusted R- squared = 1.000000
Durbin –Watson stat = 2.527000

The above table shows the initial overparameterized correction model. All the variables were lagged equally by

one period. There is still the need to proceed to the next which is the parsimonious also known as ECM2.

Table 6
Parsimonious Error Correction Model
Dependent Variable: RGDMP

Variables	Coefficient	Std. error	T-statistics	Probability
C	-1.40E-10	1.70E-10	-0.821970	0.4183
RGDPM	1.000000	4.21E-15	2.38E+14	0.0000
BLM(-1)	4.52E-15	9.10E-16	4.966565	0.0000
INF	8.49E-12	4.36E-12	1.946375	0.0621
INT (-1)	3.75E-11	1.21E-11	3.10697	0.0044
SAV(-1)	2.74E-15	5.26E-16	5.203886	0.0000
ECM(-1)	2.81E-14	5.57E-15	5.044777	0.0000

Source: Computer's output
R-squared = 1.000000
Adjusted R-square = 1.000000
Durbin –Watson = 2.321273
RGDPM= -1.40E-10+4.52E-15BLM_{t-1}+8.49E-12INF+3.75E-11INT+2.74E-15SAV_{t-1}+2.81E-14 ECM_{t-1}

The R² is 1.000000 or 1 which indicates that the ECM parsimonious value is significant but not correctly signed. No variation in RGDPM real Gross Domestic Product manufacture) has been explained by the stochastic error term.

Furthermore, the ECM otherwise known as the speed of adjustment is not correctly signed, but significant. This implies that the present value of RGDPM adjust rapidly to changes in independent variables which are: BLM, INF, INT and SAV and that 6.33E-14 of disequilibrium in the dependent variable is corrected in each period.

Therefore, the speed of adjustment is 2.81 BLM (commercial banks' Loan and advances to industrial sector), INF (Inflation rate), INT (Interest Rate) and SAV (Aggregate Saving) are positively related to the current or present value of RGDPM (Real Gross Domestic Product manufacture).

Moreover, the ECM has a probability value of 0.0000, thus confirms that the ECM value is indeed significant. The Durbin-Watson statistic of 2.32 shows that the auto-correlation is inconclusive.

4.4 Discussion of Findings

This study has been able to examine the effect of bank credit on industrial performance in Nigeria between the 1975 and 2009. The result indicates that there is short-run and long-run positive relationship between real gross domestic product manufacture (RGDPM) and interest rate, but they are stationary at different level, i.e RGDMP is stationary at second difference equation, while INT is stationary at first difference equation.

The result showed that there are positive relationship between real gross domestic product manufacture (RGDPM) and aggregate saving (SAV) both in the short-

run and long-run, and they are stationary at their second difference equations.

In the long-run, the inflation rate (INF) is having a negative relationship with RGDPM ie, a unit change in INF (inflation rate) leads to 4030.503 unit decrease in RGDPM which is in conformity with “a priori expectation. However, the relationship was otherwise in the short-run.

The relationship between commercial banks’ credit to industrial sector and real Gross Domestic Product of industrial sector exhibits a positive relationship in the short-run, but this was later altered in the long-run with a negative relationship with real gross domestic product manufacture (RGDPM).

The stationary test was carried out at zero level, only inflation rate (INF) was stationary. In a bid to correct the presence of unit root (i.e non stationary), the variables were differenced once or twice [(1(1)) or [1(2))] in order to get the order of integration. It was deduced that RGDPM and SAV were stationary at second difference, while the remaining BLM and INT were stationary at first difference.

The short-run adjustment dynamism is specified by the Error Correction Mechanism (ECM). All the variables were lagged equally by one lagged period to get our ECM1 and ECM2.

The R^2 was 1.0000 meaning that 100% of total variation in RGDPM (real gross domestic product manufacture) was explained by the present value of BLM present value of INF present valued of INT and present value of SAV, and stochastic error term showed no variation in RGDPM (real gross domestic product manufacture).

Furthermore, the ECM otherwise known as the speed to adjustment was significant, but not correctly signed. This implies that the present value of RGDPM adjust rapidly to changes in BLM, INT, INF and SAV and that 2.81 of the disequilibrium in the dependent variable is corrected in each period.

5. POLICY RECOMMENDATIONS

Based on the findings of this paper, the following policy recommendations are made.

Commercial banks should be further empowered, so as to be able to grant long-term loan that would boost industrial sector’s performance.

Stabilization policy should be put in place by the monetary authority to control inflation.

The industrial sector needs to spend heavily on research and development in order to discover the new way, best method and strategies that can increase output.

Government should provide infrastructural facilities such as good road, steady power supply and health services.

Interest rate must be allowed to operate through market mechanism to ensure that interest rate is determined by demand for loanable fund and the supply of loanable fund.

Saving should be encouraged by establishing more commercial banks in the rural area to ensure mobilization of rural saving for industrial sector’s development.

CONCLUSION

Based on the empirical findings of this study, it could therefore be concluded that commercial banks’ loan and advances to industrial sector, aggregate saving, interest rate and inflation rate are major long run determinants of industrial performance in Nigeria as expressed by the level of real gross domestic product manufacture in the economy. Therefore, monetary authority is advised to be sensitive to the behavior of the aforementioned variables so as to ensure industrial sector growth and economic development.

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