Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: 10.53935/26415305.v5i1.229

Impact of Treasury Bill on Private Sector Credit in Nigeria

♣***Ofonime Moses Akpan***: *Department of Economics, School of Arts and Social Sciences, Akwa Ibom State College of Education Afaha Nsit, Akwa Ibom State, Nigeria.*

Ubong Edem Effiong: *Department of Economics, University of Uyo, Uyo, Akwa Ibom State, Nigeria.*

Idongesit Justin Ukere: *Department of Business Administration and Management, Akwa Ibom State Polytechnic, Ikot Osurua, Ikot Ekpene, Nigeria.*

ABSTRACT: *In this study, the effect of treasury bills on private sector credit in Nigeria using annual data from 1981 to 2018 was examined. The specific objectives of the study were to examine the impact of treasury bills and treasury bill rate on private credit. Treasury bills was disaggregated into its various components and used as explanatory variables along with other essential macroeconomic variables. The study was conducted in the light of the crowding out effect hypothesis. The behavior of variables was captured in an autoregressive distributed lag (ARDL) model. The result of the estimated model shows that treasury bills held by commercial banks, treasury bills held by the public and treasury bill rate has significant negative effect on credit to private sector, showing that treasury bills have a crowding out effect on private sector credit. It is recommended that treasury bill rate should be set to align with other rate of return on short term financial asset in the financial system to allow for fair competition between public sector and private sector debt instrument and thus limit the crowding out effect and that the issuing of treasury bills should be justified with the existence of excess liquidity in the financial system.*

Key words: *Treasury bill, Treasury bill rate, Private sector credit, Domestic debt, Commercial banks, Crowding out effect.*

1. Introduction

Among the various ways of financing government budget deficit, issuing treasury bills has been a very popular option in the Nigerian fiscal policy space. From the early 1980's till date, treasury bills are the only regular component of domestic debt in Nigeria. As at 2003 the discount rate on Treasury Bills was 15.02% and in 2012, Treasury Bills alone made up about 34% of total government debt instruments in Nigeria (Central Bank of Nigeria, 2013). This has made treasury bills an attractive financial investment to individuals and financial institutions.

While investing in treasury bills has over the years offered attractive returns to economic agents, there is a trend that could inhibit the policy efforts of the monetary authority in enhancing financial intermediation. Deposit money banks and the banking public have held higher proportions of treasury bills over the years. For example, in 2012 about 67% of total treasury bills issued were held by Deposit Money Banks while the public held about 30%. In 2013 it was 51% and 47% respectively. In previous and subsequent years, the trend has been similar (Central Bank of Nigeria, 2018). This indicates that much funds from the commercial banks and the banking public were invested in treasury bills. However, the pattern of treasury bills holdings could also have some limiting impact on financial intermediation and hence private sector credit.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Generally, treasury bills feature prominently in the portfolio of deposit money banks because deposit money banks are very conscious of the usual adverse effect of economic volatility on their operations and hence the need to manage a strong portfolio. Holding treasury bills likely help banks to maintain a strong portfolio because they are very short-term debt instruments which are almost similar to holding cash while receiving a reasonable return (Takele, 2013). The high return and high risk that characterize conventional lending compared to the high return and low risk nature of treasury bills have made these assets to become competitive in the asset portfolio of deposit money banks (DMB). Although the risk premium on lending has been one of the reasons why lending rate has stayed above treasury bills rate in Nigeria, the need to bridge the increasing fiscal deficit gap has induced the government to increase the supply of Treasury bills in the market and also fix attractive rates. This has reduced the spread between lending rate and treasury bills rate and thus intensified the competition between the two assets (Obert, 2012).

It is notable that some of the perennial policy challenges facing the banking sector in Nigeria, and indeed most developing countries, are the efficiency and effectiveness with which surplus funds are intermediated between surplus units and deficit units and how to improve it. These issues have been at the heart of various financial sector reforms in Nigeria. Most of the reforms focused on the liberalization of the financial system to ensure that the sector is proactively positioned to perform the role of intermediation and play a catalytic role in economic development (Ogege & Shiro, 2012).

In the heart of financial intermediation policies is also the need to enhance the availability of credit to the private sector to boost private sector investment. This has been the main focus of financial intermediation policies in Nigeria. Commercial banks have a key role to play in making credit available to the private sector because they are the most dominant player in the Nigerian financial system. In the year 2012 alone, deposit money banks held 68 percent of the total deposits of the financial sector (Central Bank of Nigeria, 2013). The possible undesirable effect of a rise in the accumulation of Treasury Bills by Deposit Money Banks in Nigeria is that it might lead to a change in the structure of financial intermediation in favor the public sector at the expense of the private sector.

According to Sanusi (2012) a well-functioning banking system should allow banks to efficiently diversify risk while maintaining their ability to enhance the flow of liquidity into the domestic economy. It is therefore imperative that while seeking lower risk investments opportunities, commercial banks do not relegate to the background their fundamental role of making financial resources available to the private sector. This is because the inability of the private sector to access adequate finance will stall investment and output growth thereby hindering the attainment of macroeconomic stability and sustainable growth

It has been argued both theoretically and empirically that government excessive reliance on domestic borrowing as shown in the increasing accumulation of government debt instruments by commercial banks to finance government budget deficit could crowd out the private sector from the credit market (Emran & Farazi, 2009; Fayed, 2013; Gaber, 2010; Kirchner & Wijnbergen, 2012; Onyeiwu, 2012). Thus, it is expected that new issues of government debt instruments with attractive returns are likely to be taken up by banks and may serve as substitute for loans and therefore reduce the supply of bank credit to the private sector.

In Nigeria, the holdings of treasury bills are divided mainly among the public, commercial banks and the central bank. These different holdings might have varying impact on the financial system and financial intermediation. Therefore, the broad objective of this study is to examine the impact of treasury bills on private sector credit in Nigeria while the specific objectives are; to examine the impact of treasury bills (held by the public, commercial banks and the central bank) on private credit and the impact of treasury bill rate on private credit. The rest of the paper is organized as follows; section two is the literature review, section three shows the methodology of the study, section four shows the result of the findings and discussion while section five contains the summary, conclusions and recommendations.

2. Literature Review

2.1. Conceptual Literature

According to Rufino (2008) Treasury Bills are short term instruments issued by the government under varying tenor to finance its operations. They are “short-term government debt instruments” that can be redeemed at par after being offered at a discount and maturing in a year or less. In other words, Treasury Bills are debt securities issued by the government to finance its deficit budget. It could also be used for liquidity management through open market operations. In Nigeria, government through the Central Bank of Nigeria,

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

issues Treasury Bills to provide short-term funding for government budget deficit. Treasury bills are usually issued through a competitive bidding process, quoted and traded on the Financial Market Dealer's Quotation (FMDQ) platform. These bills are by nature, the most liquid and marketable money market instrument due to its ease of access, affordability and government guarantee (Central Bank of Nigeria, 2008). It was first issued in Nigeria following the Treasury Bill Act of 1959. The tremendous achievement made in the process gave a boost that led to the continuous issuance of monetary debt instrument of this nature (Anyanfo, 1996). Private sector credit refers to "financial resources channelled to the private sector, such as through loans, purchases of non-equity securities, trade credits and other accounts receivables, which establish a claim for repayment" (Olowofeso, Adeleke, & Udoji, 2015).

2.2. Theoretical Framework and Literature Review

The theoretical framework for this study is anchored on three theories; the crowding out effect, risk diversification hypothesis and the lazy bank model.

The crowding out effect is a theory used to explain a situation where government spending through deficit financing reduces private sector activities in the economy. It could refer to reduction in private sector credit, reduction in private investment spending or a reduction in aggregate economic output due to increase in government deficit financing. Its theoretical underpinning is that the issuance of government securities in the financial market attracts funds away from private lending, reducing the amount of credit available for private sector development, leading to a rise in interest rate and consequently a reduction in private investment spending and aggregate output.

When government deficit financing crowds out equals amount of private investment, the crowding out effect is said to be complete, but when reduction in private investment due to government deficit financing is less than the amount of government deficit financing, the crowding out effect is said to be partial (Jhingan, 2008). With respect to the objectives of this study, crowding out effect is examined in terms of the effect of government treasury bills on the domestic financial market on credit to the private sector. Given the understanding of the idea of crowding out effect, a treasury bill is expected to have a negative effect on private credit.

The two-opposing argument about the crowding out effect is found in the two mainstream economic theories namely; the neoclassical and Keynesian theories. Within the context of neoclassical economic theory, the economy is seen to be self-correcting and self-regulating that always guarantee full employment equilibrium. As a policy tool, neoclassical economics, therefore, advocates for the reliance on the price system for efficient allocation of resources among members of the society and very limited government intervention in economic activities. It is believed that prices (wages, interest rate and commodity prices) are flexible (moves upwards and downwards), guaranteeing that the economy will adjust itself to full employment equilibrium when there is a distortion.

Given the above assumptions about the workings of the macro economy, particularly limited government involvement in the economy, neoclassical economics is of the view that increases in government spending through deficit financing will dampen private investment. The transmission mechanism is that a rise in government spending through deficit financing reduces the supply of funds to the private sector within the banking system, leading to an increase in the price of money (interest rate) and eventually a reduction in private investment and economic growth. Such reduction will *completely wipe off* or *crowds out* the effect of increase government spending in the economy. Crowding-out effect is, therefore, the fall in private investment that is associated with an increase in debt financed public expenditure (Udaba, 2002). The crowding-out effect is thus an argument put forward to defend the position of neoclassical economics about efficiency of the price system in allocating resources.

Keynesian macroeconomics makes different set of assumptions about the workings of the economy that is in contrast with the neoclassical economics. It is assumed that the economy is not always at full employment and that prices are not flexible downwards. It is also believed that deficiency in aggregate demand cause the economy to be at less than full employment. Keynesian economics recommends that increase government expenditure through deficit financing should be used to correct the deficiency in aggregate demand rather than rely on the price system to correct such deficiency because prices are not flexible as put forward by the neoclassical recommendations.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

In the face of neoclassical economist arguments, Keynesian economics respond that when the economy is below full employment level of income, investment will be less interest rate elastic, thus an increase in interest rate that is as a result of expansionary fiscal policy (an increase in government spending), would be minimal, and therefore investment level in the economy would expand. This means that Keynesian economics acknowledge that a rise in government spending through deficit financing would lead to a rise in interest rate, but the reducing effect of such increase in interest rate on investment would be minimal leading to overall increase in aggregate output (Sen & Kaya, 2014).

With respect to the objectives of this study, the crowding out effect hypothesis from the perspective of neoclassical economics suggests that treasury bills should have a negative effect on private sector credit. Regardless of the two opposing arguments, the question of whether treasury bills which is a popular government debt instrument in Nigeria has a dampening effect on private credit or not is an empirical question which this research seek to answer.

The Lazy Bank Model of Manove, Padilla, and Pagano (2001) provide a view about banks portfolio diversification between private and public sector lending which seems to complement the neoclassical view of the crowding out effect. The lazy Bank theory states that access to safe government assets discourage the banks from lending to risky private sector or repress their incentives to seek out new profitable lending opportunities in the private sector. This means that when banks start accumulating riskless government securities, the problem of moral hazard increases, distorting their incentives and inducing them to limit their preference to private sector lending. With this view, it means that that a Naira lent to the government means a Naira less to the private economy. The theory complements the neoclassical view of the crowding out effect by attributing the risk-averse behavior of banks in the face of riskless government security and riskier private sector lending as the major factor that dampened credit to the private sector.

Risk Diversification Hypothesis centres on the role of government debt in financial intermediation they seem to complement the Keynesian view of the crowding out effect but with a different line of argument. In the theory, it is argued that government borrowing which leads to the supply of less risky debt securities might induce deposit money banks to undertake relatively riskier private lending because higher investment in risk-free government securities leaves them with extra room to undertake riskier private sector ventures. Like other corporate firms, each bank has their criteria and policy about the level and nature of risk they are willing to take.

Given the theoretical arguments of the risk diversification hypothesis, banks holding of higher proportion of government securities which are less risky financial assets would create incentives or allowance for banks to take on extra risk in their private sector lending activities. The theory therefore holds that that when the banks increase their lending to the government, there may not be any significant reduction of credit to the private sector. This view suggests that when banks have excess liquidity, the relationship between riskless government assets (treasury bills) and lending to the private sector would be complementary, thus, higher access to Treasury Bills would allow banks to take more risk and thus increase their lending to the private sector. This suggests a positive relationship between treasury bills and private sector credit.

2.3. Empirical Review

Treasury bill is a component of domestic debt in any economy. In economies where treasury bills are not issue other debt instruments may be issued of which commercial banks and the public subscribe to with a possible adverse effect on private sector credit. Studies presented in this section also includes studies where public sector variables such as public debt, fiscal deficit and government expenditure are used as explanatory variables. Theses variables are often used in the study the crowding out effect hypotheses.

Majumder (2007) investigated the effect of public borrowing on private investment in Bangladesh. Explanatory variables used in modeling the relationship were; public borrowing, Gross Domestic Product (GDP) and interest rate. He employed cointegration test and error correction model estimation to analyze data. The main finding of the study shows the domestic debt had no negative effect on private investment. This indicates that in fiscal management, government of Bangladesh can rely on domestic sources in financing expenditure deficit without hurting private investment as long as excess liquidity prevails in the financial system.

Başar and Temurlenk (2007) studied the effect of government spending on private investment in Turkey using a Vector Autoregressive (VAR) Model and included contemporary parameters. The focus of their study

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

was to study the effect of government economic policy on the private sector. The result of the VAR model estimation shows that government spending has a negative effect on real private investment. Although their result statistically confirms a negative effect, the coefficient of the estimated relationship shows that the effect is relatively small. Consequently, they concluded that limiting government spending to increase private investment is not necessarily the best policy.

Onyeiwu (2012) studied the effect of domestic debt on Nigeria's economic growth using quarterly data from 1994 to 2008. Adopting ordinary least squares (OLS) method, and a parsimonious error correction model, the result revealed that on the average, domestic debt issued by the government, for period considered extend beyond the standard 35% debt-bank deposit. The finding shows that the level of domestic debt in Nigeria had a significant negative effect on economic growth, providing evidence that domestic debt crowds out private investment.

Asogwa and Chetachukwu (2013) studied the effect of government budget deficit on private investment and economic growth. Applying ordinary least squares regression and granger causality test in their analysis, they confirmed that budget deficits crowds out private investments and that there is bidirectional causality between private investments and budget deficit. Consequently, they recommend financing of government deficit through money creation, drawing from the argument of McConnell, Brue, and Flynn (2003) that the expansionary effect of fiscal policy is greater when the budget deficit is financed through money creation rather than through borrowing.

Mbate (2013) also studied how private sector and economic growth is affected by the level domestic debt using panel data of 21 Sub-Saharan African countries for a period covering 1985 to 2010. He employed generalized method of moment (GMM) technique to analyze data and the result shows the presence of non-linear bond concerning internal borrowing and economic growth. The finding also shows that domestic debt crowds out private sector credit by 0.3 percent, reducing capital accumulation and private sector growth. He recommends reduction in domestic indebtedness to enhance availability of credit.

Shetta and Kamaly (2014) studied the effect of budget deficit on private sector credit from the banking sector in Egypt. Variables were modeled in a vector autoregressive process. The result shows that budget deficit has a negative effect on private sector credit. They explained in the study that as government issues more debt instrument to finance budget deficit, most banks shift their portfolio away from risky private loans to hold government debt and thus limits private investment and output growth.

Hailu (2015) studied the crowding out effect of government expenditure on private investment in Ethiopia within the period of 1980-2012. He adopted a modified flexible accelerator model and multiple regression and cointegration to analyze data. The result showed that capital expenditure crowded-in private investment while recurrent expenditure crowded-out private expenditure. He recommended increase in the component of government expenditure that encouraged private investment.

Zaheer, Khaliq, and Rafiq (2017) studied the effect of government borrowing on the credit to private sector in Pakistan, using monthly data from 1998 to 2015. They used volume of government borrowing along with other explanatory variables. Their result showed that government borrowing has a significant effect on private sector credit. Although the effect appears small as shown by the coefficient of the estimated relationship, it was statistically significant and hence shows strong evidence of the negative effect of government borrowing on the private sector credit.

Omitogun (2018) studied the effect of government expenditure on private investment in Nigeria using annual data from 1981-2015. Government expenditure was disaggregated into capital and recurrent expenditure. Econometric estimation of Auto Regressive Distributed Lag (ARDL) model was used for the analysis. The result shows that in general, the effect of government expenditure on private investment depends on the components of the expenditure. Evidence of crowding in and crowding out was found in the study. This implies that not all government expenditure is channeled in such a way that it attracts private investment in the economy. He recommended that policy should take into consideration the existence of private investors in expenditure plans.

Akpansung (2018) studied the relationship among domestic debt on private credit, lending rate and output in Nigeria from 1981 to 2016. He used Vector Auto Regression (VAR) to model the behavior of variables. The model allows for the analysis of the dynamic interactions among variables as well as the impacts of domestic debt on the variables of interest. The results show that government domestic debt has statistically

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

insignificant positive impacts on both private sector credit and prime lending rate, but a statistically significant negative impact on real output in Nigeria for the period under consideration.

In what seems to be a deviation from approach of most empirical literature reviewed so far, Krishnamurthy and Vissing-Jorgensen (2015) studied the impact of treasury supply on financial sector lending and stability using data of the US economy from 1874 to 2014. The study was conducted in the light of the crowding out effect hypothesis. In their study, they present a theory that the key driver of short-term debt issued by the financial sector is the portfolio demand for safe and liquid assets from the non-financial sector. Their findings showed that government debt which is mainly treasury bills crowded out financial sector lending financed by short term debt. Similarly, Yossef (2016) studied the impact of issuing treasury bills on private investment in Egypt in the light of the crowding out hypothesis. Using cointegration test and error correction model to study the long run and short run impact respectively, he found that treasury bills crowded out private investment in the short run.

2.4. Summary of Literature

Most empirical literature reviewed focused on the effect of domestic debt, budget deficit or government spending on private sector credit or investment. These explanatory variables are often used in studies that seek to investigate the crowding out effect hypotheses. In the review, most studies that used domestic debt as explanatory variables are not instrument specific. The studies of Krishnamurthy and Vissing-Jorgensen (2015) and Yossef (2016) that specifically uses treasury bills as explanatory variables were about USA and Egypt respectively. Thus, studies that are instrument specific that are about the Nigerian economy was not found, indicating that there is paucity of literature on this subject about Nigeria.

As stated in the previous section, treasury bills are the only regular component of domestic debt in Nigeria from the early 1980's till date, indicating that using treasury bills as explanatory variable is probably the most appropriate variable that could be used to measure the effect of public sector borrowing on private sector lending in Nigeria. This study will therefore be a significant addition to literature.

3. Methodology

3.1. Basic Study Design

This study adopted, expo facto design to examine the relationship between the dependent variable and the explanatory variables using secondary data.

3.2. Model Specification

The model of this study is derived from the theoretical underpinning of the crowding out effect where government deficit financing through the issuance of debt instruments such as treasury bills is said to have a negative effect on private sector credit. Thus, credit to private sector is expressed as a function of domestic debt as follows:

$$RCPS = F(RDD) \quad (1)$$

Where:

RCPS= credit to private sector in real values.

RDD= domestic debt in real values.

If treasury bill is assumed to be the only component of domestic debt issued at a particular rate of return, Equation 1 could be expressed as

$$RCPS = F(RTB, TBR) \quad (2)$$

Where:

RCPS = credit to private sector in real values.

RTB = Treasury bills in real values.

TBR= Treasury bills rate.

The holding of Treasury bills in Nigeria is divided among commercial banks, the non-bank public and the central bank, hence Equation 2 can be written as follows;

$$RCPS = F(RTBPU, RTBCB, RTBCBN, TBR) \quad (3)$$

Where:

RTBPU= Treasury bills held by non-bank public in real values.

RTBCB= Treasury bills held by commercial banks in real values.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

RTBCBN= Treasury bills held by the central bank of Nigeria in real values.
TBR= Treasury bill rate.

Since the study is done within a macroeconomic setting, other variables known to have effect on private sector credit within macroeconomic framework where the crowding out effect is usually analyzed such as lending interest rate (LIR), money supply (RMS) and government expenditure (RGEX) are included in the model. Thus, the working model for this study is specified as follows;

RCPS= F (RTBPU, RTBCB, RTBCBN, TBR, LIR, RMS, RGEX) (4)

Where:
LIR = Lending Interest Rate.
RMS= Money supply in real values.
RGEX= Government expenditure in real values.

Equation 4 is transformed into an econometric form as follows:

$$RCPS = \alpha_0 + \alpha_1 RTBPU + \alpha_2 RTBCB + \alpha_3 RTBCBN + \alpha_4 TBR + \alpha_5 LIR + \alpha_6 RMS + \alpha_7 RGEX + \mu \quad (5)$$

Equation 5 represents the econometric form of our model which is amendable to estimation. The variables included are as earlier defined while the parameters(α's) are the slope coefficients of the variables which are to be estimated, and μ is the error term.

3.3. A Priori Expectation

The various components of treasury bills (RTBCB, RTBPU, and RTBCBN) are expected to have negative effects on credit to private sector (RCPS) in line with the crowding out effect of neoclassical economic theory. Thus, $\alpha_1 < 0$; $\alpha_2 < 0$; and $\alpha_3 < 0$. Lending interest rate (LIR) and government expenditure (RGEX) are expected to have negative effect on private sector credit (RCPS), $\alpha_5 < 0$ and $\alpha_7 < 0$ while money supply (RMS) is expected to have a positive effect on private sector credit, $\alpha_6 > 0$.

3.4. Estimation Techniques

The estimation technique adopted to address the two objectives of this study is the autoregressive distributed lag (ARDL) model. In this model, the dependent variable is expressed as a function of the lag value of the dependent variable and the current and lag values of the explanatory variables and the error correction term. This estimation technique is adopted because it allows us to study the effect of the current and lag values of the explanatory variables on the dependent variable. It also allows us to study the long run and short run relationship between variables.

The specification of the ARDL model with the inclusion of the variables of this study is as follows;

$$RCPS_t = \beta_0 + \beta_1 RCPS_{t-i} + \beta_2 RTBPU_{t-i} + \beta_3 RTBCB_{t-i} + \beta_4 RTBCBN_{t-i} + \beta_5 TBR_{t-i} + \beta_6 LIR_{t-i} + \beta_7 RMS_{t-i} + \beta_8 RGEX_{t-i} + \sum_{i=0}^{p} \beta_9 \Delta RCPS_{t-i} + \sum_{i=0}^{q} \beta_{10} \Delta RTBPU_{t-i} + \sum_{i=0}^{q} \beta_{11} \Delta RTBCB_{t-i} + \sum_{i=0}^{q} \beta_{12} RTBCBN_{t-i} + \sum_{i=0}^{q} \beta_{13} TBR_{t-i} + \sum_{i=0}^{q} \beta_{14} LIR_{t-i} + \sum_{i=0}^{q} \beta_{15} RMS_{t-i} + \sum_{i=0}^{q} \beta_{16} RGEX_{t-i} + \mu_t \quad (6)$$

Where

$RPSC_t$ = Real private sector credit at time t.
$RPSC_{t-i}$= Lags of real private sector credit.
$RTBPU_t$= Treasury bills held by non-bank public in real values at time t.
$RTBPU_{t-i}$= Lags of treasury bills held by non-bank public in real values.
$RTBCB_t$= Treasury bills held by commercial banks in real values at time t.
$RTBCB_{t-i}$= Lags of treasury bills held by commercial banks in real values.
$RTBCBN_t$= Treasury bills held by the central bank of Nigeria in real values at time t.
$RTBCBN_{t-i}$= Lags of treasury bills held by the central bank of Nigeria in real values.
TBR_t= Treasury bill rate at time t.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

TBR_{t-i}= Lags of treasury bill rate.
LIRt = Lending interest rate.
LIRt-i= lags of lending interest rate.
RMSt= money supply in real values.
RMSt-i= lags of money supply.
RGEXt= government expenditure in real values.
RGEXt-i= lags of government expenditure.
U_t = error term.
p and q = optimal lag length for the dependent and independent variables respectively.

3.5. Diagnostic Test

Augmented Dickey Fuller (ADF) test is used as pre-estimation test to check for stationarity of all variables. Autoregressive Conditional heteroscedasticity (ARCH) test, Jarque-Bera (JB) normality and Lagrange Multiplier (LM) test are used as post estimation test for heteroscedasticity test, test for normality of the error term of the estimated model, and autocorrelation test respectively. These post estimation tests are carried out to ensure that absence of autocorrelation, absence of heteroscedasticity and normal distribution of the error terms which are the important assumptions of regression analysis are fulfilled. The results indicate whether or not the estimated coefficients of the model are reliable.

4. Result and Discussion of Findings

In this section, the empirical results from the application of the required econometric technique are presented as follows.

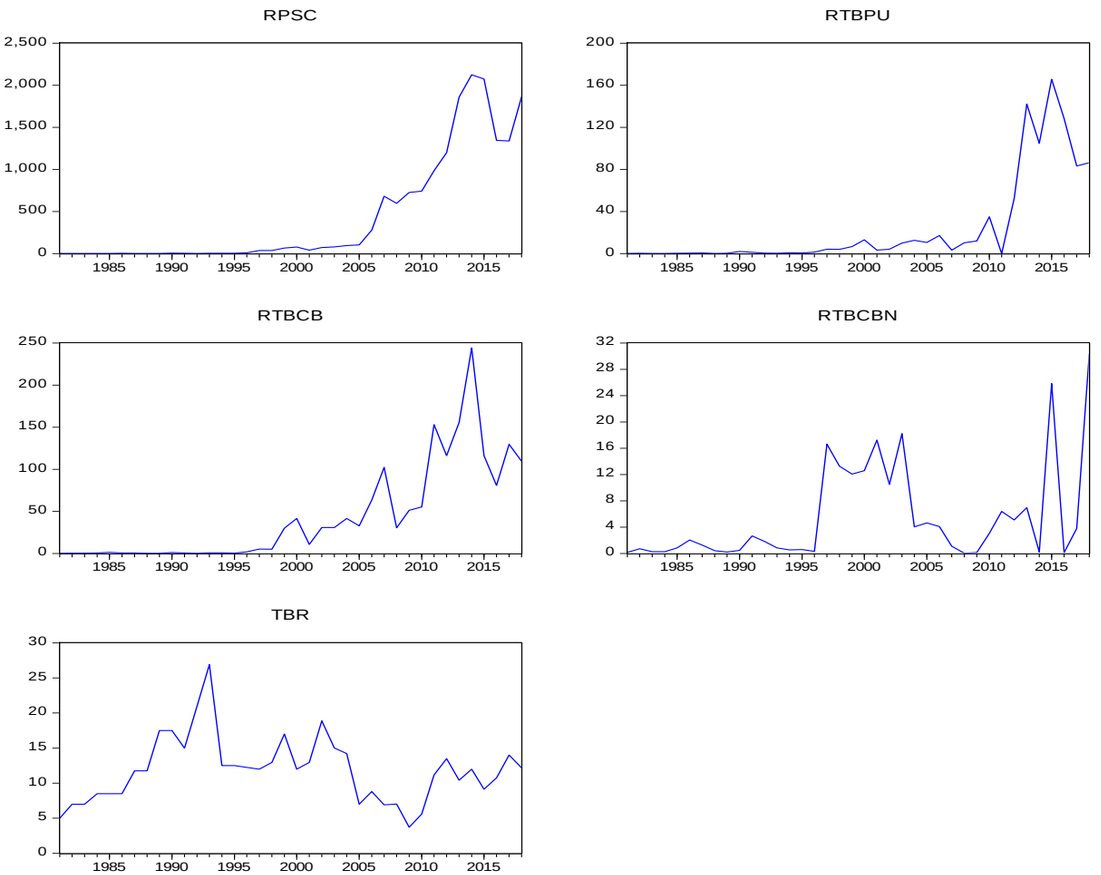


Figure 1. Yearly graphical trends of variables.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Figure 1 captures the trend behaviour of different treasury bill variables used in the study. It can be observed that each of the panels exhibits high volatility in the behaviour of the variables over time. This high volatility could have serious implications on the private sector credit which this paper will provide empirical evidence in subsequent sections.

4.1. Stylize Fact

The trend above shows that private sector credit was generally low from the early 1980's to early 2000 but rises significantly thereafter with notable fluctuations. Treasury bills held by the public and deposit money banks were also low in the early years but rise significantly in later years with notable fluctuations. Treasury bills held by the central bank also follows a similar trend but with more significant highs and lows in some years. Treasury bill rate seem to show a reverse behavior with relatively higher rates in the early years and relatively lower rates in the later years. These trends do not clearly portray how the explanatory variables relate to the dependent variable. This is clarified in the regression analysis on this study.

4.2. Unit Root Test

The result of the Augmented Dickey-Fuller (ADF) unit root test is presented in Table 1.

Table 1. ADF unit root test result.

Variables	ADF stat	Critical Values			P-Value	Remarks
		10%	5%	1%		
RPSC	-5.459	-2.614	-2.951	-3.639	0.000	I (1)
RTBPU	-7.284	-2.612	-2.946	-3.627	0.000	I (1)
RTBCB	-6.870	-2.613	-2.948	-3.633	0.000	I (1)
RTBCBN	-7.701	-2.613	-2.948	-3.633	0.000	I (1)
TBR	-7.179	-2.612	-2.946	-3.627	0.000	I (1)
RGEX	-5.405	-2.614	-2.951	-3.639	0.000	I (1)
LIR	-2.990	-2.610	-2.943	-3.621	0.045	I (0)
RMS	-5.401	-2.614	-2.951	-3.639	0.000	I (1)

The result of the unit root test shows that lending interest rate (LIR) is stationary at levels while all other variables were stationary at first difference. This justifies the application of the ARDL estimation technique in the estimation of the model of this study. We start by doing ARDL bond test for the existence of a long run relationship.

4.3. ARDL Bounds Test

The result of the ARDL test for levels relationship is presented in Table 2, where k is the number of parameters.

Table 2. Cointegration test for levels relationship.

ARDL Bounds Test		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	7.104	7
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.03	3.13
5%	2.32	3.5
1%	2.96	4.26

The ARDL bond test result shows that the test statistics of 7.104479 is greater than both the lower and upper bound critical values of the bond testing process. Hence the null hypothesis is rejected. This indicates that there is strong statistical evidence that a long run relationship exists among variables.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

4.4. ARDL Estimation

Following the result of the ARDL bond testing which indicates existence of a long run relationship among variables, the short coefficients which includes an error correction term and the long run coefficients of the ARDL was estimated. The estimate presented here came after a simulation of the model with different lag length. The estimate with the most optimal properties was adopted based on statistical and econometric criteria. Table 3 captures the result.

Table 3. ARDL cointegrating and long run form result.

Dependent Variable: RPSC				
Selected Model: ARDL(1, 2, 2, 2, 1, 1, 0, 2)				
Short Run Coefficients				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
D(RTBPU)	0.357	0.356	1.003	0.330
D(RTBPU(-1))	-1.076	0.249	-4.315	0.000***
D(RTBCB)	0.793	0.227	3.496	0.003**
D(RTBCB(-1))	-0.809	0.298	-2.713	0.012**
D(RTBCBN)	-0.109	0.642	-0.170	0.867
D(RTBCBN(-1))	1.376	0.913	1.508	0.150
D(TBR)	0.600	1.329	0.452	0.657
D(LIR)	0.560	1.169	0.479	0.638
D(RMS)	0.638	0.039	16.519	0.000***
D(RGEX)	-0.069	0.099	-0.695	0.497
D(RGEX(-1))	-0.421	0.106	-3.984	0.001**
ECM(-1)	-0.658	0.057	-11.475	0.000***
Cointeq = RPSC - (-2.8990*RTBPU + 0.7610*RTBCB -2.5981*RTBCBN + 6.1959*TBR -4.6188*LIR + 0.9695*RMS -0.0077*RGEX + 7.1569)				
Long Run Coefficients				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
RTBPU	-2.899	1.155	-2.510	0.023**
RTBCB	0.761	0.626	1.216	0.241
RTBCBN	-2.598	1.466	-1.773	0.094*
TBR	-6.196	3.062	-2.023	0.059*
LIR	-4.619	2.540	-1.818	0.087
RMS	0.969	0.112	8.638	0.000***
RGEX	-0.008	0.319	-0.024	0.981
C	7.157	19.659	0.364	0.720

Note: *indicates 10% statistical significant.
**indicates 5% statistical significant.
***indicates 1% statistical significant.

The estimated ARDL model shows that treasury bills held by the public (RTBPU) has a significant negative effect on private sector credit both in the long run and in the short run. In the short run, RTBPU has a negative effect on private sector credit (RPSC) at lag one. The estimate shows that a 1% increase in RTBPU leads to a 1.076% decrease in RPSC in the short and 1% increase in RTBPU leads to 2.899% decrease in RPSC in the long run.

Treasury bills held by commercial banks (RTBCB) has a positive and significant effect on RPSC at zero lag but a negative and significant effect at lag one. The coefficient shows that a 1% increase in RTBCB leads a 0.793% increase in RPSC at zero lag and a 1% increase in RTBCB leads to 0.809% decrease in RPSC. From the coefficients the net effect of the positive and negative effect is negative. In the long run RTBCB has no significant effect on RPSC.

Treasury bills held by Central Bank of Nigeria (RTBCBN) has no significant effect on credit to private sector (RPSC) in the short run but a negative effect in the long run. The coefficient of the long run relationship shows that a 1% increase in RTBCB leads to 2.598% decrease in RPSC. Treasury bill rate (TBR) has no

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

significant effect on RPSC in the short run but has a negative and significant effect on RPSC in the long run. The long run coefficient shows that a 1% increase in TBR leads to a 6.196% decrease in RPSC. Lending interest rate (LIR) has no significant effect on RPSC in the short run but has a negative and significant effect on RPSC in the long run. The long run coefficient shows that 1% increases in LIR leads to a 4.619% decrease in RPSC.

Money supply (RMS) has a positive and significant effect on RPSC both in the short run and in the long run. The estimates show that a 1% increase in RMS leads to 0.638% increase in RPSC in the short run and 0.969% increase in the long run. Government expenditure (RGEX) has a negative and significant effect on private sector credit in the short run. But in the long run the relationship is not significant. The error correction of -0.658 shows that about 65.8% of the deviation of the dependent variable from equilibrium due to changes in the explanatory variables are corrected annually.

4.5. Post-Diagnostic Test

The post-diagnostic test result is presented in Table 4.

Table 4. Summary of post estimation diagnostic test.

Breusch-Godfrey Serial Correlation LM Test:			
F statistics	2.058	P Value	0.189
Obs*R-squared	20.324	P Value	0.207
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.360	P Value	0.265
Obs*R-squared	21.249	P Value	0.267
Normality Test			
Jarque-Bera (JB) Stat.	0.995	P Value	0.608

Note: * denotes a multiplication function.

The summary of post estimation diagnostic test result shows that there is absence of autocorrelation and absence of heteroscedasticity in the estimated model. It also shows that the error terms are normally distributed. This is because the P-values of the respective post estimation test which are more than the acceptable level of statistical significance, indicates that the null hypothesis of the LM and Heteroskedasticity test which respectively state that there is no autocorrelation and no heteroscedasticity cannot be rejected. Also, the null hypothesis of the normality test procedure which states that the error terms are normally distributed cannot also be rejected. This shows that the estimated coefficients are reliable because the estimated model meets the underlying assumptions of regression analysis.

4.6. Discussion of Finding

The findings of the study show that treasury bill held by the commercial banks and the public have negative effect on credit to private sector showing the crowding out effect of government treasury bill on private sector credit. Investing in treasury bills usually allows the commercial banks to earn impressive returns that are less risky, affecting their willingness to give credit to the private sector with higher risk. As discussed earlier, holding treasury bills likely help banks to maintain a strong portfolio because they are very short-term debt instruments which are almost similar to holding cash while receiving a reasonable return. Also, the high return and high risk that characterize conventional lending compared to the high return and low risk nature of treasury bills have made these assets to become competitive in the asset portfolio of deposit money banks (DMB) with a consequent reduction in the giving of private loans.

Concerning treasury bills held by the public, the possible explanation is that the public who lend to the government through treasury bills channel a significant amount of funds from the financial sector to the government and this also reduces the amount of loanable funds available to banks to give credit to the private sector. Treasury bills held by the Central Bank of Nigeria (CBN) also have a significant negative effect on credit to private sector only in the long run. The decision of the CBN directly affects the commercial banks and other financial institutions. This is probably why treasury bills held by the CBN do not have significant effect on private credit in the short run.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Treasury bill rate also have a negative effect on private sector credit in the long run. An increase in treasury bill rate make treasury bill an attractive investment for individuals, banks and other cooperate organizations, leading to the channeling of a significant amount of funds to the purchase of treasury bills at the expense of private lending. Money supply has a positive and significant effect on private sector both in the long and short run, indicating that a rise in money supply through expansionary monetary policy allows banks to give out more credit to the private sector. Government expenditure have significant negative effect on private credit in the short run, indicating that government spending which partly comes from funds raised by issuing treasury bills has a limiting effect on private sector credit.

5. Summary, Conclusion and Recommendations

This study examined the effect of treasury bills on private sector credit in Nigeria using annual data from 1981 to 2018. The study is done in the light of the crowding out effect hypothesis. Treasury bill was disaggregated into its various components and used as explanatory variables along with treasury bill rate. The behavior of variables was captured in an autoregressive distributed lag (ARDL) model. The result of the estimated model shows that:

i) Treasury bills held by commercial banks has a significant negative effect on credit to private sector in both short run and long run.
ii) Treasury bills held by the public has a significant negative effect on credit to private sector only in the short run.
iii) Treasury bills held by commercial banks has significant negative effect on credit to private sector only in the long run.
iv) Treasury bill rate also has a significant negative effect on private sector credit.

Treasury bill is both a monetary and fiscal policy instrument as a monetary policy tool it is used to mop up excess liquidity in the economy. As a fiscal policy tool, it is used to finance government budget deficit. It is also an attractive fix income investment for individuals and cooperate organizations. However, the findings of this study show that treasury bills have a negative effect on private sector credit in Nigeria in line with the crowding out effect hypothesis. The function of treasury bills shows that for it to be effective, the need to finance government budget deficit should coincide with the need to mop up excess liquidity in the economy.

It is notable that most of the financial sector policies in Nigeria focused on repositioning the financial system to ensure that it perform the role of intermediation and play a catalytic role in economic development, and in the heart of financial intermediation policies is the need to enhance the availability of credit to the private sector to boost private sector investment. Therefore, the finding of this study shows the need for proper fiscal and monetary policy coordination in the use of treasury bills as a policy instrument.

The following recommendations were given based on the findings of the study, that;

i) Since treasury bill is seen to have a negative effect on private sector credit, the Central Bank of Nigeria should set treasury bill rate to align with other rate of return on short term financial asset. This will allow for fair competition between public sector and private sector debt instrument and thus limit the crowding out effect and further deepen the financial market.
ii) The monetary policy authorities should balance between the need to fund government deficit and the need to mop up excess liquidity in the financial system. The justification for the issuance of treasury bills should be the existence of excess liquidity in the financial system.
iii) The government should be less dependent of domestic debt to finance budget deficit but should rather explore other sources of revenue generation, as this will reduce the effect of government presence in the debt market, and the crowding out effect.

References

Akpansung, A. (2018). Analysis of the impacts of domestic debts on private sector credit, lending rate, and real output: Evidence from Nigeria. Journal of Finance and Economics, 6(3), 111-123.

Anyanfo, A. (1996). Public finance in a developing economy: The Nigerian case. Enugu: Department of Banking and Finance, University of Nigeria, Enugu Campus.

Asogwa, F., & Chetachukwu, O. (2013). The crowding out effect of budget deficits on private investment in Nigeria. European Journal of Business and Management, 5(20), 161-165.

Başar, S., & Temurlenk, M. S. (2007). Investigating crowding-out effect of government spending for Turkey: A structural var approach. Ataturk University Journal of Economics and Administrative Sciences, 21(2), 95-104.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*

♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com

Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022

Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

Central Bank of Nigeria. (2008). Money market dynamics in Nigeria: Structure, transaction cost and efficiency. Central Bank of Nigeria (CBN) Occasional Paper, No. 35.
Central Bank of Nigeria. (2013). Statistical bulletin. Abuja: Central Bank of Nigeria.
Central Bank of Nigeria. (2018). Statistical bulletin. Nigeria: Central Bank of Nigeria.
Emran, M. S., & Farazi, S. (2009). Government borrowing and private credit in developing countries: George Washington University: Institute for International Economic Policy Working Paper Series No. IIEP-WP-2009-09.
Fayed, M. E. (2013). Crowding out effect of public borrowing: The case of Egypt. International Research Journal of Finance and Economics, 107(1), 28-38.
Gaber, S. (2010). Economic implications of deficit finance. Bamberg: Bamberg University.
Hailu, F. (2015). Crowding-in or crowding-out? Government expenditure and private investment in Ethiopia (1980-2012). Journal of Economics and Sustainable Development, 6(9), 59-66.
Jhingan, M. L. (2008). Monetary economics. Delhi, India: Vrinda Publication Ltd.
Kirchner, M., & Wijnbergen, S. (2012). Fiscal deficits, financial fragility, and the effectiveness of government policies. Discussion Paper Deutsche Bundes Bank, No. 20.
Krishnamurthy, A., & Vissing-Jorgensen, A. (2015). The impact of treasury supply on financial sector lending and stability. Journal of Financial Economics, 118(3), 571-600.Available at: https://doi.org/10.1016/j.jfineco.2015.08.012.
Majumder, A. (2007). Does public borrowing crowd-out private investment? The Bangladesh evidence (pp. 2–26). Policy Analysis Unit (PAU), Working Paper Series: No. WP 0708.
Manove, M., Padilla, A. J., & Pagano, M. (2001). Collateral versus project screening: A model of lazy banks. RAND Journal of Economics, 32(4), 726-744.Available at: https://doi.org/10.2307/2696390.
Mbate, M. (2013). Domestic debt, private sector credit and economic growth in Sub-Saharan Africa. African Development Review, 25(4), 434-446.Available at: https://doi.org/10.1111/1467-8268.12040.
McConnell, C. R., Brue, S. L., & Flynn, S. M. (2003). Economics: Principles, problems, and policies. New York: McGraw-Hill.
Obert, C. (2012). Treasury bills and/or central bank bills for absorbing surplus liquidity: The main considerations. IMF Working Paper WP/12/40. Retrieved from: https://www.imf.org/external/pubs/ft/wp/2012/wp1240.pdf.
Ogege, S., & Shiro, A. A. (2012). The dynamics of monetary and fiscal policy as a tool for economic growth: Evidence from Nigeria. Journal of Management and Sustainability, 2(2), 247.Available at: https://doi.org/10.5539/jms.v2n2p247.
Olowofeso, E. O., Adeleke, A. O., & Udoji, A. O. (2015). Impact of private sector credit on economic growth in Nigeria. CBN Journal of Applied Statistics, 6(2), 81-101.
Omitogun, O. (2018). Investigating the crowding out effect of government expenditure on private investment. Journal of Competitiveness, 10(4), 136-150.Available at: https://doi.org/10.7441/joc.2018.04.09.
Onyeiwu, C. (2012). Domestic debt and the growth of Nigerian economy. Research Journal of Finance and Accounting, 3(5), 45-56.
Rufino, G. C. (2008). The steady state relationship and the spread between treasury bills and commercial lending rates. DLSU-AKI Working Paper Series No. 2008-2.
Sanusi, S. L. (2012). Financial system as catalyst for economic development. Retrieved from www.thisdaynigeria.com.
Sen, H., & Kaya, A. (2014). Crowding-out or crowding-in? Analyzing the effects of government spending on private investment in Turkey. Panoeconomicus, 61(6), 631-651.Available at: https://doi.org/10.2298/pan1406631s.
Shetta, S., & Kamaly, A. (2014). Does the budget deficit crowd-out private credit from the banking sector? The case of Egypt. Topics in Middle Eastern and African Economies, 16(2), 251-279.
Takele, Y. (2013). A dynamic and multivariate analysis of treasury bills behavior in a bank asset portfolio. European Scientific Journal, 9(7), 34-45.
Udaba, S. (2002). Introduction to Nigerian public finance. Enugu: Linco Press Nig Ltd.
Yossef, M. (2016). The impact of issuing treasury bills on private investment in Egypt. International Journal of Management and Applied Science, 2(11), 83-89.
Zaheer, S., Khaliq, F., & Rafiq, M. (2017). Does government borrowing crowd out private sector credit in Pakistan. State Bank of Pakistan (SBP) Working Papers No. 83.

Research in Social Sciences
ISSN: 2641-5305
Vol. 5, No. 1, pp. 30-42.
2022
DOI: *10.53935/26415305.v5i1.229*
♣*Corresponding Author: Ofonime Moses Akpan*
Email: wangdianjian@msn.com
Funding: *This study received no specific financial support.*
Article History:
Received: 8 June 2022
Revised: 20 July 2022
Accepted: 5 August 2022
Published: 30 August 2022
Copyright:
© 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).