

Analysis of Bank Sectoral Lending and its Influence on Economic Growth in Nigeria

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Abstract

This paper examines the relationship between bank sectoral lending and economic growth in Nigeria over the period 2009 to 2018 using annual time series data gathered from the Nigerian Bureau of Statistics and the Central Bank of Nigeria (CBN) annual report for the period of 2009 to 2018. The stationarity of the data was tested using the Augmented Dickey Fuller Test (ADF) and it indicates that the all the variables of the study were all stationary at levels and are integrated of order [I (0)]. This implies that the relationship between the variables of the study can be estimated using the ordinary least square regression analysis (OLS). The probability value of the estimate was used to test the hypotheses of the study. The summary statistics shows that the probability value of the Jarque-Bera test statistics is greater than the critical value, implying that the data for the study is normally distributed. The finding from the study indicates that sectoral allocation to Manufacturing Sector (MAN) has a positive effect on Gross Domestic Product and the relationship is statistically. This implies that a unit increase in sectoral allocation will lead to an increase in GDP by a margin of 90.01%. Sectoral lending to Agriculture (AGR) was found to have positive but not statistically significant ($p > 0.05$) effect on Gross Domestic Product. It was concluded that bank lending has a tremendous positive effect on economic growth. It was recommended among others that It is recommended that sectoral allocation to the agricultural subsector be increased and the disbursement of the loan be monitored so that it can reach the intended beneficiaries. Also, the disbursed loan should be monitored so that it is utilized or the purpose for which it was meant for. Since sectoral allocation to the manufacturing sector is significant and positive, government should ensure the proper financing and monitoring of this sector.

Keywords: *Bank lending, Economic growth, Nigeria*

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Background to the Study

Output of the Nigerian economy comes from six main sectors namely; agriculture, manufacturing, mining and quarrying, real estate and construction, wholesale and retail trade (general commerce) and service sectors. These six sectors interact with one another using the stock of capital and other factors of production within the economy to produce the desired goods and services. In the process of production in these sectors, capital plays a key role. It enables the producers to procure the necessary inputs of production and thereby helps expand production capacities. Therefore, availability or non-availability of capital determines, to a greater extent, the growth process in the various sectors and hence the economy as a whole.

Due to abject poverty, low savings capacity and consequent low capital formation, producers in developing countries like Nigeria are unable to finance their activities and therefore have to depend on external sources of funding. According to Uma (2001), availability of external funding, especially access to long-term credit influences firms' investments level in any economy, since credit is viewed as a productive input and policy makers believe that it is possible to promote specific economic activities by delivering pre-determined amounts of loans to producers. Hence, bank lending has become an essential feature in output growth process in Nigeria. Availability of bank credit enables producers to harness innovations by bringing about new combinations of productive resources and employing hitherto unemployed resources.

Statement of Problem

At the heart of Nigeria's economy is a banking system that has been in existence prior to her independence in October 1960. Nwankwo (1975), observes that formal banking began in Nigeria in 1892 with the establishment of the African Banking Corporation (ABC) in Lagos. From Nigeria's colonial era to present day, the banking sector has witnessed vast transformations in character, structure and organization with the primary aim of promoting a more efficient allocation of funds and ensuring that financial intermediation occurs as efficiently as possible thereby enhancing funds mobilization and accessibility, which are required for economic growth. The importance of bank lending in generating output growth within an economy has been widely discussed in the literature. Early economists such as Schumpeter (1934), McKinnon (1973) and Shaw (1973) identified banks' role in facilitating technological innovation through their intermediation role. This role according to them is performed through the process of channeling funds in the form of credit or loan for investment to those economic agents who need them and can put them into the most productive use. Thus, lending which is defined in this context, as the link through which resources are transferred for capital formation, facilitates investment which leads to output growth. Several scholars thereafter, such as Fry (1988), Kinga and Levine (1993), Levine (2004) and De Serres, Kobayakawa, Slok and Vartia (2006), have supported the above postulation about the significance of bank lending to output growth in an economy.

It is worthwhile to note that most of the studies on the role of bank lending in output growth were conducted in the developed economies. Limited studies exist in the developing/emerging economies (especially in Nigeria), thereby creating a huge knowledge gap. To our

knowledge, earlier studies on the role of bank lending in output growth in Nigeria were carried out by Haruna, Yahya and Nasiru (2013), Oluitan (2007), and Josephine (2009). But the lack of clarity about the effect of different sector level bank credit on output growth of the various sectors of a developing economy like Nigeria is the motivating factor for this study.

The present study intends to reduce this knowledge gap by examining the impact of bank sectoral lending on output growth in Nigeria (using sector level productivity and bank lending data), specifically to ascertain whether sector level bank lending has any impact on output growth of the various sectors (namely; agriculture, manufacturing, and quarrying sectors). The rest of this paper is organized as follows: section two is literature review and discusses the theoretical and empirical evidence of the effect of bank lending on economic growth. Section three contains the sectoral distribution of commercial bank loans and advances in Nigeria. Section four is data analysis while section five discusses the results and policy implications of findings. Sixth section gives the summary and concluding remarks.

The main objective of this study is to carry out analysis of bank sectoral lending and its influence on economic growth in Nigeria. The specific objective of the study is to determine the effect of sectoral lending to the manufacturing sector on economic growth and determine the effect of sectoral lending to Agricultural sector on economic growth

Hypotheses of the Study

- Ho₁:** Bank Sectoral Lending the manufacturing sector has no significant effect on Economic Growth in Nigeria.
- Ho₂:** Bank Sectoral Lending the agricultural sector has no significant effect on Economic Growth in Nigeria.

Literature Review

Conceptual Review

Bank Lending

According to CBN (2003), the amount of loans and advances given by the banking sector to economic agents constitute bank lending. Through bank lending, savings are channeled into productive investments thereby facilitating output growth. Bank lending according to Josephine (2009) is one of the important aspects of financial intermediation that provides funds to economic entities that can put them to the most productive investment. Thus, the availability of credit allows the role of intermediation to be carried out, which is important for output growth in the economy. Vohra and Sehgal (2012), argue that, lending is one of the two principal functions of banks, not only because of their social obligation to cater for the credit needs of different sections of the community, but also because lending is the most profitable, for the interest rates realized on loans have always been well above those realized on investments. They opined that, most business organizations, especially in developing countries are highly dependent on bank loans as a source of capital.

However, studies by Demirguc-Kunt and Levine, 2008; Beck, Rioja and Valev, 2009; Levine, 2002; and Boyreau-Debray, 2003 stress the importance of efficiency of the allocation of credit rather than an all bank intermediation. To them, because credit to the public sector is prone to

waste and politically motivated programmes which may not serve the interest of the populace, it is weak in generating growth in an economy. To Plamen and Khamis (2009), credit availability enables firms to undertake investments that they could not have otherwise carried with their own funds alone.

Economic Growth

Economic growth can be defined as an increase in a country's output, which is most commonly measured by GDP. The benefits stemming from economic growth are wide ranging. The specific benefits to banks are improvements in living standards, rising employment, increased capital investment, greater business and investor confidence and improved environmental outcomes. These benefits can be translated by banks through increasing bank lending.

Economic growth is a sustained expansion of production possibilities measured as the increase in real GDP over a given period (Slavin, 2009). Rapid economic growth maintained over a number of years can transform a poor nation into a rich one. The growth rate of real GDP tells us how rapidly the total economy is expanding. This measure is useful for telling us about potential changes in the balance of economic power among nations. But it does not tell us about changes in the standard of living.

Alternative theories of economic growth as shown in figure (3-1) provides insights into the process of economic growth, but none provides a complete and definite answer to the basic questions: What causes economic growth and why do growth rates vary? Why poor countries are poor? How design policies that can help them grow? How our own growth rate is affected by shocks and our government's policies? Economics has some way to go before it can provide definite answers to these questions. The growth theories have developed over time, each building upon and replacing the previous theory (Parkin, 2012).

Nexus between Bank Lending and Economic Growth

Schumpeter made the first articulated statement about how financial transactions take central stage in economic growth. Thus, he wrote, "The banker stands between those who wish to form new combinations and the possessors of productive means. He is essentially a phenomenon of development, though only when no central authority directs the social process. He makes possible the carrying out of new combinations, authorizes people, in the name of the society as it were, to form them. He is the ephod of the exchange economy" (Schumpeter, 1934, 78).

The relationship between bank/credit or lending and output growth or the impact of bank credit/ lending on output growth has been investigated by several authors in the past. A review of a few important studies may be mentioned here. King and Levine (1993), in trying to find out whether higher levels of financial development are significantly and robustly correlated with faster current and future rates of economic growth, physical capital accumulation and economic efficiency improvements, use seventy seven countries that comprise of developed and developing economies and cross-country growth regression to show that finance seems

important to lead economic growth. Eatzaz and Malik (2009) analyse the role of financial sector development in economic growth of 35 developing countries using cross-section data over the period 1970-2003, and report that domestic credit to the private sector is instrumental to increasing output per worker and hence promoting economic growth in the long-run. This finding agrees with the works of Levine (2004) and Franklin and Oura (2004) that confirm the presence of long run relationship between bank credit and economic growth.

Although a vast majority of empirical literature on bank lending and output growth suggests a positive and long-run relationship as already discussed above, by contrast, few research works report either little or no relationship between bank lending and output growth. Lucas (1988) opines that economists have hyped the role of finance in economic growth. In his view, banks only react passively to industrialization and economic growth. Favara (2003), using panel estimation technique reports that the relationship between financial development and economic growth is at best weak because finance does not have a first order effect on economic growth. Oluitan (2007), examines the significance of bank credit in stimulating output and the factors that prompt financial intermediation within the Nigerian economy over the period 1970-2005. She uses the Johansen Cointegration and Error Correction Model to provide evidence that although, a long run equilibrium relationship exists between private sector credit and economic growth, real output causes financial development, but not vice versa. Haruna, Yahya and Nasiru (2013), analyse the relationship between private sector credit and economic growth in Nigeria, using time series data for the period of thirty-seven (37) years (1974-2010). Their Autoregressive Distributed Lag (ARDL) bound F-test for cointegration results indicate that a long run equilibrium relationship exists between private sector credit and economic growth, however, causality results indicate that there is no causal relationship between private sector and economic growth in Nigeria.

It is worthwhile to note that most of the studies on the role of bank lending in output growth were conducted in the developed economies. Limited studies exist in the developing/emerging economies (especially in Nigeria), thereby creating a huge knowledge gap. Also, previous studies on the impact of bank lending on output growth in Nigeria have neglected the sectoral allocation of bank credit in their analysis. This study intends to reduce these knowledge gaps by examining the impact of bank lending on output growth in Nigeria (using sector level productivity and bank lending data), specifically to ascertain whether bank lending has any impact on output growth of the various sectors (namely; agriculture, manufacturing, and mining and quarrying sectors).

Theoretical Review

Classical growth theory: Study the main concentrates on the dynamics of economic growth. A combination of the contributions of Adam Smith, Thomas Robert Malthus, and David Ricardo, the leading economists of the late eighteenth century and early nineteenth century and is sometimes called the Malthusian theory.

Neoclassical growth theory: Economic growth will be happened with the proper amounts of the three driving forces: labor, capital and technology. When a technology becomes available, the labor and capital need to be adjusted to maintain growth equilibrium. Because

technological change induces saving and investment that make capital per hour of labor grow. Robert Solow the most popular version of this growth theory in the 1950s.

New growth theory: Real GDP per person grows because of the choices people make in the pursuit of profit. Paul Romer developed this theory during the 1980s, based on ideas of Joseph Schumpeter during the 1930s and 1940s.

The Solow Growth Model

Solow's theory on growth supports the neoclassical view that the economy naturally adjusts to achieve stable equilibrium growth. Before the Solow model, the most commonly referred to model in growth is Harrod-Domar, which mostly focuses on the potential shortcomings of growth such as the coexistence of growth and increasing unemployment.

We assume that the economy produces a single good Y_t by means of two factors of production - capital, K_t and labor, L_t . The productivity of these inputs also depends on the level of technology A_t . The production function:

$$Y_t = F(K_t, A_t, L_t) \quad (1)$$

The Solow growth model is designed to show how growth in the capital stock, growth in the labor force, and advances in technology interact in an economy, and how they affect a nation's total output of goods and services.

None of these theories tell us the whole story, but each teaches us something of value. Classical growth theory reminds us that our physical resources are limited but without advances in technology. Neoclassical growth theory has the same conclusion but without keep growth going just by accumulating physical capital. But also with advance technology and accumulate human capital. New growth theory emphasizes innovation of human resources (Parkin, 2012).

Empirical Review

The impact of bank lending on economic growth is a controversial issue on both empirical and theoretical framework. As shown in figure (3-2) the theoretical underpinnings of this relationship can be found in the works of Bagehot (1873) and Schumpeter (1954) and more recently in the works of Gurley and Shaw (1955, 1960), McKinnon (1973), Shaw (1973) and Lucas (1988).

Sharma and Gounder (2012), examined the change in the bank credit provided to the private sector in six economies in the South Pacific during the period 1982-2009. The study used the credit granted to the private sector as a dependent variable, while the independent variables included the average interest rate on the loans, the rate of inflation, the ratio of deposits to the GDP, the size of the banks' assets of output, a dummy variable reflecting the existence of a financial market, and the GDP. The results showed that the higher average interest rates on loans and the higher inflation rate may have negative effects on the rate of growth in credits, while the size of the deposits and assets had a positive impact on the growth of credit. The results also indicated that the strong economic growth leads to higher growth in credit.

Udom (2013), empirically analyzed the impact of deposit money bank on the manufacturing sector in Nigeria within a time frame of 1980-2011. The relationship was investigated using distributed autoregressive analysis. The empirical analysis carried out showed that the lag of exchange and commercial bank credit have a significant and positive impact on manufacturing sector performance in Nigeria within the period under review, and as such the monetary and capital market in Nigeria should be further developed to meet standards and provide the necessary capital for the manufacturing sector. It was recommended that the government and relevant authorities should see to the strengthening of the exchange rate

Bassey, Asinya and Amba (2014), studied Bank Lending, Macro-Policy Variables and the Growth of Small Scale Industries in Nigeria. The paper employed time series data obtained from the Central Bank of Nigeria for the period 1992-2011 to examine the impact of bank lending and macroeconomic policy on the growth of Small Scale Enterprises in Nigeria. Data were analyzed using the Ordinary Least Square (OLS) regression technique. The data was first examined for unit roots using the Augmented Dickey Fuller (ADF) with view to ascertaining their stationarity. Result revealed that all the variables were stationary at first difference except government expenditure. Empirical findings further revealed that Commercial bank credit finance and industrial capacity utilization exerted significant positive impact on the growth of Small Scale Enterprises. Also, while exchange rate had a significant negative effect on the growth of Small Scale Enterprises, surprisingly, government expenditure and interest rate charged by banks fails to explain the variation in the growth of Small Scale Enterprises in the period under investigation. This informed the need to pursue policies that would ensure access to short, medium and long-term bank credit finance at concessionary interest rate and less stringent conditions ensure proper funding of the sector by government, enhance the install capacity utilization rates of manufacturing sector and reduce exchange and interest rates as the way out.

Methodology

This study adopted was the ex-post facto research design using secondary data from the Nigeria Bureau of Statistics for the period of 2009 to 2018. The unit root property of the data was examined using Augmented Dickey Fuller test. Ordinary Least Square Regression analysis was used to determine the relationship between the variables of the study as the data are integrated of order zero. The data was analyzed using E-views 10.0. The hypotheses of the study were analyzed using the probability value of the regression estimate. The model specification for the analysis is as follows: The general regression equation states that:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Y_{it} + U \dots\dots\dots (1)$$

- Where
- Y_{it} = dependent variable (financial performance measure)
 - β_0 = the intercept term
 - X_{it} = independent variable
 - β_1, β_2 = Regression coefficients
 - U = error term
 - t = time unit (t = 1, 2... 9 years)

and a positive skewness of 0.281989. Manufacturing Subsection (MAN) has a Mean of 385.5210, a standard deviation to the right of the Mean of 263.6836. Agricultural subsector has a Mean of 1883.290 with a standard deviation of 1679.809. The main statistics of interest, the Jarque-Bera statistics which is used to establish the normality or otherwise of a time series data indicate that the Jarque-Bera test probability values are greater than 0.05 i.e. ($p > 0.05$) for all the variables of the study, implying that the data is normally distributed. The descriptive statistics gives an indication of the spread of the data collected. The Mean, the standard deviation and other test statistics indicates a good spread of the data collected.

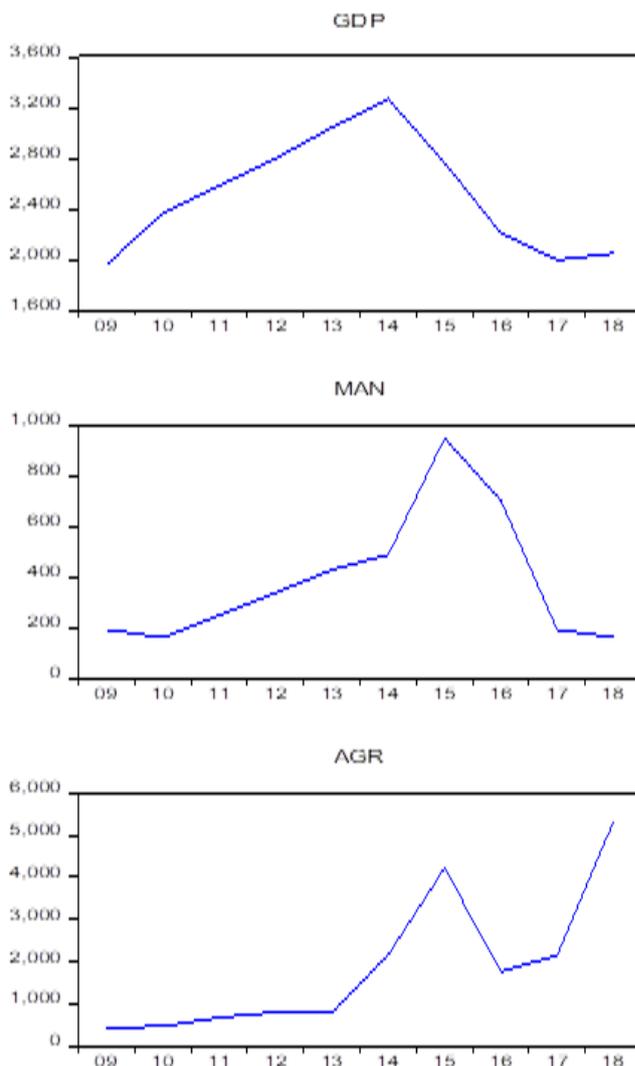


Figure 1: Trend analysis

The above graph shows trend analysis of the variables as they move from one year to the other during the study period. The graph of the Gross Domestic Product (GDP) against year shows that the GDP rose from 2009 to the highest height in 2014 considerable height and dropped steadily from the start point in 2005 and rose gradually in 2018 to its highest in 2014 before it

cascaded down to its lowest in 2018. This oscillation in the level of the GDP can be linked to the changes in factors that affect GDP such as the amount of money allocated to the various sectors as examined in this study.

Sectoral allocation to the manufacturing rose from 2009 to its highest in 2015 before it cascaded sharply to its lowest in 2017. This fluctuation in movement of the variables over time indicates the kinds of decision made by government in sectoral allocation of fund to the manufacturing subsector. Sectoral allocation to Agriculture showed high volatility probably owing to the policy and policy reversal of various governments on Agriculture.

Testing for Unit Root (ADF-Test)

The unit root test is motivated by theory; it will be one test in combination with other tests to establish the stationarity properties of the data and to satisfy the basic assumption for the test statistics adopted for this study. Testing for the order of integration is standard in applied econometric work at different levels of integration.

Table 2: Augmented Dickey-Fuller Test (ADF) at Level

Variables	ADF	5% Critical Value	Integration Order
GDP	-2.175699	-3.320969	I (0)
MAN	-2.177708	-3.320969	I (0)
AGR	-3.259808	-0.789441	I (0)

Source: E-views 9.0 Result computation, 2019.

The unit root test using Augmented Dickey Fuller test (ADF) shows that Gross Domestic Product (GDP), sectoral allocation to Manufacturing (MAN) and Agriculture (AGR) were all stationary at levels and are integrated of order [I (0)]. This implies that the null hypotheses of non-stationary for all the variables at levels is rejected.

Table 3: Regression Coefficients

Dependent Variable: GDP
 Method: Least Squares
 Date: 07/15/19 Time: 04:31
 Sample: 2009 2018
 Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN	0.900775	0.598547	1.504936	0.0161
AGR	-0.078447	0.093955	-0.834941	0.4313
C	2.303471	1.104275	2.184953	0.0001
R-squared	0.756224	Mean dependent var	2503.000	
Adjusted R-squared	0.643717	S.D. dependent var	459.8256	
S.E. of regression	449.6622	Akaike info criterion	15.29820	
Sum squared resid	1415372.	Schwarz criterion	15.38897	
Log likelihood	-73.49098	Hannan-Quinn criter.	15.19861	
F-statistic	1.205720	Durbin-Watson stat	0.973729	
Prob(F-statistic)	0.003452			

Source: E-views 9.0 Result computation, 2019

The result of the multiple regression analysis revealed that sectoral allocation to Manufacturing Sector (MAN) has a positive effect on Gross Domestic Product and the relationship is statistically. This implies that a unit increase in sectoral allocation will lead to an increase in GDP by a margin of 90.01%. Using the probability value of the estimate, we reject the null hypothesis, that mean we accept that the estimate b_1 is statistically significant. This implies that sectoral allocation to the manufacturing sector has a significant effect on economic growth proxied by the Gross Domestic Product (GDP). The findings are in line with that of Sharma and Gounder (2012) who examined the change in the bank credit provided to the private sector in six economies in the South Pacific during the period 1982-2009. The study indicates that the higher average interest rates on loans and the higher inflation rate may have negative effects on the rate of growth in credits, while the size of the deposits and assets had a positive impact on the growth of credit. The results also indicated that the strong economic growth leads to higher growth in credit dispensed to the private sector.

The expansion needed to boost economic growth is hampered by financial constraints. The financial institutions are not much willing to advance loans to the manufacturing, agriculture and mining and quarrying sectors. This limits the productivities of these sectors and thus low economic growth in general. The only way out is the government intervention to increase the volume of credit that goes to these sectors and persuade the financial institutions to comply with monetary policy objectives. As agriculture is not supported financially, means more food insecurity and hunger ahead. More food importation is expected in the future leading to depletion in foreign reserve. Also, low productivity in manufacturing and mining and quarrying means that our export base is limited instead. This makes Nigeria to be consuming nation rather than exporting nation.

On the other hand, sectoral lending to Agriculture (AGR) was found to have positive but not statistically significant ($p > 0.05$) effect on Gross Domestic Product. Using the probability value of the estimate, we accept the null hypothesis, that mean we accept that the estimate b_2 is not statistically significant. This implies that sectoral allocation to the agricultural sector has no significant effect on economic growth proxied by the Gross Domestic Product (GDP).

The study is in line with that of Bassey, Asinya and Amba (2014), who studied Bank Lending, Macro-Policy variables and the Growth of Small Scale Industries in Nigeria to which the agricultural sector belong. The paper employed time series data obtained from the Central Bank of Nigeria for the period 1992-2011 and found that commercial bank credit finance and industrial capacity utilization exerted significant positive impact on the growth of Small Scale Enterprises. This finding creates the need to pursue policies that would ensure access to short, medium and long-term bank credit finance at concessionary interest rate and less stringent conditions ensure proper funding of the agricultural sector by government.

The value of the R-squared (0.756224) indicates that about 75.62% of the total variation in the dependent variable is explained by the independent variables. Also given that the probability value of the F-statistic (0.003452) is greater than the critical value of 0.05, the study reject the null hypothesis and concluded that the variables of the independent variables is sufficient in predicting the dependent variable of the study.

Conclusion and Recommendation

The study examined the impact of bank sectoral lending on the economic growth in Nigeria. The analysis does indicate that bank lending has a tremendous positive effect on economic growth. The result indicates that sectoral allocation to the manufacturing sector has a positive and significant effect on Economic Growth proxied by the gross domestic product. Sectoral allocation to Agriculture was negatively related to Economic Growth but the relationship is not statistically significant. This inability of the agricultural sector to have a positive effect on economic growth can be linked to the myriads of issues associated with credit lending to the agricultural sector. The inability of the farmers to provide collateral for securing loan means that even when the loans have been provided for, it cannot be assessed by the farmers due to their inability to meet lending conditions.

Some farmers divert the borrowed fund meant for agricultural purposes to other uses which negatively impact on productivity and economic growth. The negative effect of fund allocated to the agricultural sector on GDP could be linked to the financial constraints made possible by high interest rates charged by financial institutions. It is recommended that sectoral allocation to the agricultural subsector be increased and the disbursement of the loan be monitored so that it can reach the intended beneficiaries. Also, the disbursed loan should be monitored so that it is utilized or the purpose for which it was meant for. Since sectoral allocation to the manufacturing sector is significant and positive, government should ensure the proper financing and monitoring of this sector so that it can continue to play a huge role in the improvement of the nation's economic growth measured by the gross domestic product.

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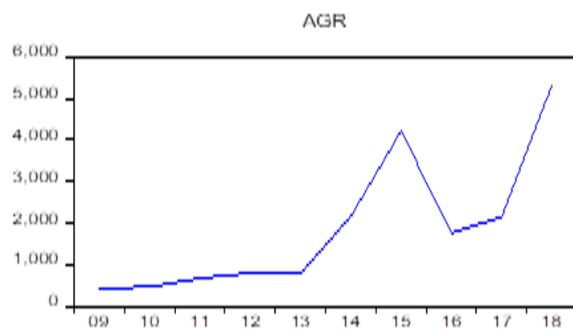
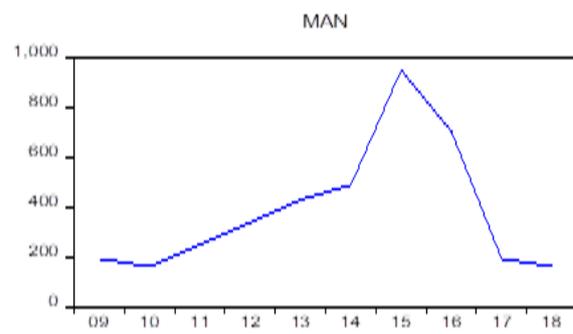
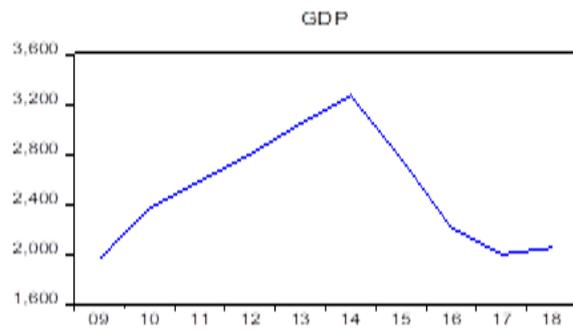
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APPENDIX

Output

Year	GDP	Man	Agric
2009	1959	191.23	445.5
2010	2365	160.89	467.5
2011	2583	248.77	680.4
2012	2798	337.22	805.80
2013	3042	428.22	788.7
2014	3268	487.11	2169.8
2015	2763	947.69	4222.4
2016	2208	701.96	1769.3
2017	1995	191.23	2153.7
2018	2049	160.89	5329.8

	GDP	MAN	AGR
Mean	2503.000	385.5210	1883.290
Median	2474.000	292.9950	1287.550
Maximum	3268.000	947.6900	5329.800
Minimum	1959.000	160.8900	445.5000
Std. Dev.	459.8256	263.6836	1679.809
Skewness	0.281989	1.089012	1.078950
Kurtosis	1.777484	3.021409	2.856267
Jarque-Bera	0.755257	1.976768	1.948831
Probability	0.685485	0.372178	0.377413
Sum	25030.00	3855.210	18832.90
Sum Sq. Dev.	1902956.	625761.1	25395828
Observations	10	10	10



Null Hypothesis: GDP has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.175699	0.0259
Test critical values: 1% level	-4.582648	
5% level	-3.320969	
10% level	-2.801384	

*MacKinnon (1996) one-sided p-values.
 Warning: Probabilities and critical values calculated for 20 observations
 and may not be accurate for a sample size of 8

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(GDP)
 Method: Least Squares
 Date: 07/15/19 Time: 04:11
 Sample (adjusted): 2011 2018
 Included observations: 8 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.494078	0.227089	-2.175699	0.0016
D(GDP(-1))	0.764431	0.259503	2.945751	0.0320
C	1255.373	601.9233	2.085604	0.0914
R-squared	0.661379	Mean dependent var	-39.50000	
Adjusted R-squared	0.525931	S.D. dependent var	338.7401	
S.E. of regression	233.2317	Akaike info criterion	14.02194	
Sum squared resid	271985.1	Schwarz criterion	14.05173	
Log likelihood	-53.08775	Hannan-Quinn criter.	13.82101	
F-statistic	4.882885	Durbin-Watson stat	1.993553	
Prob(F-statistic)	0.066724			

Null Hypothesis: MAN has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.177708	0.0224
Test critical values: 1% level	-4.582648	
5% level	-3.320969	
10% level	-2.801384	

*MacKinnon (1996) one-sided p-values.
 Warning: Probabilities and critical values calculated for 20 observations
 and may not be accurate for a sample size of 8

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(MAN)
 Method: Least Squares
 Date: 07/15/19 Time: 04:13
 Sample (adjusted): 2011 2018
 Included observations: 8 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN(-1)	-0.846214	0.388580	-2.177708	0.0013
D(MAN(-1))	0.553912	0.372339	1.487654	0.1970
C	370.5453	189.8272	1.952014	0.1084
R-squared	0.495561	Mean dependent var		6.66E-15
Adjusted R-squared	0.293786	S.D. dependent var		283.2410
S.E. of regression	238.0260	Akaike info criterion		14.06263
Sum squared resid	283281.8	Schwarz criterion		14.09242
Log likelihood	-53.25053	Hannan-Quinn criter.		13.86171
F-statistic	2.456002	Durbin-Watson stat		1.989036
Prob(F-statistic)	0.180726			

Null Hypothesis: AGR has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.259808	0.0019
Test critical values:		
1% level	-4.420595	
5% level	-0.789441	
10% level	-2.771129	

*MacKinnon (1996) one-sided p-values.
 Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 9

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(AGR)

Method: Least Squares

Date: 07/15/19 Time: 04:13

Sample (adjusted): 2010 2018

Included observations: 9 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGR(-1)	-0.364149	0.461275	-0.789441	0.4558
C	1089.049	875.9757	1.243241	0.2538
R-squared	0.081752	Mean dependent var		542.7000
Adjusted R-squared	-0.049426	S.D. dependent var		1572.609
S.E. of regression	1611.004	Akaike info criterion		17.80023
Sum squared resid	18167341	Schwarz criterion		17.84406
Log likelihood	-78.10105	Hannan-Quinn criter.		17.70565
F-statistic	0.623216	Durbin-Watson stat		1.643884
Prob(F-statistic)	0.455758			

Dependent Variable: GDP

Method: Least Squares

Date: 07/15/19 Time: 04:31

Sample: 2009 2018

Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN	0.900775	0.598547	1.504936	0.0161
AGR	-0.078447	0.093955	-0.834941	0.4313
C	2.303471	1.104275	2.184953	0.0001
R-squared	0.756224	Mean dependent var		2503.000
Adjusted R-squared	0.643717	S.D. dependent var		459.8256
S.E. of regression	449.6622	Akaike info criterion		15.29820
Sum squared resid	1415372.	Schwarz criterion		15.38897
Log likelihood	-73.49098	Hannan-Quinn criter.		15.19861
F-statistic	1.205720	Durbin-Watson stat		0.973729
Prob(F-statistic)	0.003452			