

**FOREIGN DIRECT INVESTMENT, DOMESTIC INVESTMENT
AND OTHER COMPLEMENTARY DETERMINANTS OF
ECONOMIC GROWTH IN NIGERIA
A TIME SERIES ANALYSIS**

Yusuf Umar Dantama*PhD
Department of Economics
Usmanu Danfodiyo University, Sokoto
PMB 2346, Sokoto
Tel: 08034313330
Email: yusuf_dantama@yahoo.ca

and

Usman A. Usman**
Department of Economics
Usmanu Danfodiyo University Sokoto
Tel: 08039648684
PMB 2346, Sokoto
Email: U.usmana84@yahoo.com

*Yusuf Umar Dantama, is a Senior Lecturer with the Department of Economics, Usmanu Danfodiyo University, Sokoto

**Usman A Usman is a Post-Graduate Student with the Department of Economics, Usmanu Danfodiyo University, Sokoto

Abstract

This study investigates the relationship between Foreign Direct Investment and Domestic Investment in Nigeria using time series data spanning 1981 to 2010. The study applied the ADF stationarity test, Johansen Co-integration test, and the Granger Causality test. The result for stationarity shows that all series are stationary at first difference and integrated of order one 1(1), the result for Johansen test shows no long-run relationship between FDI and DI, conversely, Public Debt and debt service have no long-run relationship with DI. However, the result for Granger Causality indicates no causality between FDI and DI in the short-run; Public debt granger causes Debt Service in the short-run. Policy implication is the gross increase in FDI flow in the country may have little or no change on dynamics of domestic investment. FDI flow tends to discourage domestic investors in the economy

thus; this crowds out investment of healthy economies. Sustainable economy succeeds with less FDI, Public Debt and Debt Services.

Key words: *Domestic Investment, Foreign Direct Investment, Public Debt and Debt Service.*

1. Introduction

Domestic investment is fundamentally one of the key economic structures that constitutes and contribute to growth and development. One of the major challenges facing large number of Sub-Saharan African countries is the volatility in oil prices, public debt and debt services. The period 1970's witnessed a rise in oil price which generated huge revenue to Nigerian economy. Similarly, public investment share of GDP rose from 7.8% to 24.3% until 1980's, it fell to 15.4. The adverse consequence of oil price shock and debt led to huge decline in public investment from 16.8 per cent in 1982 to 6.9 per cent in 1985 Oyediji and Raheem (1993). Since 1986's to date, The Structural Adjustment Programme (SAP) of 1986, National Economic Empowerment and Development Strategy (NEEDS) were policy programmes aimed to revamp Nigeria to a domestic production based economy with domestic investment encapsulated in the blue print. Okonjo-Iweala and Osafo-Kwaako (2007) argued that in spite the success recorded in sustaining growth, major challenge remain as the reform agenda failed to translate the benefits of the reform to the citizens by improving domestic investment climate. Thus, the prolonged economic stagnation and rising poverty levels remain acute. The sizeable public debt and debt service considerably consumed resources

for investment, negatively affected socio-economic development and poverty reduction in Nigeria making it to dwindle to an underdeveloped state. The objective of this study is to investigate the whether there is a long-run relationship between FDI inflow and public debt and to also establish the relationship between other complementary determinants of economic growth in Nigeria. However, to achieve this objective, this study is divided into six separate sections including this introduction. Section two explains the theoretical framework, section three reviews recent literature on the relationship between FDI and Domestic Investment in Nigeria, section four captures the methodology, section five explains the analysis and discussion of results, and finally, section six draws its conclusion and policy implications.

2. Theoretical Framework

The Cobb-Douglas theory shows the relationship between output and factor inputs in an economy with aggregate production function expressed as:

$$Y = A\Phi(K, L, F)$$

Y denotes output, K denotes capital, L represents labour, F denotes FDI inflows, and A represents the state of the economy with policy and control variables inclusive that influence the productivity of the economy. Due to the FDI inflows, physical

stock in the recipient economy is composed of domestic (K_d) and foreign-owned (K_f) capital.

The Dependency theory suggests that FDI may not necessarily be of advantage to host economies while Krugman (1998) argues that the transfer of control from domestic to foreign firms may not always be beneficial to the host countries because of the adverse selection problem. According to Agosin and Mayer (2000), domestic firms may be crowded out as a result of unfair competition. Therefore, the theory underpinning this study is theory built by Krugman.

3. Literature Review

Eregha (2011) uses panel data co-integration approach to investigate the relationship between FDI and Domestic investment in ECOWAS Countries for the sample period of 1970 to 2008, evidence shows that FDI had discouraged domestic investment. However, export openness and import openness were found to positive and negative on domestic investment. Rachdi and Saidi (2011) uses panel data to investigate the effect of FDI on portfolio investment in developing and developed economies spanning 1990 to 2009 by applying the generalized method of moment GMM, WG GLS estimator. The authors find that the coefficient of portfolio investment is negative in developing economies although not significant. However, it is positive and significant in developed economies. In another study, Alfa and Tukur (2012) using time series data on Nigeria spanning 1981 to 2010 and apply range of econometric tools, and find

evidence of positive long-run relationship between export, domestic investment and economic growth and a bi-directional relationship between domestic investment and economic growth in the short-run.

Osinubi and Fdiamaghionyeodiwe (2010) examine the relationship between foreign private investment, domestic investment and export on economic growth in Nigeria using time series data spanning 1970 to 2005 applying augmented dickey fuller test and Johansen co-integration test. Results depict that FDI, Net Export and Domestic Investment have positive relationship with economic growth and were all statistically significant.

There are other complementary determinants of economic growth. For instance Akperan (2003) and Eiya (2010) also showed positive relationship between debt and economic growth on Nigerian economy. On sub-Saharan Africa, Iyoha (1999) applies a range of econometric tools and found external debt to have had negative impact on sub-Saharan African economies. Distinctively, although Maana (2008) did not find any evidence of domestic debt crowding out private lending and investment in Kenya. On the contrary, Rufus *et al* (2009) observes domestic debt to have crowds out private lending in Kenya. Were (2001) does not find any severe negative impact of debt services on economic growth; he points out that it affects investment on human capital. Ezike and Mojekwu (2011) uses ordinary least square and Augmented Dickey fuller test on Nigeria data spanning 1980 to 2004 and reported a positive relationship between external debt and economic growth while debt service is

negative to growth. On the contrary, Boboye and Ojo (2012) apply Johansen co-integration technique, the authors found external debt and debt service to have positive impact on national income in Nigeria. However, Ogunmuyiwa (2011) uses time series data using 1970-2007 as sample period and applying Augmented Dickey fuller, Granger causality, Johansen Co-integration test and Vector Correction model to examine the relationship between external debt and economic growth in Nigeria. He reported that debt has no negative effect on growth and there is no causal relationship between external debt and economic growth in Nigeria. Amassoma, (2011) applies the ADF test, Phillip Peron test, the VEC and VAR models on Nigeria for the period 1970-2009, in an empirical study and the evidence shows that there is no co-integration relationship between domestic debt and economic growth with a bi-directional relationship while there is a co-integration with external debt and economic growth.

4. Methodology

This study uses time series data spanning 1981 to 2010 from Nigeria. The data will be collected from secondary source, i.e. CBN Statistical Bulletin through non-probability sampling technique in form of availability data. Basically, owing to non stationarity of series variables, the study subject estimated residuals from Ordinary Least Square (OLS) to differencing such that residuals become stationary avoiding series depending on time. Glynn *et al.* (2007) argues that virtually all macroeconomic variables are not stationary because they fluctuate around a constant long-run mean, indicating that series has a finite variance which depends on time. Since one of the limitations of Augmented Dickey fuller (ADF) is the inherent structural break, Baum (2001) argues that the Augmented Dickey Fuller Generalized Square (ADFGLS) is the most widely used traditional stationarity test due to its robust nature relative to other alternatives. This study will apply the ADFGLS test and it is expressed as:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_t + \delta_t + e_t \dots\dots\dots (1)$$

Where

y_t is a time series, t is a linear time trend, Δ is the first difference operator, α_0 is a constant, n is the optimum number of lags on the dependent variable and e_t is the random error term. When non-stationary

series is differenced once and becomes stationary, it is said to be stationary at first differenced and integrated of order one 1(1) thus, series are seen to be cointegrated Glynn *et al* (2007). The equation for cointegrated series will be expressed as:

$$l\text{dominvt}_t = \beta_0 + \beta_1 l\text{FDI}_{t-1} + \beta_2 l\text{PUBDEBT}_{t-1} + \beta_3 l\text{DEBTSERV}_{t-1} + u_t \text{ where } u_t \sim 1(0) \dots \dots \dots (2)$$

Where

$l\text{dominvt}$ = Natural log of domestic investment

β_0 = The intercept

β_1 = Vector of the estimated coefficient of the lag values of FDI

β_2 = Estimated coefficient vector of public debt

β_3 = Estimated coefficient vector of Debt service

l_{t-i} = lag values of series or estimated residuals.

There will be linear combination with series becoming stationary

$$u_t = l\text{DOMINV}_t - \alpha_1 l\text{FDI}_{t-1} - \alpha_2 l\text{PUBDEBT}_{t-1} - \alpha_3 l\text{DEBTSERV}_{t-1} - \alpha_0 \dots \dots \dots (3)$$

According to Fernandes (2009) the VEC is to show the normalized co-integration coefficients which are the long-run equilibrium coefficients for the detected relationship. The VEC is expressed as:

$$EC_t = l\text{DOMINV} + \alpha_1 l\text{FDI}_{t-1} + \alpha_2 l\text{PUBDEBT}_{t-1} + \alpha_3 l\text{DEBSERV}_{t-1} + \alpha_0 \dots \dots \dots (4)$$

The growth equation changes as a result of domestic investment normalizing as 1 taking the form of dependent variable as domestic investment takes the subject of the formula hence all signs changes due crossing of equal sign Fernandes (2009).

$$l\text{DOMINV}_t = -\beta_0 - \beta_1 l\text{FDI}_{t-1} - \beta_2 l\text{PUBDEBT}_{t-1} - \beta_3 [l\text{DEBTSERV}_{t-1} - EC_t] \dots \dots \dots (5)$$

The granger causality test is applied to indicate short-run equilibrium relationship and direction of flow where series ceases to show long-run equilibrium, it means there are no co-integration among series,

therefore, the error term is treated as the equilibrium error, error correction mechanism to show both long-run and short-run effect (Keele and De Boef 2004). Vector autoregressive VAR is expressed as:

$$l\text{DOMINV}_t = \beta_0 + \beta_1 l\text{DOMINV}_{t-1} + \beta_2 l\text{FDI}_{t-1} + \beta_3 l\text{PUBDEBT}_{t-1} + \beta_4 l\text{DEBTSERV}_{t-1} + ut \dots \dots \dots (6)$$

Variable Definition

Domestic investment is measured by gross domestic investment

Foreign Direct Investment is measure as gross foreign private investment

Public Debt is measured as gross total public debt
 Debt Service is measured by gross total public debt servicing.

5 Empirical Results and Discussion

The empirical result of Dickey fuller test on Domestic Investment, Foreign Direct Investment, Public Debt and Debt Service indicates stationarity of series at level and differenced values.

Table 1. Summary of ADFGLS Stationarity Test

Variable	Level Value	Difference Value	Conclusion
Domestic Investment	-1.961(2)	-3.446(2)**	1(1)
Foreign Direct Investment	-2.229(2)	-3.193(3)*	1(1)
Public Debt	-1.511(4)	-3.922(6)***	1(1)
Debt Service	-1.843(5)	-4.800(1)***	1(1)

Source: Author's Calculation using STATA 9.1

Note: * ** and *** depicts 10%, 5% and 10% level of significance while the values in bracket are the lag values.

The result for Dickey fuller GLS indicates that at level various level values, all series variables are not stationary. This is because trace statistics are greater than the critical values at all level. However, all series trace statistic are less than the critical values at differenced value which

denotes stationary. Moreover, all variables become stationary after being subjected to first differencing at various levels of significance. All series are stationary at first difference and integrated at order one 1(1).

Optimal lags to be included in the Johansen Co-integration analysis will determine the lags selection as shown by SBIC, SQIC, AIC, FPE.

Table 2 The Result of Optimal Lag Selection to be included in the Johansen Co-integration Test will show number of Co-integration vectors.

```
. varsoc ldominv lfdi lpubdebt ldebserv, maxlag(4) lutstats

Selection order criteria (lutstats)

Sample: 1985 2010          Number of obs   =   26

+-----+
|lag | LL   LR   df  p   FPE   AIC   HQIC  SBIC |
|----+-----|
| 0 | -108.433          .067027 -3.01051 -3.01051 -3.01051 |
| 1 | -31.9021 153.06 16 0.000 .000649* -7.66673* -7.44378* -6.89252* |
| 2 | -16.2585 31.287 16 0.012 .000737 -7.63932 -7.19343 -6.09089 |
| 3 | -5.7355 21.046 16 0.177 .00148 -7.21801 -6.54917 -4.89537 |
| 4 | 8.16101 27.793* 16 0.033 .003269 -7.0562 -6.16442 -3.95935 |
+-----+
```

Source: Author’s Calculation using STATA 9.1

The output for optimal selection shows that one lag be included in our test for Johansen co-integration given the criteria stated by Akaike Information Criteria (AIC), Hannan Quinn Information Criteria (HQIC), Schwartz Bayes Information Criteria (SBIC). Glynn *et al.*, (2007) rpressed that the use of optimal lag selection criteria have become widely

accepted approach in determining numbers of lags in time series and unit root test in general.

The Johansen Co-integration analysis shows the number of Co-integration vectors which determines the long-run relationship.

Table 5. Summary of Granger Causality Test for Short-run Relationship
Dependent Variable Independent Variable

Dependent Variable	Independent Variable	Chi-square Statistics	Remarks
Natural log of Domestic Investment	Natural log of Foreign Direct Investment	-.0056222 (0.970)	Causality does not run from FDI to DI
Natural log of Domestic Investment	Natural log of Public debt	-.2597219 (0.185)	Causality does not run from public debt to DI
Natural log of Domestic Investment	Natural log of Debt Service	.2659849 (0.108)	Causality does not run from debt service to DI
Natural log of FDI	Natural log of DI	.102689 (0.211)	Does not run from DI to FDI
Natural log of Foreign Direct Investment	Natural log of Public Debt	.1125681 (0.285)	Does not run from Public debt to FDI
Natural log of Foreign Direct Investment	Natural log of Debt Service	.0382272 (0.668)	Causality does not run from debt service to FDI

Natural log of Public debt	Natural log of Foreign Direct Investment	.1515963 (0.232)	Does not run from FDI to public debt
Natural log of public debt	Natural log of Domestic investment	-.1349595 (0.302)	Does not run from DI to public debt
Natural log of public debt	Natural log of debt service	-.0099112 (0.944)	Does not run from debt service to public debt
Natural log of debt service	Natural log of DI	.0907127 (0.520)	Does not run from DI to debt service
Natural log of debt service	Natural log of FDI	-.0307877 (0.822)	Does not run from FDI to debt service
Natural log of debt service	Natural log of public debt	.7446605 (0.000)***	Causality runs from Public debt to debt service.

Source: Authors Calculation using STATA

Basically, the Granger Causality test is applied owing to absence of co-integration or long-run relationship vectors in the Johansen co-integration test. However, the granger causality test indicates causal flows between series. The results for granger causality test for short-run relationship show that there is a causal relationship between public debt and debt service in the short-run and the causality flows from public debt to debt service. This means that public debt causes debt service. Based on theoretical grounds, debt services is a major consequence of non-concessionary borrowing. However, neither of the variable granger causes domestic investment in the short-run.

6 Conclusions and Policy Implication

This study seeks to examine the effect of FDI on Domestic investment, and other determinants of domestic investment in Nigeria using the annual time series data from 1981 to 2010. The data is sourced from CBN Bulletin and the statistical tool used for analysis is STATA 9.1. The following tests were conducted and are as follows: ADFGLS, Johansen Co-integration, VECM and Granger Causality test.

From the empirical analysis, it can be deduced that FDI and DI have no long-run relationship, conversely, public debt and debt services have no long-run

relationship with domestic investment in Nigeria as well.

The result for Granger Causality test indicates no short-run relationship between FDI, public debt, debt service and Domestic investment in Nigeria. However, it shows that there is a causal relationship between public debt and debt services with public debt granger causing debt service in the short-run though the direction is uni-direction flow, i.e. public debt granger causes debt services. Policy implication is the gross increase in FDI flow in the country may have little or no change on dynamics of domestic investment. FDI flow tends to discourage domestic investors in the economy, this does not help healthy economy. However, public debt and debt service appears not to have any co-integration with domestic investment in Nigeria, policy makers must be conscious of funds borrowed in the name of financing investment. An economy is healthy when its investment profile is sustainable but unsustainable when it is highly indebted with large inflow of FDI having no impact on the economy.

This study recommends that Nigerian economy should concentrate much on growing domestic investment and not FDI. There should also be low public debt and debt service profile as none appears to be cointegrated with domestic investment within the sample period used.

References

- Alfa B and Tukur G (2012) The Relation between Domestic Investment and Economic Growth in Nigeria *International Journal of Research in Social Sciences* Vol. 2 No 8.
- Agosin, M. R. & Mayer R (2000), "Foreign Investment in Developing Countries", UNCTAD Discussion Papers, No. 146.
- Aktas, Cengiz and Yilmaz V (2008) "Causal Relationship between Electricity Consumption and Economic Growth in Turkey". *ZKU Sosyal Bilimler Dergisi*, 4(8):45-54.
- Aktas, C. and V. Yilmaz (2008): "Causal Relationship between Electricity Consumption and Economic Growth in Turkey". *ZKU Sosyal Bilimler Dergisi*, 4(8):45-54.
- Amassoma, D. (2011): "External Debt Internal Debt and Economic Growth Bound in Nigeria Using Causality Approach" *Current Journal of Social Science*, 3(4): 320-325.
- Baum, F. C (2001) "Stata the language of Choice for time series analysis?" *The Stata Journal*, 1(1) 1-16.
- Boboye A L and Ojo A M (2012) Effect of External Debt on Economic Growth and Development of Nigeria, *International Journal of Business and Social Science* Vol. 3 No. 12
- Erega P. B (2011) The Dynamic Linkages Between Foreign Direct Investment and Domestic Investment in ECOWAS Countries: A Panel Co-integration Analysis. Being a paper Presented at the 2011 Conference of the Centre for the Study of African Economies, Oxford University, Oxford, UK between 20th-22nd March.
- Ezike J E and J N Mojekwu, (2011) The Impact Of External Debt On Macro-Economic Performance *International Journal of Business and Management Tomorrow* Vol. 1 No. 2.
- Fernandes, A. Costa (2009) Explaining Government Spending A Co-integration Approach FEP *Working Paper No 311*. University of Porto, Portugal.
- Glynn J; N Perera and R Verma (2007) Unit Root Test and Structural Break: A Survey with Applications *Resvista de Metodos Cuntitativos Para la Economia y la Empresa* No 3, 63-79.
- Hall, S. G. (1986) An Application of Granger and Engle and Granger Two-Step Estimation Procedure to United Kingdom Aggregate Wage Data, *Oxford Bulletin of Economics and Statistics* Vol. 48 no 3 229-239.
- Iyoha M. A. (1999): External Debt and Economic Growth in Sub Saharan African Countries: An Econometric Study, *African Economic Research Consortium, (AERC) Research Paper 90: 1-53* Nairobi.
- Keele, L and Suzanna De Be of (2004) Not Just for Co-integration: Error Correction Moddels with Stationarity Data Discussion Paper.
- Krugman, P. (1998), "Fire Sale FDI", working paper, Massachusetts Institute of Technology.
- Maana, I., Owino, R. and N. Mutai (2008): Domestic Debt and its Impact on the Economy: The Case Study of Kenya paper presented during the 13th annual African econometric conference in Pretoria South Africa 1-27.

- Ogunmuyiwa M. S. (2011): Does External Debt Promote Economic Growth In Nigeria? Department of Economics: Olabisi Olanjo University Ogun State Nigeria. *Current Research Journal of Economic Theory*, **3**(1): 29-35.
- Okonjo-Iweala, N. and P. Osafo-Kwaako (2007): Nigeria's Economic Reforms Progress and Challenges the Brookings Institution 1775 Massachusset Av., NW Washington, DC 20036 *Working Paper* 6: 1-28.
- Oyejide, F.A. and M.I. Raheem. (1993) Nigeria. In the Rocky Road to Reform. Taylor (ed.) United National Press.
- Osinubi T. S and Amaghionyeodiwe (2010) foreign Direct Investment and Economic Growth in Nigeria Volume 3 issue 1 105-127.
- Rufus, I. A. and P. O. Segun (2008): Optimizing macroeconomic investment decision A Lesson for Nigeria Department of Economics, Faculty of Social Science, University of Ibadan. *Journal of Scientific Research* 22(4).
- Tang, S., E.A. Selvanathan and S. Selvanathan (2008): FDI, Domestic Investment and Economic Growth in China A Time Series Analysis. *UNU-WIDER Research Paper No. 2008/19*. World Institute of Development Economics Research Helsinki, Finland.