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Public Sector Credit and Economic Growth in Nigeria: An ARDL Approach

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Abstract:

This study investigates the link between public sector credit and economic growth in Nigeria using the ARDL approach. The empirical analysis is based on annual time series data from 1985 through 2016. While credit to central government is used to proxy public sector credit, economic growth is measured by real GDP. Further, inflation, credit to private sector, and interest rate covering are used as control variables. The results suggest that long run relationship exist between public sector credit and economic growth, controlling for the influence of credit to private sector, interest rate and inflation. There is therefore, need for policy makers to pursue policies that would strengthen the capacity of the banking sector and the financial market to give long-term credit to the public sector so as to promote economic growth in the long run.

Keywords: Private sector credit, economic growth, co-integration

1. Introduction

Finance (credit) is required by different individuals, organizations and governments for different purposes. For individuals, finance is needed for financing both consumption and investment, while for business organizations and industries, it needed for real productive investment such as acquisition of plants and machineries. Government also obtain bank credit mostly to meet the infrastructural developmental needs of the country to improve welfare of the citizens. Theoretically, the explicit role of financial markets in economic growth has been at the forefront of debate in the literature. According to Popkova, Shakhovskaya and Mitrakhovich(2010), economic growth can be achieved through strengthening the capacity to fast-track productivity using the available resources. To enhance the growth process of the economy is also a serious policy issue as policy makers all over the world consider growth as one of the major policy objectives. Economic growth is also the surest means of improving welfare and a gateway for economic development. To provide the needed finance for growth, there are several institutions providing financial services. These institutions are formally known as financial institutions. Broadly speaking, financial institutions operate in two distinct markets; namely, money and capital markets. Commercial banks are dominant in the money market where they provide short-term financial services. This involves channelling funds from the surplus spending to the deficit spending units of the economy, therefore, transforming bank deposits into credits. Thus, the banks convert the savings into loanable funds. These loanable funds are channel to investors who borrow to meet the financial need of their businesses. In Nigeria, the banking sector is at the core financial intermediary and credit provided by banks is the main channel for transforming savings into investment.

Banks provide credit to both the private sector and the public sector. The extent to which a bank provides credit for productive activities reflects on the nation's economic growth and sustainability. For the purpose of this study, credit is viewed as a channel through which the banking sector provides financial resources for investment and other productive activities of the economy. Thus, domestic credit plays a prominent role in economic growth in Nigeria and other developing countries. However, the effectiveness of this role largely depends on the extent of financial sector development and the savings culture of the people. The provision of credit for productive uses is therefore considered as a necessary condition for economic growth (Uremadu, 2006).

Public sector borrowing plays a critical role in creating productive capacity and influence growth in the economy. Therefore, given that in Nigeria, banks are the largest financial intermediaries and bank credit is the main channel for transforming savings into investments and which serve as source of public sector credit in Nigeria, the need to evaluate the impact of public sector credit is critical for enhancing sustainable growth in Nigeria. However, the relationship between public sector credit and economic growth has received little consideration in the Nigerian context. In the light of this, this study, therefore, seeks to determine the effects of public sector credit on the Nigeria economy and to suggest ways of strengthening the capacity of the banking sector to provide credit to the public sector in order to achieve higher economic growth.

The structure of the remaining part of this study is as follows: The next section reviews both the theoretical literature and previous empirical studies. Section 3 describes the data and empirical strategy. Section 4 presents the empirical analysis and the study is concluded in section 5.

2. Literature Review

2.1. Theoretical and Empirical Literature

Schumpeter (1971) argues that banks play significant roles in the economy by providing the needed financial resources for technological innovation through their intermediary roles. Samolyk (1992) use state level data from 1983 to 1990 to examine empirically the link between the banking sector credit and economic growth. Providing the empirical support for credit view, the results indicate that real growth rate of loan loss reserves, non-performing loan share and the per capita volume of failed business liabilities all are negatively related to economic growth. In contrary, return on assets and real growth rate of domestic loans both show positive relationship with economic growth. According to credit view, banks are important because they produce information when finding specialized investments.

Kumhof and Tanner (2005) assert that due to weak legal and institutional infrastructures, banks in developing countries consider holding assets in the form of government debts safer than supplying credit to private sector. This is in contrast with what prevails in developed countries where banks seem give more attention to private sector credit. They show that this behaviour of banks facilitates financial intermediating process if there is a stable debt management. According to them, inadequate development of laws and weak institutions as well as rigidity in collateral requirement explain why some important sectors of the economy cannot access bank credit. They provide evidence that quality of legal and institutional infrastructure both have negative relationship with the amount of government debt held in banks' balance sheets. Besides, the authors believe that because government bond markets is usually the first step for most fixed income securities markets, existence of a government debt market, together with more stable macroeconomic conditions and sufficient volume of debt, supports the private sector bond market as it facilitates the provision of the basic financial infrastructure including laws, institutions, products, services, repo and derivatives market and plays a role as an informational benchmark.

Hauner (2008) conducts a country-level cross-sectional study that seeks to determine whether credit to government can explain financial deepening, profitability and efficiency in banking sector for 142 advanced and developing countries. The study shows that the credit to government sector tends to be higher in developing countries with lower income per capita growth and higher external debt. The study reports that credit to private sector relates negatively to economic growth in low income countries and there is a close association between credit to government and credit to private sector. The study also provides evidence that proportion of credit to the government in total bank credit affects bank deepening negatively in developing countries while no effect is established for developed countries. In terms of profitability, the results show that in developing countries profitability increases with credit to government, but no effect is reported for advanced countries. Finally, there is some evidence that credit to government decreases the level of bank efficiency in developing countries while the reverse is the case for advanced countries.

Josephine (2010) investigates the relationship between deposit money bank credit and economic growth in Nigeria from 1992 to 2008. Domestic credit is used as a proxy for bank credit while economic growth is measured by gross domestic product. The results show no significant growth effect of bank credit in Nigeria. According to the author, this finding reflects the unwillingness of the Nigeria deposit money banks to extend credit to the productive private sector, especially the agricultural sector because of their preference for the short-term money sector. The study, therefore, recommends that deposit money banks should be encouraged to extend both short term and long-term credit to the productive sectors of the economy.

Misati and Nyamongo (2011) considers the importance of bank credit in stimulating the real sector output and the factors that explain the intermediary roles of banks in Nigeria. Real GDP and real private sector credit growth are used. The study finds evidence of a reserved causation between the two variables and thus, recommend that the government should ensure that the financial sector is properly integrated for effective mobilization of financial resources for the real sector development.

The study by Egbetunde (2012) seeks to determine whether the rural sector has a cointegrating relationship with economic growth in Nigeria over a period from 1982 to 2009. Economic growth is proxied by the gross domestic product while the explanatory variables are commercial bank loan to rural areas and rural deposits with commercial banks. The result suggests that there is a cointegrating relationship between rural commercial bank credit indicators and economic growth in Nigeria. The study, therefore, recommends amongst others that monetary authorities should ensure that financial resources mobilized in the rural sector are used to boost economic activities of that sector.

Alex (2012) examines the role of commercial banks in capital formation and how it affects economic growth in Nigeria from 1980 to 2009. The dependent variable is gross domestic product while the explanatory variables are commercial banks deposit liabilities, maximum lending rate, commercial banks credit, investment by banks and gross fixed capital formation. The results show evidence of a positive effect of commercial bank credit on gross fixed capital formation. According to the author, effective management of bank lending will most likely increase investment activities which will in turn boost capital formation needed for real sector investment and industrial growth.

Akano and Kazeem (2014) consider the growth effect of total bank credit in Nigeria using ordinary least square technique and cointegration test. They find that controlling for the influence of inflation, total bank credit exerts a positive and significant influence on economic growth.

The study by Nwaeze, Michael and Nwabekee (2014) seeks to determine the extent to which financial intermediation influences economic growth in Nigeria during period between 1992 and 2011 using the Ordinary Least Squares (OLS) regression approach. They find among other things that total bank deposit and total bank credit both exert a positive and significant influence on economic growth in Nigeria.

Nnamdi (2015) examines the relative effects of banking sector credit to private and public sectors on the Nigeria's economy for the period between 1981 and 2011 using both co integrating and causality regressions. He finds that both credit to private sector and credit to public sector have a co integrating relationship with economic growth in Nigeria. The results also show that a feedback causality exists between credit to private sector and credit government sector, and a unidirectional causal direction exists from GDP to credits to both sectors of the economy.

Recently, Odufuye (2017) considers the credit-growth relationship in Nigeria for the period of 24 years from 1992 to 2015 using the OLS technique. While economic growth is measured by the gross domestic product, the explanatory variables are credit to small and medium scale enterprises, credit to private sector, money supply and interest rate. The results show that the explanatory variables individually have no significant relationship with economic growth but can jointly explain some of the variations in economic growth.

3. Methodology

3.1. Data

In this study, we use annual time series data for inflation, real GDP, credit to private sector, credit to central government and interest rate covering from 1985 to 2016. Thus, the sample of 32 observations. All the data are sourced from the CBN statistical database and are analysed in E Views. The data are all transformed into logarithms to minimize the effects of possible outliers. The graphical plot of the raw data is shown in figure 1. A cursory look at this figure reveals while inflation and interest rate data appear to be generated by a stationary process, the rest of the variables seems to be generated by a random walk process. This therefore, provides motivation for testing for stationarity to formally determine the order of integration for these variables.

3.2. Methods

This study adopts the ARDL methodology to investigate the relationship between public sector credit and economic performance. As it is well known, the ARDL model is an extension of the static OLS model which incorporates both lags of the dependent and explanatory for estimating the dynamic relationship being investigated. This possibly checks for any specification problems caused by omitting important explanatory variables. ARDL methods also provides a framework for testing for cointegration even when the variables have different orders of integration.

3.3. Model Specification

The functional relationship between public sector credit and economic performance is expressed as follows:

$$RGDP = f(CGS, CPS, \text{interest rate}, \text{Inflation})$$

The simple ARDL model for the dynamic relationship is specified as follows:

$$LRGDP = \beta_0 + \beta_1 LRGDP_{t-1} + \beta_2 LCGS_t + \beta_3 LCPS_t + \beta_4 LINT_t + \beta_5 LINF_t + \epsilon_t$$

where $\epsilon_t \sim \text{Niid}(0, \sigma^2)$, $LRGDP$ = Log of real GDP, $LCGS$ = Log of credit to central government, $LCPS$ = Log of credit to private sector, $LINT$ = log of interest rate and $LINF$ = Log of inflation rate. β_0 =regression constant, β_1 = autoregressive coefficient, $\beta_2, \beta_3, \beta_4$ and β_5 are the regression slopes for the explanatory variables.

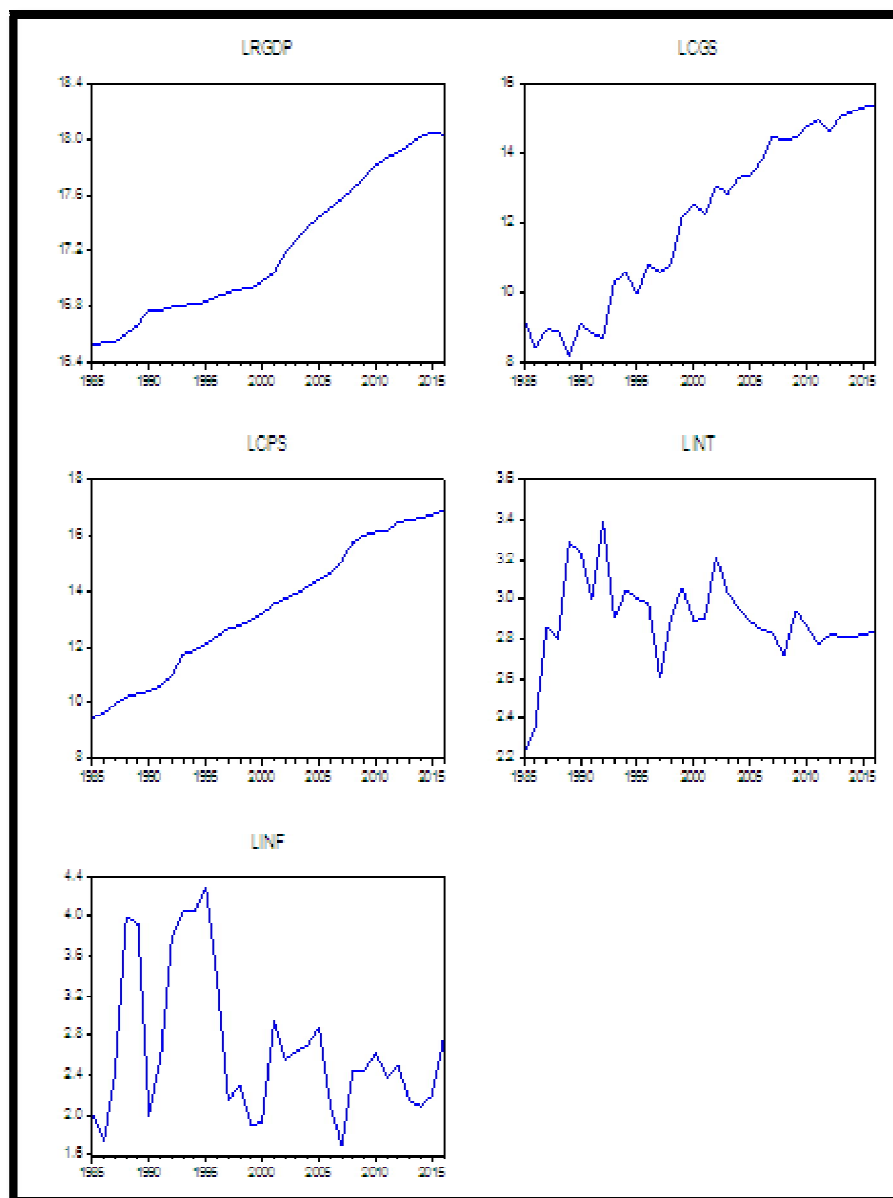


Figure 1: Data Plot for the Variables

4. Data Analysis and Discussion

4.1. Stationarity Test

To determine the order of integration for each of the data series, we perform the popular ADF unit root test. The test is performed on both the level data and the first differenced data. The optimum lag order for the ADF test is determined by the Schwarz information criterion (SIC). The test results are presented in table 1. Panel A reports the test results of the test on the level data while panel B reports the test results of the test on the first differenced data.

From panel A, the associated probability of the ADF statistic is above all usual significance levels for LRGDP, LCPS and LCGS, indicating that the test is insignificant for those variables. This leads us not to reject the null hypothesis of unit root for real GDP, credit to private sector and credit to government sector. On the contrary, however, the ADF statistic is significant at 1% and 10% levels for LINT and LINFL, and thus, rejecting the null hypothesis of unit root for both variables. Thus, while LRGDP, LCPS and LCGS are all nonstationary at level data, LINT and LINFL both are stationary. LINFL is stationary only at 10% significance level

From panel B, the results indicate that all the variables are stationary but at different levels of significance. The ADF statistic rejects the unit root null hypothesis at 1% level of significance for LCPS, LCGS, LINT and LINFL, but at 10% level of significance for LRGDP respectively. Therefore, while interest rate and inflation which are both $I(0)$ series, other variables are $I(1)$ series. This is consistent with the data plots in figure 1 and motivates the use of bound cointegration test for testing the long-run relationship between inflation and the included macroeconomic variables. We therefore, proceed to estimate an ARDL model to capture the dynamic relationship between the study variables.

4.2. ARDL Model Estimation

4.2.1. Lag order Determination and Model Selection

To determine the optimum lag length for our ARDL model estimation, we estimate an ARDL model incorporating 4 explanatory variables (LCGS, LCPS, LINT and LINF) and an intercept, using the Schwarz information criteria to select the best model for economic performance, with a maximum of 2 lags allowed for both dependent variable and dynamic regressors. The best 20 models after evaluating a total of 162 models are shown in figure 2. From the figure, the model with the lowest information value is an ARDL (1, 2, 2,1,0) model. Thus, a model that includes 1 lags of the dependent variable, 2 lags of LCGS, 2 lags of CPS and 1 lag of interest rate as additional regressors is appropriate for the relationship between public sector credit and economic performance.

Variable	ADF Statistic	p-Value	Decision
Panel A			
LRGDP @ Level	-0.321520	0.9102	Nonstationary
LCPS @ Level	-0.842656	0.7926	Nonstationary
LCGS @ Level	-0.291479	0.9146	Nonstationary
LINT @ Level	-4.287277	0.0021	Stationary
LINFL @ Level	-2.857148	0.0621	Stationary
Panel B			
LRGDP @ First difference	-2.802640	0.0699	Stationary
LCPS @ First difference	-4.368591	0.0017	Stationary
LCGS @ First difference	-6.568743	0.0000	Stationary
LINT @ First difference	-4.147663	0.0034	Stationary
LINFL @ First difference	-4.920238	0.0004	Stationary

Table 1: ADF Test of Stationarity for the Study Variables

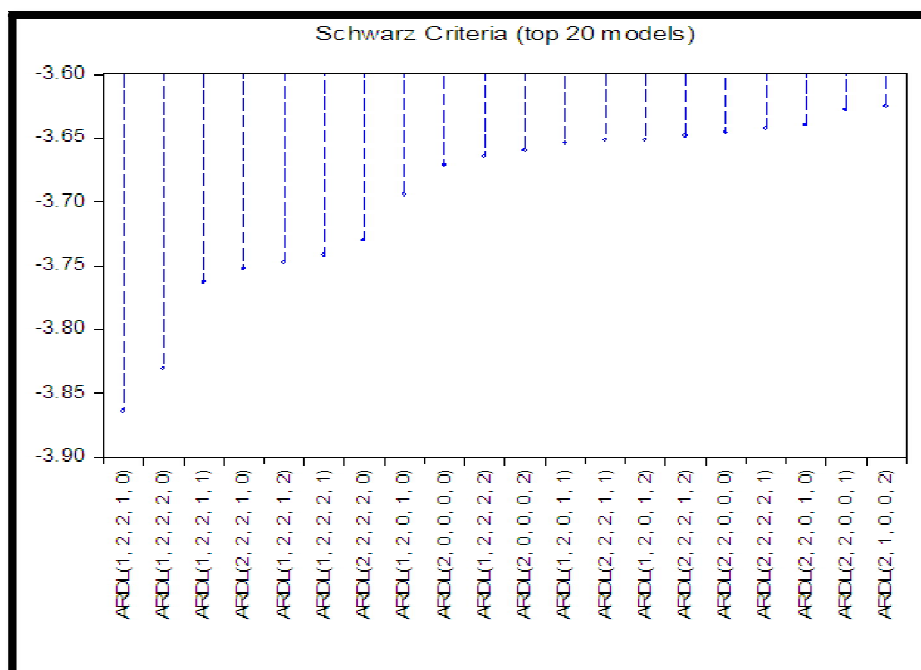


Figure 2: Top 20 Models for Price Stabilization

4.2.2. Public Sector Credit and Economic Performance

Table 2 shows the estimation results for the preferred ARDL model for our data using the Newey-West HAC robust standard errors that correct for the problems of autocorrelation and heteroskedasticity. As this table shows, the coefficients on LRGDP (-1), LCGS (-2), LCPS, LCPS (-1), LCPS (-2) and LINT (-1) are all significant while the rest are insignificant. LCPS is significant at 10% level (p = 0.0675). Among the variables that show significance, LRGDP (-1), LCGS (-2), LCPS(-1) and LINT(-1) all have positive coefficients while LCPS and LCPS (-2) both have negative coefficients. This implies that, holding other factors constant, credit to central government (public sector credit) at lag 2 has a positive and significant relationship with real GDP. In terms of the overall model performance, the adjusted R-square and the F-Statistic show that 99% of the total variation in real GDP is accounted for by the collective influence of included regressors. Thus, the estimated model has almost a perfect fit.

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LRGDP(-1)	0.932761	0.043525	21.43034	0.0000
LCGS	-0.000898	0.012677	-0.070831	0.9443
LCGS(-1)	0.005727	0.011570	0.495005	0.6263
LCGS(-2)	0.055703	0.012206	4.563584	0.0002
LCPS	-0.071042	0.036644	-1.938704	0.0675
LCPS(-1)	0.131491	0.050448	2.606484	0.0173
LCPS(-2)	-0.104647	0.034835	-3.004057	0.0073
LINT	0.008932	0.037105	0.240736	0.8123
LINT(-1)	0.116469	0.029795	3.908972	0.0009
LINF	-0.013000	0.008666	-1.500193	0.1500
C	0.744078	0.636663	1.168714	0.2570
R-squared	0.998528	Durbin Watson stat.		2.088333
Adjusted R-squared	0.997753	F-statistic (p-value) 1288.647 (0.0000)		

Table 2: Estimation results for ARDL model

4.2.3. Test of Cointegration

Table 3 shows the Bound cointegration test which tests for the existence of a long run relationship between LRGDP and the included regressors in the preferred ARDL model. The test is motivated by the results found previously that our variables have different orders of integration. As the test results in table 3 indicate, the value of F-statistic (6.981479) is considerably higher than all the usual significance levels for both I(0) and I(1) series, indicating that the test is highly significant. We, therefore, reject the no cointegration null hypothesis and conclude that a long-run relationship exists among the variables in the preferred ARDL model.

Bound Test		Value	
F-statistic		6.981479	
		Critical value bounds	
Significance		I(0) bound	I(1) bound
10%		2.45	3.52
5%		2.86	4.01
2.5%		3.25	4.49
1%		3.74	5.06

Table 3: ARDL Bound Test for Co- integration Results

5. Summary and Conclusions

In this study, we investigate the relationship between public sector credit and economic performance using the ARDL methodology. The data consist of 32 annual time series observations for real GDP, credit to central government, and credit to private sector, interest rate and inflation from 1985 to 2016. The empirical results lead to the following conclusions.

Controlling for the influence of inflation, credit to private sector and interest rate, public sector credit at lag 2, as measured by credit to central government, has a positive and significant relationship with economic performance in Nigeria. There is strong evidence of a long run relationship between real GDP and credit to central government, credit to private sector, interest rate and inflation.

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