Domestic Debt and Domestic Private Investment: A re-investigation of the Crowding-out Hypothesis in Nigeria

John Norense IZEVBIGIE[1], Orhogbuyunmwun AKENZUA[2]

[1&2]Department of Economics, University of Benin, Nigeria

Abstract

Owing to the huge increase in volume of domestic borrowing in Nigeria (especially within the last two decades) and the existence of conflicting findings on impact of domestic borrowing has on domestic private investment,this study re-examined the crowding-out hypothesis in Nigeria spanning the period 1981-2020. The estimates from co-integration and error correction mechanism show that domestic debt impact negatively on domestic private investment in Nigeria. This implies that crowding-out hypothesis holds for Nigeria. The model was affirmed structurally stable using CUSUM and this also implies that findings could be relied upon. In the light of the findings, it was recommended that a strategy/policy that help manage and cushion negative impact domestic debt has on domestic private investment in Nigeria should be put in place and effectively implemented. Example includes; policy that enhances domestic savings, utilization of public funds for critical infrastructure and enabling environmentfor business to strive amongst others.

Keyword: Domestic Debt, Investment, Time Series Analysis, Nigeria

JEL Classification: H63, L16, C22, N37.

1.   Introduction

Excessive domestic borrowing by government reduces credit availability for domestic private investment owing to the rise in interest rate it engenders. This occurs if government spending fails to stimulate the economy as expected (Carlson and Spencer, 1975).This is in tune with lazy bank hypothesis which holds that huge government domestic borrowing weakens bank ability to seek new profitable ventures and thus result in a reduction in lending to the private sector for investment.However, it is also worthy to note that the rise in interest rate which domestic borrowing engenders could attract more capital inflow into the economy and as such have a positive effect on investment and the economy (if the domestic financial market exhibit resilience) [Izevbigie, 2015].

Data from Debt Management Office-DMO (2018 and 2020) and Central Bank of Nigeria-CBN (2020) shows that domestic private investment is characterized by a downward fluctuation while domestic debt recorded tremendous increase over the last two decades in Nigeria. For example, DMO (2018) specifically showed that domestic

debt (in percentage of GDP) rose from 10.92 percent in 2013 to 13.04 percent in 2016 and thereafter to 14.52 percent in 2017.As at late 2019 government domestic debt profile average about15.2 percent of GDP (CBN, 2020). Data from CBN (2020) also revealed that domestic private investment fell from about 10 percent in 2000 to about 6 percent in 2005 with a marginal increase to the tune of about 9 percent by 2019.

In recent times, there isa rebound of interest among researchers on the impact domestic debt has on domestic credit to the private sector in developing countries such as Nigeria owing to the quest for fund to attend to developmental challenges.A cursory look at the literature shows thatempirical findings are divided between those that upheld that domestic debt crowds-out domestic private investment for example Akanbi (2020), Abubakar, Adegoke and Augustine (2019) and those that found otherwise- Omodero (2019), Aigheyisi (2014). This study therefore set out to re-examine the Nigeria caseusing a lucid econometric technique and by so doing established the crowding-out hypothesis amidst increasing domestic debt profile of the country in recent times.

2.   Some Metal Reflections

Treasury bills, Treasury bond, Treasury certificate and developmental stock are the major domestic debt instrument in Nigeria. As at 2002, Treasury bill, Treasury bond and development stock accounted for about 62.93 per cent, 36.93 percent 0.14 per cent of domestic debtCBN (2010). Also,World Bank (2020) report showed that the volume of domestic debt accumulation in Nigeria has been in the upward direction for over the past two decades. For example, in 2003 Nigeria's domestic debt was N1.09 trillion while domestic debt-GDP ratio stood at about 21.26 per cent. The report showed further that domestic debt increase from about $34.4 billion in 2011 to about $47.05 billion in 2014. As a share of GDP, domestic debt was 10.92 per cent, 13.04 per cent and 14.52 per cent in 2013, 2016 and 2017 respectively (DMO 2018). Also, data from CBN (2020) shows that the consolidated government domestic debt stock as at late 2019 was 15.2 percent of GDP compared to 15.9 percent of GDP in 2018. Using figure 1, the development in Nigeria domestic debt can be seen at a glance for the period 1981 to 2019.

Figure 1: Trend in Domestic Private Investment (percentage of GDP)
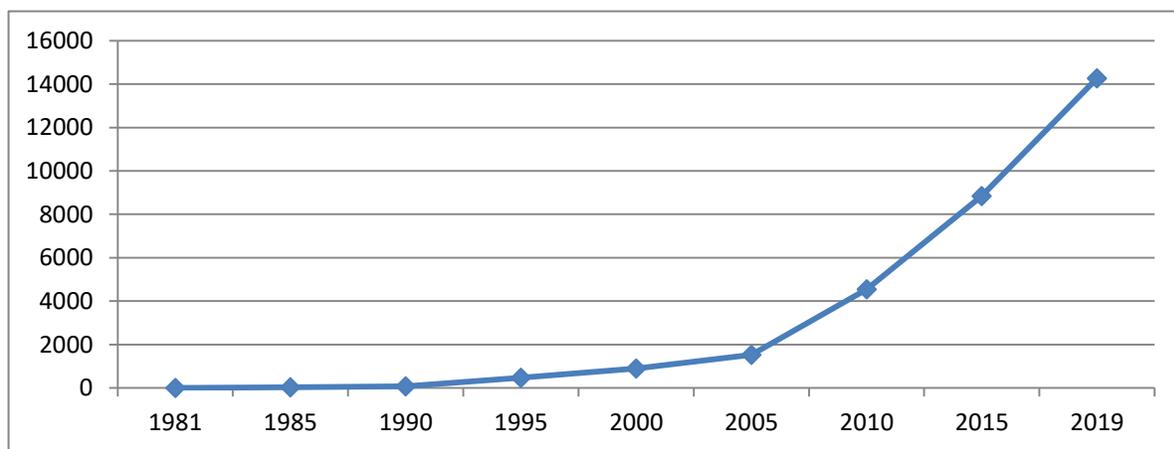
Graphed by Author using Data from DMO (2020)

The upward trend in the volume of domestic debt as shown in Figure 1 for the period

1981-2019 may not be unconnected to the quest for funds to attend to myriad

developmental challenges such as weak productive capacity, high unemployment rate, weak infrastructural facilities among others bedevilingNigeria as a country. It may also not be unconnected to the fact that domestic borrowing hedges against exchange rate fluctuation/risk. As stated by (Aigheyisi, 2014), the continuous increase in the volume of domestic debt in Nigeria could be attributed to the fact that domestic borrowing

is denominated in domestic currency, lowers currency mismatch and promotes a stable investors' base.

Also, to get a clearer picture of the development in domestic private investment in Nigeria,presentedbelow is the trend in private domestic investment in percentage of GDP for selected years between 1981 and 2019.

Figure 2: Trend in Domestic Private Investment (percentage of GDP)
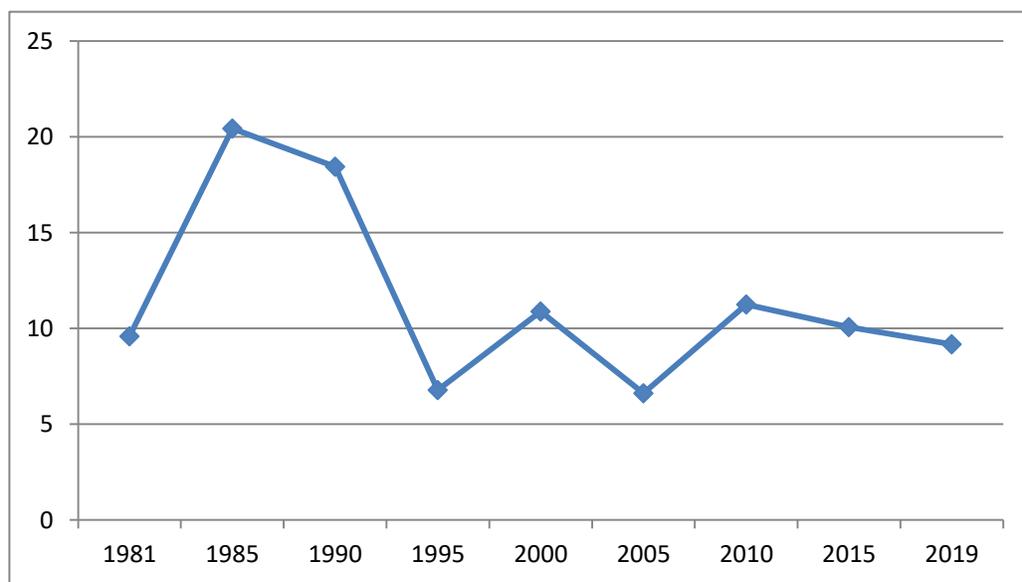
Graphed by author using data from DMO (2020)

From figure 2, it can be observed that there is a somewhat decreasing fluctuating trend for the period. Specifically in 1981, domestic private investment as a percentage of GDP was about 10 percent; in 1985 it rose to about 20 percent and thereafter fell again to about 18 percent and 6 percent in 1990 and 1995 respectively. However, between year 2000 and 2019, domestic private investment as a

percentage of GDP hovers between 6 percent and 11 percent. Specifically, while domestic private investment was about 10 percent in 2000, it fell to about 6 percent, 11 percent, 10 percent and 9 percent in 2005, 2010, 2015 and 2019 respectively. From the trend as depicted in Figure 2, there seem to be a sharp variation in domestic private investment in Nigeria over the years.

3. Empirical Review

An attempt is made here to bring to fore studies that relate domestic debt to domestic

private investment in Nigeria. Omodero (2019) examined the impact government domestic debt has on private sector credit in Nigeria for the period 1988-2018 using OLS technique. It was found that domestic debt has a significant positive impact on private sector credit while interest rate exerts negative influence on the private sector credit. Izevbigie (2015) examined the role of public sector debt in facilitating domestic private investment in Nigeria for the period 1981-2013 using co-integration and error correction mechanism. It was found that while domestic debt positively and significantly impact on domestic private investment, external debt exhibited negative and significant impact on domestic private investment. This was similar to earlier findings by Aigheyisi (2014) while determining if government domestic debt crowds-out domestic private investment in Nigeria for the period 1981 to 2012 using co-integration and ECM technique. Other similar studies includes Özdemir and Gomez (2020); Coban and Tugcu (2015); Xu and Yan (2014);Şen and Kaya (2014);Apere (2014);Mahmoudzadeh, Sadeghi and Sadeghi (2013); Maana, Owino and Mutai (2008); Atukeren, (2005).

Akanbi (2020) examined the impact of government domestic borrowing on private sector credit in Nigeria for a 10 year period 2009-2018 using OLS estimation technique. The results showed that prime lending rate has a positive effect on government bond issuance although not significant. The findings also revealed that there is a negative relationship between government domestic bond issuance and the banks credit to private sector. Abubakar, Adegoke & Augustine (2019) examined the relationship between government borrowing and private sector growth in Nigeria for the period 2005-2017 using structural vector auto-regressions (SVAR). The results from impulse response functions and variance decomposition show

that government domestic borrowing impact negatively on domestic private sector investment in Nigeria. Chinanuife, Eze and Nwodo (2018) investigate public debt spiral and the level of public investment in Nigeria in a quarterly time series data spanning 1981-2016. Result from ARDL methodology employed showed that public debt has negative and statistical significant impact on domestic investment in Nigeria, that is, public debt crowds-out domestic investment in Nigeria. Also, other studies in this light includes; Nwaeze (2017); Anyanwu (2016); Akomolafe, Bosede, Emmanuel and Mark(2015); Mbate (2014);Damian, Ude and Ekesiobi (2014); Ude and Ekesiobi (2014).

4. Methodology

4.1. Theoretical Framework

The theoretical foundation for this study is neoclassical theory of investment which is based on the neoclassical theory of optimal capital accumulation determined by relative prices of factors of production. The theory holds that firms maximize profit/stock of capital where marginal product of capital (MPK) equals cost of capital.

Given Cobb-Douglas production function as stated in equation (1);

$$Y = AK^a L^{1-a} \quad (1)$$

where, Y = output, K = capital, L = labour; A= level of technology; α = measures of share of capital/labour in output.

To obtain MKP, we differentiate equation (1)with respect to labour, that is;

$$MPK = dY/dK = \alpha AK^a L^{1-a} = \alpha Y/K \quad (2)$$

Equation (2) can also be express as;

$$\alpha Y/k = r/P \quad (3)$$

From equation (3), the desired stock of capital (K*) is then stated as;

$$K* = \alpha P/r * Y \quad (4)$$

Equation (4) expresses desired stock of capital (K*) as a function of output (Y), real cost of capital (r/p)- r = price/user cost of capital; p = price of output.

Also, from equation (3), the rental cost of capital can be expressed as;

$$r = \alpha P / K * Y \qquad (5)$$

If the real cost of capital is estimated by nominal rate of interest (i) adjusted for expected rate of inflation (πe). Then, the expected real interest rate, that is, i – πe could be taken to be the real cost of borrowing funds/adding to the stock of capital. If depreciation (d) is taking as a flat rate per year, the rental cost or price of capital (r) can then be expressed as;

$$r = i - \pi e + d \qquad (6)$$

Equation (6) shows that the rental cost of capital (r) is determined by rate of interest, expected rate of inflation and rate of depreciation.

4.2   Model Specification

In the light of the above theoretical exposition and in tune with Jorgensen (1967), the model for this study is derive through a modification of equation (6) stated functionally as;

$$DPI = f(DDT, INT, INF, CAM, GES) \qquad (7)$$

Where:DPI = domestic private investments; DDT = domestic debt; INTR = interest rate; INF = inflation rate; CAM= capital accumulation; GES = government expenditure

The eschewing error correction specification is stated as;

$$DPI_t = \beta_0 + \beta_1 DDT_t + \beta_2 INT_t + \beta_3 INF_t + \beta_4 CAM_t + \beta_5 GES_t + \Omega ECT_{t-1} + \varepsilon_t \qquad (8)$$

Where; β_0 = intercept term; β_1-β_5 = parameter estimates; ECT_{t-1} = error correction term; Ω = error correction term coefficient; ε_t= error term. Other variables are as previously defined.

The *a priori* expectations of the coefficient estimate β_1, β_2, β_3, β_4 and β_5 are indeterminate, that is they could either be positive or negative while the coefficient of error term is expected to be negative, that is, $\Omega < 0$.

4.3.   Analytical Technique and Data Sources

Co-integration   and   error   correction mechanism (ECM) is adopted for this study. This methodology basically comprises three steps. The first step is testing for unit root (stationarity test). This is followed by co-integration test, that is, test of long run convergence among the variables.   If variables are found to be co-integrated, we then carry out estimation of the error correction model.Besides being amenable to times series analysis, ECM wide application in empirical analysis may be attributed to the fact that it is amenable to times series analysis and correct for dis-equilibrium in the short run.

Data covering the period of estimation1981-2020 were sourced from World Bank, World Development Indicator (2021) and Central Bank of Nigeria (2021).

5.   Analysis and Discussion

The various estimates conducted are presented and explained below.

Table 5.1: Descriptive Statistics

	DPI	DDT	INT	INF	CAM	GEX
Mean	2874.9	13.68	17.69	19.15	9.21	5.17
Median	898.25	10.56	17.6	12.55	8.17	5.24
Maximum	14272.6	33.29	31.7	72.84	19.63	19.03
Minimum	11.19	4.68	8.9	5.39	4.96	-3.26
Std. Dev.	4124.12	6.44	4.8	17.06	3.56	4.25
Skewness	1.52	1.04	0.25	1.78	1.19	0.93
Kurtosis	4.05	3.39	3.76	4.99	3.99	5.12
Jarque-Bera	16.88	7.26	1.37	27.16	10.9	12.95
Probability	0	0.02	0.5	0	0	0
Sum	1121.21	533.51	690	746.71	359.19	201.5
S Sq. Dev.	6.46	1677.60	875.98	11063.33	480.53	686.43
Observations	39	39	39	39	39	39

Source: Authors' Computations (2021)

From the Table 5.1, the average of domestic private investment (DPI) is about 2874 with a high standard deviation value to the tune of 4124. This implies that observations are widely spread from the mean. Skewness is a measure of asymmetry of the distribution of the series around the mean. Positive skewness implies that the distribution has a right tail while negative skewness implies that the distribution has a left tail. From Table 5.1, skewness is positive implying that domestic private investment lie to the right of the mean. Kurtosis measures the peakedness or flatness of a distribution. If kurtosis is above three, the distribution is peaked or leptokurtic relative to the normal distribution and if the kurtosis is less than three, the distribution is flat or platykurtic relative to normal distribution. Here, kurtosis is more than three; this indicates that the distribution is peaked. The 1 percent statistically significant of J-B indicates that the density function of the series is non-normally distributed. For domestic debt (DDT), the mean and standard deviation values are approximately 13 and 6 respectively. The relative low standard deviation indicates that observations are not widely dispersed from the mean. The Skewness is positive showing that DDT lie to the right of the mean. The kurtosis is also more than three and as such shows that the distribution is peaked. J-B statistics passes the significant test at 5 percent and thus indicate that the density function of the series is non-normally distributed.

Table 5.2. Unit Root Test

Variables	Levels		First difference		I (d)
	ADF Stat	ADF 95%	ADF Stat	ADF 95%	
DPI	-0.78	-2.94	-7.18	-2.94	I(1)
DDT	-1.11	-2.94	-11.09	-2.94	I(1)
INT	-0.007	-2.94	-3.31	-2.94	I(1)
INF	-2.77	-2.94	-4.46	-2.94	I(1)
CAM	-1.11	-2.94	-6.85	-2.94	I(1)
GES	-2.66	-2.94	-5.36	-2.94	I(1)

Source: Author's Computation (2021)

Unit root test helps to determine the stationarity status of the variables in the model and the method employed here is Augmented Dickey Fuller (ADF). From the result presented, variables were not statitionary at levels. However, they all attained stationarity at first difference as can be observed that the ADF test statistic are greater than the corresponding 95 percent critical ADF value at first difference.

Table 5.3: Co-integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.731	114.670	95.753	0.001
At most 1 *	0.555	73.963	69.818	0.022
At most 2 *	0.536	48.824	47.856	0.040
At most 3	0.404	24.971	29.797	0.162
At most 4	0.196	8.925	15.494	0.372
At most 5	0.067	2.160	3.841	0.141
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.573	40.707	40.077	0.042
At most 1	0.211	25.138	33.876	0.375
At most 2	0.577	23.852	27.584	0.140
At most 3	0.323	16.045	21.131	0.222
At most 4	0.198	6.765	14.264	0.517
At most 5	0.055	2.225	4.421	0.141

Source: Author's Computation (2021)

From the Table 5.3, the trace statistics and the Maximum eigen statistics indicated that there are three and one co-integrating equations respectively at 5 percent significant levels. In other words, Trace test indicates three (3) co-integrating equations at the 0.05 level and Max-eigenvalue test indicates one (1) co-integrating equation at the 0.05 level.

Table 5.4: ECM and Long Run Estimates

ECM Estimates					Long Run Estimates				
Variable	Coeff	Std. Error	t-Stat	Prob.	Variable	Coeff	Std. Error	t-Stat	Prob.
C	1.957	0.867	2.256	0.032	C	1.929	0.843	2.286	0.029
DDT	-0.159	0.051	-3.087	0.004	DDT	-0.146	0.051	-2.84	0.007
INF	-0.230	0.103	-2.225	0.034	INF	-0.231	0.101	-2.27	0.030
INT	0.580	0.256	2.258	0.032	INT	0.614	0.240	2.551	0.015
CAM	0.402	0.274	1.467	0.153	CAM	0.316	0.276	1.143	0.261
GEX	0.239	0.090	2.642	0.013	GEX	0.221	0.078	2.820	0.008
ECM(-1)	-0.451	0.180	2.503	0.018					
R-squared 0.615		Mean dep var 2.433			R-squared 0.578		Mean dependent var 2.462		
Adj R-squared 0.608		S.D. dep var 0.404			Adj R-square 0.554		S.D. dep var 0.415		
S.E. of reg 0.311		Akaike info criterion 0.683			S.E. of reg 0.323		Akaike info criterion 0.726172		
Sum sq resid 2.613		Schwarz criterion 0.998			Sum sq resid 3.237		Schwarz criterion 0.987		
Log likelihood -4.627		Hannan-Quinn criter. 0.791			Log likelihood -7.434		Hannan-Quinn criter. 0.818		
F-statistic 4.792 Prob(F-stat) 0.001		Durbin-Watson stat 1.929			F-statistic 5.682 Prob(F-stat) 0.000		Durbin-Watson stat 2.186		

Source: Author's Computation (2021)

From Table 5.4, domestic debt has negative and statistically significant impact on domesticprivate investment in both the short and long run. One unit rise in domestic debt result to about 0.15 unit and 0.14 unit decrease in domestic private investment in the short run and long run respectively. This is in tune with studies such as Abubakar, Adegoke and Augustine (2019); Nwaeze (2017); and Anyanwu (2016). By implications, the findings upheld that the crowding-out hypothesis holds with regards to domestic debt and domestic private investment in Nigeria. Also, inflation rate exhibited a negative impact on domestic private investment in both the short run and long run and this was statistically significant in both cases. A unit increase in inflation rate

result to about 0.23 units decrease in domestic private investment in the short and long run. With respect to interest rate, it was found to exhibit positive and statistically significant impacts on domestic private investment in both the short run and long run respectively. A unit rise in interest rate result to the tune of approximately 0.6 units increase in domestic private investment. For capital accumulation, it exhibited positive impact on domestic private investment in the short run and long run, this was however not statistically significant in both cases.

Lastly, government spending exerts positive and statistical significant impact on domestic private investment in both the short and long run. A unit rise in government spending result to an increase in domestic private investment to the tune of about 2.2 units in the short and long run.The error correction term is negatively signed with a coefficient that ranges between zero and one and statistically significant (at 5 percent). Its coefficient of 0.45 indicates a restoration to equilibrium to the tune of approximately 45 percent in the event of a temporary displacement thereof. The coefficient of determination and the adjusted coefficient of determination in both the short run and long run were moderately high and ranges between 55percent and 61 percent. This shows that the explanatory variables account significantly for the changes in the dependent variable. This was further attested to by the statistical significant F-statistics value of approximately 5 unit in both the short and long run affirming the overall explanatory power of the model.Durbin-Watson statistics value that falls within the neighborhood of two (2) clearly indicates the absence of serial correlation in the model.

5.5. Stability Test

Stability test was conducted to determine the structural stability of the model by examining the property of the plots of Cumulative Sum of Recursive Residual (CUSUM). From Figure 1 as shown in the appendix, the plots of CUSUM fall within the critical bounds at 5 percent significance level. This indicates that the model is structural stable and findings could be relied upon.

6. Conclusion and Recommendations

Owing to the continuous increase in domestic borrowing and the seemingly mixed empirical findings on its impact on domestic private investment, this study attempted a re-examination of the Nigeria case using a simple and lucid econometric technique covering the period 1981 to 2020. The result shows that domestic debt impact negatively on domestic private investment in Nigeria in tune with studies such as Abubakar, Adegoke and Augustine (2019); Anyanwu (2016)and this implies that the crowding-out hypothesis holds for Nigeria. The model was affirmed structurally stable using CUSUM and this also implies that findings could be relied upon.

In the light of the empirical findings, the following are suggested;

1. To increase the volume of fund at public and possibly private domain, policies that encourage domestic savings should be strengthened.

2. Political office holders should harness and leverage on other sources of fund in the light of the crowding-out effect of domestic debt on domestic investment.

References

Abubakar A. A., Adegoke, I. A. &. Augustine .U. (2019). Government borrowing behaviour: implications for private sector growth in Nigeria.

International Journal of Sustainable Development & World policy, 8(2).

Aigheyisi, S. (2014). Does government domestic debt crowds-out domesticinvestment in Nigeria? An empirical re-investigation. *Empirical Economic Letters,* 13(8),841-849.

Akanbi, A. (2020) Government domestic borrowing and private sector credit crowding out: Empirical evidence from Nigeria. *Journal of Investment and Management.* 9(4), 100-106.

Akomolafe, K. J., Bosede, O., Emmanuel, O., & Mark, A. (2015). Public debt and private investment in Nigeria. *American Journal of Economics*, 5(5), 501-507.

Anyanwu, A (2016)**.** Government Domestic Debt, Private Sector Credit, and Economic Growth in Oil-Dependent Countries: a Dynamic Panel Data Analysis. *A thesis submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Economics at Lincoln University.*

Apere, T.O.(2014). Impact of public debt on private investment in Nigeria. Evidence from a Non-linear Model. *International Journal of research in Social Science,* 4(2), 130-138.

Atukeren, E. (2005). Interaction between public and private investment: Evidences from Developing Countries, *KYKLOS*, 58(3):307-330.

Carlson, K. M. & Spencer, R. W. (1975). Crowding out and its critics. *Federal Reserve Bank of St Louis.*

Central Bank of Nigeria (2010). *Statistical Bulletin and Annual Report.*Abuja.http://www.cenbank.org/.[Accessed June 2020].

Central Bank of Nigeria (2020). *Statistical Bulletin and Annual Report*. Abuja.

Central Bank of Nigeria (2021). *Statistical Bulletin and Annual Report.* Abuja.

Chinanuife, E., Eze, P., & Nwodo, O (2018). Public debt spiral and domestic investment in Nigeria*. Academic Journal of Economics Studies.* 4(1),153-161.

Christensen, J. (2005). Domestic debt markets in Sub-Saharan Africa. *IMF Staff Papers* 52 (3), 518-538.

Coban, S. &Tugcu, T. C. (2015). Do budget deficits crowd-out or in private investment? A dynamic heterogeneous panel estimation. *Empirical Economics Letters*, 14(4).

Damian K., Ude, D.K. &Ekesiobi, C.S (2014). Domestic Debt and Private Investment in Nigeria. *International Journal of Scientific Research and Education* 2(8), 1533-1540.

Debt Management Office (2018). *Annual Reports*, Abuja.

Debt Management Office (2020). *Annual Reports*, Abuja.

Izevbigie, J.N. (2015). Role of public sector debt in facilitating domestic private investment in Nigeria. *Journal of Economics and Development,* 3(1), 61-78.

Jorgenson D.W. (196**7**) Capital Theory and investment behaviour. *The American Economic Review*, 52(2), 247-259.

Maana, I., Owino, R. & Mutai, N. (2008). Domestic debt and its impact on the economy-the case of Kenya. *Paper presented at the 13th Annual African Econometric Society Conference. Pretoria*, South Africa. http://citeseerx.ist.psu.ed [Accessed July 2019].

Mahmoudzadeh, M., Sadeghi, S., & Sadeghi, S. (2013). Fiscal spending and crowding out effect: a comparison between developed and developing countries. *Institutions and Economies,* 5(1), 31-40.

Mbate, M. (2014). Domestic debt, private sector and economic growth in Sub-Saharan Africa. *African Development Review*, 25(4), 434-446.

Nwaeze .N.C. (2017). Public Borrowing And Private Investments In Nigeria: Any Crowding-out Effect? *Journal of Research in National Development*, 24-34.

Omodero, C.O (2019) Domestic Debt and Private Sector Credit in Nigeria: An Empirical Investigation. *Danubius Journals, Danubius University, AUDŒ*, 15(6), 188-207.

Özdemir, B.K & Gomez, E. (2020). The impact of domestic debt on private investment in The Gambia: An ARDL Approach. *Journal of Research in Economics, Politics and Finance*, 5(1),111-127.

Şen, H. & Kaya, A. (2014). Crowding-out or crowding-in?: The effects of government spending on private investment in Turkey. *Panoeconomicus*, 61(6), 631-651.

Ude K. D. &Ekesiobi C .S. (2014). Domestic Debt and Private Investment in Nigeria. *International Journal of Scientific Research and Education.* 2(8), 1533-1540.
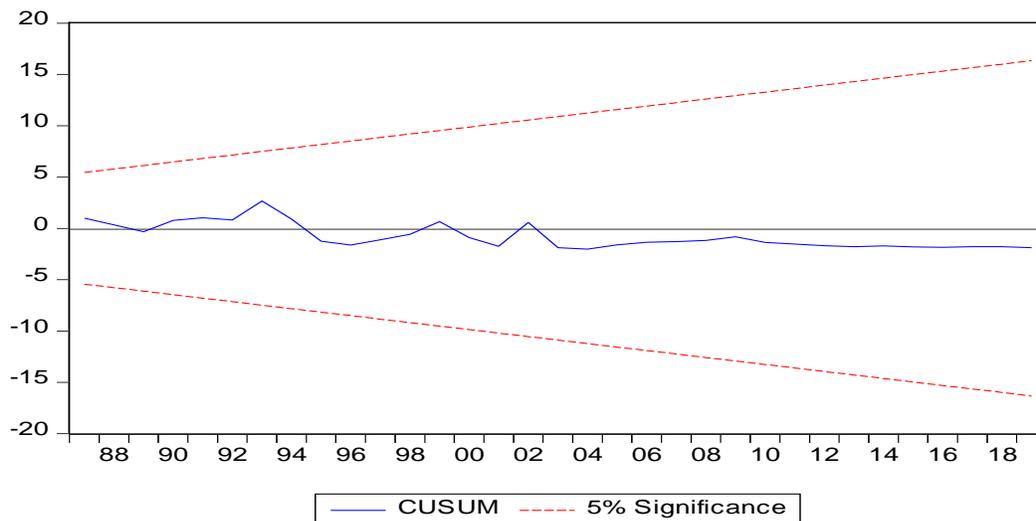
World Bank (2020). *World Development indicators*, Washington DC.

World Bank (2021). *World Development Indicators*, Washington DC.

Xu, X., and Yan, Y. (2014). Does government investment crowd out private investment in China? *Journal of Economic Policy Reform*, 17(1), 1-12.

Appendix

Figure 1: CUSUM Test Result

Source: Author's Computation (2021)