FINANCE OF ECONOMIC DEVELOPMENT IN NIGERIA: DOES FOREIGN CAPITAL INFLOWS COMPLEMENT DOMESTIC SAVINGS?

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ABSTRACT

This study examines the interactive effects of domestic savings and foreign capital inflows on economic development in Nigeria. It investigates the dynamic linkage between economic development variables and the interaction of domestic savings and foreign capital inflows into the country. Annual data on savings, investment, export, import, gross domestic product growth rate and other variables for computation of an index for measuring human development in Nigeria between 1981 and 2021 are sourced from the Central Bank of Nigeria statistical bulletin (2022), World Bank Development Indicators (2020) and Human Development Report (2022). Technique of autoregressive distributive lag is used to determine the dynamic relationship among these variables in Nigeria. The results of the interactive models show that official development assistance complements domestic savings to have positive effect on gross domestic product growth rate but foreign direct investment crowds out domestic saving's positive effect on gross domestic product growth. However, foreign direct investment is found to complement domestic savings in its positive effect on index for human development in Nigeria. The study recommends that more official development assistance and foreign direct investment should be attracted into the country to complement domestic savings in its positive effects on gross domestic product growth rate and index for human development respectively in Nigeria. However, in the case of official development assistance, government should monitor its disbursement. It should not be used for consumption purpose, efforts should be intensified to ensure that corruption and embezzlement are curbed and to ensure its judicious use.

KEYWORDS

Domestic Savings, Official Development Assistance, Foreign Direct Investment, Gross Domestic Product, Index for Human Development.

INTRODUCTION

Background to the Study

The finance of economic development has been an issue of concern to all countries of the world. All countries, developing or developed, strive at increasing its rate of economic growth and development over the years (Nwanne, 2014; Adebayo, 2020). However economic development has to be financed by resources which are to be mobilized internally or externally. Savings and investment have been important factors in the development process. In fact, the above studies make it clear that the level of growth a country can achieve, to a large extent, depends on the level of investment in the country. The higher the level of investment, the higher is the expected level of economic growth and hence development (Gabriel, Paschal, Chinedu & Josaphat, 2020).

Similarly, investment is dependent on the level of saving in the economy. In a planned economy, the savings of individual households, corporate firms and those of government enterprises are aggregated and channeled into investment through the banks which serve as the intermediary between the depositors and the investors. Savings when converted into investment is used by investors to augment working capital, establish new industries, replace the wears and tears in the existing capital stock and also adds to the capital stock within the economy thereby creating employment opportunities and increasing the level of output in various sectors of the economy (Ebele & Iorember, 2016; Keho, 2019). Therefore, the level of investment in the economy is largely affected by the level of aggregate savings in the economy.

Despite large deposit of natural and human resources in Nigeria, savings is generally low to propel investment and the growth of the economy to a desired level of growth and development (Balogun, Okafor & Ihayere, 2019; Okoro, Nzotta & Alajekwu, 2019). Although the problem of low savings has been a common trait to most developing countries, it has to a large extent been a factor to their underdevelopment.

As the level of domestic savings of the country is low, it becomes difficult to finance additional investment needed to achieve the desired development. Given such a situation, the complementarity of foreign resources, particularly foreign capital inflows and the domestically mobilized savings would have intensified the level of investment and improve economic growth and development. Foreign capital inflows into the Nigerian economy have been fluctuating since 1981.A combination of Official development assistance and foreign direct investment accounted for 0.42% of GDP in 1983. This figure rose to a high value of 5.10% in 1989 and further to 6.39% in 1994. The sum was however on a downward trend since1994 reaching 1.83% in 24.it started rising again from 2005 till 2006 when it was 6.99%. Since2006, it was fluctuating at a low level. It stood at 1.55% as at 2019. Despite this inflows of foreign capital, the rate of development has remained very low. The question calling for an answer remains how this inflows of foreign capital is affecting domestic savings and the growth and development of the country.

Theoretical and Empirical Review

Basically there are two points of view in literature as far as the roles of foreign capital inflows on economic growth are concerned. The first proponents are of the view that foreign capital inflows are indeed a necessity for economic growth and development in developing countries. This school of thought is of the opinion that there is a positive relationship between foreign capital inflows and economic growth. This school claims that foreign capital inflows complement domestic resources on one hand and help in closing the foreign exchange gap in procuring capital import from overseas on

another hand. It is also believed that foreign capital inflows also provide access to managerial skills as well as modern technology (Chigbu, Ubah & Chigbu, 2015).

The other proponents are of the view that foreign capital inflows exert negative effects significantly on the economic growth of recipient countries. They contend that foreign capital inflows are fully consumed and as such, substitutes domestic resources rather than complimenting it. They claim further that foreign capital inflows assist in importing inappropriate technology, encourage a corrupt and inefficient government and distort the domestic income distribution in developing countries (Griffin & Enos, 1970).

Empirically, various studies carried out on the effect of foreign capital inflows on economic growth in Nigeria reported positive effect of foreign capital inflows on growth (Igbinedion & Olele, 2018; Angmortey & Tandoh-Offin, 2014). Some studies however reported negative effect (Basnet, 2013; Workneh, Migbaru & Alamirew, 2013) while some even concluded that there is no relationship between foreign capital inflows and economic growth in Nigeria. Apart from the inconclusiveness of the extant studies, these studies did not take into cognizance the effect of the complementarity of foreign capital inflows and domestic savings on growth and development. The response of the economy to foreign capital inflows has been argued to depend on the extent to which it complements savings rather than substituting it (Basnet, 2013). In particular this depends on the interaction between foreign capital inflows and domestic savings in the country. The effect of foreign capital on Nigeria's economic growth must therefore not be assessed in isolation but holistically, taking into cognizance its interaction with the level of savings in the country.

Empirical studies abound on the impact of foreign capital on domestic savings in developing countries. The results of their findings have continued to differ depending on the different measures of variables, methodologies and environmental diversities. Some of these studies are reviewed here.

Igbinedion & Olele (2018) examines the nexus between foreign aid and domestic savings using Johansen co-integration and error correction modeling in Nigeria, applying time series data for the period 1980-2015. The finding reveals that foreign aid complements domestic savings in Nigeria, suggesting that the problem of low savings in the economy may most probably be associated with other factors, not foreign aid. Also, results show that strong growth in gross domestic product positively and significantly influence domestic savings, while growth in per capita income fails to significantly promote aggregate national savings due, perhaps, to its subsistence level of the economy.

Angmortey & Tandoh-Offin (2014) also examines the contribution that foreign capital has on the Ghanaian economy. The work examines the effect of foreign capital inflows on domestic savings. Using real gross domestic product, foreign borrowing and foreign direct investment as independent variables, it examines their effects (foreign direct investment, foreign aids and grants and foreign commercial borrowing) on domestic savings. The study uses the co-integration technique for the estimation of the long-run and the Error Correction Model (ECM) to estimate the short-run dynamic savings model in Ghana. The result of the study shows that there is a significant and positive effect of foreign capital inflows on real domestic savings in Ghana in the long run, though not steady but volatile. The short-run dynamic model reveals that foreign capital has no significant effect on real domestic savings in Ghana in the short-run. Therefore the three components of foreign capital inflows do not displace domestic savings both in the short-run and the long-run.

In another study, Burke & Almadi-Esfahani (2006) tests the effectiveness of foreign capital inflow (aid) in promoting growth in three South East Asian countries using a simultaneous equations model in which economic growth and savings are jointly determined. Their findings indicate that aid has an insignificant effect on the growth rates of the sampling countries during 1970-2000 and does not displace domestic savings.

Özcan Karahan (2019) is motivated by large financial capital inflows to Turkey within the last ten years to study the impact of capital inflows on domestic savings in Turkey. The study employs Autoregressive Distributed Lag (ARDL) Bound Testing Approach with quarterly data for the period between 2002 and 2018 after examining unit root with both Augmented Dickey Fuller (ADF) and Philips-Perron (PP) unit root tests. Findings of the study reveal that capital inflows does not have positive effect on domestic savings in Turkey as expected. The study reports that capital inflows has a substitution effect instead of complementary effect on domestic savings in the Turkish Economy. The results also reveal that Turkey is experiencing a significant increase in external dependence and thus a fragile financial market.

Basnet (2013) also investigates the role of foreign aid on domestic savings and economic growth in South Asian countries of Bangladesh, India, Nepal, Pakistan, and Sri-Lanka. He develops a simultaneous equation system and using a two stage least square method of analysis. In the model, economic growth and savings are jointly determined (both endogenous variables). The results indicate that aid has a positive and significant effect on the growth rates of the five nations studied during 1960 to 2008. However, foreign aid appears to crowd out domestic savings rather than complementing it in contrast to Burke & Almadi-Esfahani's study.

Workneh (2013) analyses the effect of foreign aid on domestic savings in Ethiopia within the period of 1981 to 2011. The study uses annual time series data to examine the relationship between foreign aid and domestic savings. Foreign aid is disaggregated into bilateral aid and multilateral aid for analytical purpose and multivariate cointegration analysis is employed for the regression Finding of the study reveals that multilateral aid inflows is positively significant, exerting positive effect on domestic savings in the long run. Bilateral aid on the other hand is also significant but with negative effect on domestic savings. The study contends that foreign multilateral aid enhances economic growth by complementing domestic savings while foreign bilateral aid retards economic growth and development by crowding out domestic savings most especially when the fund is spent for consumption rather than productive purposes.

In his own study, Serieux (2009) examines the effect of aid on domestic savings in the Sub-Saharan Africa. The effect of aid on savings is estimated using a panel data regression with the data set covering 29 Sub-Saharan African countries for a period of 1965 to 2006. In fact, within the period 1965-2006, the results suggest that 35 percent of an increase in aid relative to output is used to finance reverse flows (interest payments, capital flight, debt amortization and reserve increases), 41 percent is used in increasing consumption proportional to output (i.e. a reduction in the rate of domestic savings) and 24 percent is used in increasing the investment rate. However, it is discovered that during the extended period of increasing aid levels, i.e. from the early '70s to mid '90s, reverse flows responsible for a larger proportion of aid, but more aid is invested and less consumed.

The review of empirical literature indicates divergent views and positions in term of nature and direction of interaction among savings, foreign capital inflows and economic development. Most of the reviewed studies are characterized by mixed and diverse findings mostly due to data accessibility

and methodological issues. This makes the results on capital inflows and economic development studies in the less developed nations inconclusive.

Methodology

This study is premised on Neoclassical school of economic thought. The theory provides the context within which the theoretical and analytical framework of the study is captured. The theory also provides the model linking savings, foreign capital inflows and economic growth and development. The neoclassical growth theory asserted that it is possible to explain the broad patterns of economic growth change across countries by looking at it through the lens of aggregate production function. This aggregate production function according to Solow Swan (1956), relates the total output of an economy to the aggregate amounts of labour, rate of capital accumulation and a measure of technological level in the economy. The model explains that savings, capital accumulation, among others and technological progress are the dominant drivers of economic growth.

The theory assumes free market system that is characterized by liberalization of domestic markets, savings is seen as important for investment growth, but not necessarily domestic savings as foreign savings can be substitute for domestic savings in a liberalized economy.

Solow-Swan model presents Cobb-Douglas production function expressing a relationship between the production factors (like capital, labour and technology) and the level of output or the growth of the economy as presented in the equation below:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \qquad (1)$$

There are other variables which also influence the rate of growth in an economy in addition to those highlighted in the model. These variables however operate through the factor productivity A_t.

In specifying the study's model, the study adapts the school of thought's model as expressed in equation 1 and modifies it with other factors influencing the economy's total welfare.
To incorporate the control variables into the model, the technology or factor productivity, A_t, in equation 1 can be expressed as

$$A_t = f(RD_t, FCI_t, SAV_t,) = RD_t^{\alpha_3} FCI_t^{\alpha_4} SAV_t^{\alpha_5} \qquad (2)$$

where RD_t is Research and development, FCI is the foreign capital inflows variable and SAV is the domestic savings. Substituting 2 into equation 1, and Y being ECDEVT, the economic development variable, equation 1 becomes

$$ECDEVT_t = C_t CAPS_t^{\alpha_1} LABF_t^{\alpha_2} RD_t^{\alpha_3} FCI_t^{\alpha_4} SAV_t^{\alpha_5} \qquad (3.3)$$

Linearising equation 3.3, by taking natural logarithms of both sides,

$$\ln ECDEVT_t = \alpha_0 + \alpha_1 \ln CAPS_t + \alpha_2 \ln LABF_t + \alpha_3 \ln RD_t + \alpha_4 \ln FCI_t + \alpha_5 \ln SAV_t + \varepsilon_t \qquad (4)$$

Where $\alpha_0 = \ln C_t$, α_1, α_2, α_3, ..., α_7 are constant elasticity coefficients of $ECDEVT_t$ with respect to $CAPS_t$, $LABF_t$, RD_t, FCI_t, SAV_t and ε_{1t}, the error term. $ECDEVT_t$ is a measure of economic development.

In order to capture the interactive effect of capital inflows and savings on economic development, the interaction variable of savings and foreign capital inflows (SAV*FCI) is included in this model thus

$$lnECDEVT_t = \alpha_0 + \alpha_1 lnCAPS_t + \alpha_2 lnLABF_t + \alpha_3 lnRD_t + \alpha_4 lnFCI_t + \alpha_5 lnSAV_t + \alpha_6 ln(FCI * SAV)_t + \varepsilon_t \quad (5)$$

Economic development (ECDEVT) is a vector of two variables-GDP and a constructed index for huan development, IHD. While GDP measures the economic growth aspect of economic development, IHD measures the structural changes, especially in terms of standard of living, education and health. Foreign capital inflows (FCI) is also a two variable vector, official development assistance (ODA) and foreign direct investment (FDI).

Equation 5 gives room to assess the role played by joint interaction of savings and foreign capital inflows, as a different variable, in influencing economic development in the country.

Equation 5 is estimated using Autoregressive Distributed Lag (ARDL) after the stationary conditions of the variables have been examined. This technique has been found to be more efficient when the variables of a model exhibit different stationary properties particularly a combination of I(0) and I(1) (Mariana, Cristina & Mihaela, 2020; Nagawa & Bbaale, 2020). The empirical analysis involves estimating directly the long-run and the short-run variants of equation 5. An ARDL model of this equation is therefore specified as follows

$$\Delta lnECDEVT_t = \alpha_0 + \sum_{i=0}^{n} \alpha_{1i}\Delta lnECDEVT_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\Delta lnCAPS_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\Delta lnLABF_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{4i}\Delta lnRD_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\Delta lnFCI_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta lnSAV_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{7i}\Delta lnFCI * SAV_{t-i} + \delta_1 lnECDEVT_{t-1} + \delta_2 lnCAPS_{t-1} + \delta_3 lnLAF_{t-1}$$
$$+ \delta_4 lnRD_{t-1} + \delta_5 lnFCI_{t-1} + \delta_6 lnSAV_{t-1} + \delta_7 lnFCI * SAV_{t-1} + u_t \quad (6)$$

where Δ denotes the first difference operator, α_0 is the drift component, u_t is the usual white noise residuals.

The ARDL bounds testing approach to cointegration depends on the tabulated critical values by Pesaran et al. (2001) in order to take decision about cointegration among variables. The null hypothesis of no cointegration is $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$ in the model while the alternative hypothesis of cointegration among variables is $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0$. Next, is to compare the calculated F-statistics with lower critical bound and upper critical bound by Pesaran *et al.* (2001). There is cointegration among variables if calculated value of F-statistics is more than upper critical bound. If lower critical bound is more than computed F-statistics then hypothesis of no cointegration may be accepted. Finally, if calculated F-statistics is between lower and upper critical bounds then decision about cointegration is inconclusive.

The error correction version of ARDL model pertaining to the variables in equation 5 is specified as follows:

$$\Delta lnECDEVT_t = \alpha_0 + \sum_{i=0}^{n} \alpha_{1i}\Delta lnECDEVT_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\Delta lnCAPS_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\Delta lnLABF_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{4i}\Delta lnRD_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\Delta lnFCI_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta lnSAV_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{7i}\Delta ln(FCI * SAV)_{t-i} + \gamma lnECM_{t-1} + u_t$$

(7)

where γ is the speed of adjustment parameter and ECM is the residuals that are obtained from the estimated cointegration model of equation (5).

Measurement of Human Development

Although the most acceptable index for measuring human development in the literature remains HDI, one of the computing variables of the index, mean years of schooling, is not available for Nigeria until 2003. HDI is a composite measure of average achievement in three basic dimensions of human development- a long and healthy life, knowledge and a decent standard of living. However unavailability of mean years of schooling data makes data unavailability for Nigeria until 2003. An index, computed index for human development (IHD), is thus constructed as a measure of human development in Nigeria for the purpose of this study. IHD is constructed to proxy UNDP's HDI and it is constructed exactly in the methodology of the UNDP's HDI. All the variables and data are from the UNDP's data base are adopted except for the missing variable (mean years of schooling). Mean years of schooling is thus replaced in the HDI by school enrollment at all level of education in computation of IHD. The computation of IHD is thus

$$IHD = \sqrt[3]{\text{Income index X Life expectancy index X Education index}}$$

Where each index is calculated as

$$Index = \frac{ActualValue - MinimumValue}{MaximumValue - MinimumValue}$$

Life expectancy is used as a proxy for health, gross national income per capita is a proxy for standard of living while school enrollment at all level of education and expected years of schooling are proxies for education. The minimum and maximum values of each variable are as found in the UNDP's HDI.

A correlation coefficient was also found between the data obtained for the constructed IHD and the UNDP's HDI for the period 2003 and 2021when data was available for Nigeria's HDI. The correlation coefficient was found to be 89.7% indicating that IHD is a good proxy for UNDP's HDI for measuring human development.

Data Measurement and Sources

This study covered a period of 41 years spanning 1981 to 2021. The choice of the period is informed by two factors – availability of data and implementation of various development policy reforms. Since so many variables are involved, the study was constrained by data availability (on all the variables) to the period so selected. The period was also characterized by the implementation of various fiscal,

financial, institutional and structural reforms in Nigeria. Data for these variables are collected from WDI (2022), CBN statistical bulletin (2022) and HDR (2022).

Model Estimations and Empirical Analysis

This section provides an empirical analysis of the interactive effects of foreign capital inflows and domestic savings on economic development so as to establish the substitutability or otherwise of domestic savings by foreign capital inflows in the course of development financing in the country.

Unit root test results

The first step of any time series estimation is to determine the order of integration of the series. In this study, two formal tests of stationarity are employed. The two formal tests are the Augmented Dickey Fuller (ADF) and the Phillips-Perron unit root tests. The results from tests give the same outcome for each variable's stationary level, hence only the results from Augmented Dickey Fuller are presented. Table 1 therefore presents the stationarity/unit root test results.

It should be noted that the test is a test of null hypothesis of a unit root. Therefore, a rejection of the null hypothesis under any of the ADF or means the series does not have a unit root. The results for the ADF tests in Table 1 show that five of the series –GDPGR, CAPS, RD, ODA and FDI are stationary at level, since their test statistics (second column) are all negative greater than the MacKinnon 5 per cent critical value of -2.94. This is equally confirmed by their t-statistic probability values which are less than 5% each. However, IHD, LABF, EXCR, and SAV are less negative than the critical value and their t-statistic probability values are greater than 5%, thus are not stationary at level. When the test is applied to first differences of all the series that are not stationary at level, they all become stationary implying that they are stationary at first differences, that is they are I(1). Results based on the Phillips-Perron are very consistent with those of ADF.

Table 1: ADF Unit root/stationarity test (with intercept)

Variables	Level t-Statistic	Prob	1st Difference t-Statistic	Prob	Remark
GDPGR	-4.158*	0.0024	-10.08	0.0000	I(0)
IHD	0.971	0.9954	-5.624*	0.0000	I(1)
CAPS	-3.632*	0.0096	-4.477	0.0010	I(0)
LABF	-1.246	0.6442	-5.005*	0.0002	I(1)
RD	-3.686*	0.0083	-7.298	0.0000	I(0)
ODA	-4.214*	0.0021	-6.847	0.0000	I(0)
FDI	-3.933*	0.0043	-8.020	0.0000	I(0)
EXCR	1.400	0.9987	-4.258*	0.0018	I(1)
SAV	-2.300	0.1771	-6.659*	0.0000	I(1)

Note: The MacKinnon (1996) 5% critical value = -2.941145 for level stationary and -2.943427 for first difference   stationary,* denotes the rejection of the hypothesis of a unit root.

It can be concluded therefore that four of the series are first difference stationary, I(1) while the other five are level stationary, I(0). The data for the I(1) variables, - IHD, LABF, EXCR, and SAV are first differenced before they are entered into the models for estimations.

Lag Length Selection and Bound Cointegration Tests

For the purpose of this analysis, the study's model is sub-divided into models I, II, III and IV based on the components of economic development and foreign capital inflows. Models I and II have gross domestic product as their dependent variable with different variables as components of foreign capital inflows. While model I has official development assistance as its foreign capital inflows variable, model II has foreign direct investment as its foreign capital inflows variable. Models III and IV have index for human development (a proxy for economic development) as their dependent variable but contain official development assistance and foreign direct investment as their foreign capital inflows variables respectively.

As for the choice of the lag order for ARDL, the information criterion approach is employed as a guide in selecting the lag order. The selection is drawn from a maximum of 3 lags, this is in order to allow for adjustment in the models as well as the attainment of well behaved residuals. The results show that lag 3 is selected by at least 3 of Sequential Modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC) Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) tests in all the four models. The study thus adopts lag 3 for each of the models so as to improve the degree of freedom.

Next is the conduct of the cointegration test to ascertain if there is a long run relationship in each of the model. Table 2 presents the results of ARDL bound cointegration tests in models I to IV. The result from the table reveals that F-statistic for models I, II, III and IV are 5.880, 3.865, 4.378 and 8.418 respectively. Each of the model's F-statistic is greater than the 5% Perasan critical upper bound value of 3.61, hence the establishment of long run relationship between the dependent and the independent variables in each of the models.

Table 2: Bound Cointegration Test Results

Test Statistic	K	Model I	Model II	Model III	Model IV
F-statistic	6	5.879	3.865	4.378	8.418
Prob Value		0.012	0.023	0.022	0.002
Perasan critical Value			Lower Bound		Upper Bound
1%			3.15		4.43
5%			2.45		3.61
10%			2.12		3.23

Source: Author's computation (2023).

Estimation results

The main objective of this study is to investigate the interactive effects of foreign capital inflows (official development assistance and foreign direct investment) and domestic savings on economic development in the Nigerian economy. As earlier stated, the interactive model relates economic development variables (gross domestic product and index for human development) to a vector of independent variables including domestic savings, foreign capital inflows and the interaction of foreign capital inflows and domestic savings. The method of estimation is autoregressive distributive lag (ARDL). The interactive model as earlier mentioned is sub-divided into models I, II, III and IV based on the components of economic development and foreign capital inflows. The results of unit root tests, lag length selection tests, cointegration tests and diagnostic tests have been reported in the test results section. The reports of short run and long run estimation results are presented and discussed in this section, first with short run estimation results.

Short Run Regression Results

The ARDL estimation results are presented in table 3 in case of models I and II where the dependent variable is GDP growth, and in table 4 in case of models III and IV where the dependent variable is index for human development. The error correction term (ECT) which indicates the speed of adjustment from disequilibrium to equilibrium in the following year is estimated. The signs of the coefficients of ECT are negative in all the models and they are all statistically significant at 5% ($t = -6.009$, $p < 0.05$, $t = -4.367$, $p < 0.05$, $t = -4.213$, $p < 0.05$ and $t = -5.941$, $p < 0.05$ for models I-IV respectively). The economic interpretation of the results is that about 20% and 52% of the discrepancies between long run and short run dynamics are corrected within the following year in case of models I and II respectively (table 3). In case of models III and IV however, about 87% and 62% of the discrepancies between long run and short run dynamics are resolved in the following year. These results show that there is a high speed of adjustment within a year interval for all models except model I in which the speed of adjustment is 20%.

In model I (table 3), although the Wald f-statistic result shows that the coefficients of official development assistance, domestic savings as well as their interaction are positive, they are all insignificant at 5%. The Wald results produce f-statistic of 0.820 with a probability value of 0.5182, f-statistic of 3.479 with a probability value of 0.0704 and f-statistic of 3.049 with a probability value of 0.0922 for official development assistance, domestic savings and their interactive term respectively. This indicates that these variables do not influence economic growth in the short run. In fact, only research and development happens to have a positive and statistically significant coefficient in the short run. Its Wald result shows f-statistic of 11.629 with a probability value of 0.0027.

In model II, the results are just the same as in model I, only research and development also have a positive and statistically significant coefficient. It has a Wald coefficient of 10.508 with a probability value of 0.0015. Foreign direct investment, domestic savings and their interactive

Table 3: Short Run Results for Models I and II

Dependent Variable: GDPGR

Variable	Model I				Model II			
	Coeff	SE	t-Stat	Prob	Coeff	SE	t-Stat	Prob
D(GDPGR(-1))	0.297	0.151	1.971	0.0802	0.601	0.339	1.774	0.1036
D(GDPGR(-2))	-	-	-	-	0.221	0.1806	1.224	0.2465
D(GDPGR(-3))	0.092	0.059	1.553	0.1548	-	-	-	-
D(CAPS(-1))	1.319*	0.505	2.614	0.0281	0.317	0.170	1.858	0.0901
D(CAPS(-2))	-0.053	0.041	-1.293	0.2283	0.330	0.153	2.154	0.0543
D(LABF(-1))	1.043*	0.398	2.622	0.0277	-1.382	0.773	-1.787	0.1015
D(LABF(-2))	0.276	0.139	1.991	0.0776	-0.447	0.649	-0.690	0.5045
D(LABF(-3))	0.183	0.096	1.903	0.0894	-	-	-	-
D(RD(-1))	0.1169*	0.048	2.436	0.0376	-42.42*	10.24	-4.144	0.0016
D(RD(-2))	-7.5868*	1.880	-4.036	0.0029	-0.612	0.493	-1.242	0.2401
D(RD(-3))	-5.433*	1.535	-3.540	0.0063	-10.55	6.251	-1.688	0.1196
D(FCI(-1))	-	-	-	-	1.244	0.666	1.869	0.0885
D(FCI (-2))	-	-	-	-	0.745	0.721	1.033	0.3238
D(SAV(-1))	0.821	0.657	1.249	0.2431	0.447	0.427	1.046	0.3181
D(SAV(-2))	24.745*	6.575	3.764	0.0045	0.227	0.223	1.019	0.3303
D(SAV(-3))	-0.186	0.508	-0.367	0.7225	0.253	0.321	0.789	0.4469
D(FCI *SAV(-1))	-0.521	0.440	-1.184	0.2666	-0.177	0.210	-0.841	0.4181
D(FCI *SAV(-2))	1.028*	0.316	3.254	0.0099	-	-	-	-
D(FCI *SAV(-3))	0.092	0.059	1.553	0.1548	-0.108	0.179	-0.605	0.5575
ECM(-1)	-0.201*	0.366	-6.009	0.0003	-0.524*	0.578	-4.368	0.0011

Notes: Models 1 and II represent the estimation of the model with FCI = ODA and FDI respectively. * denotes the significance of the individual coefficient at 5%.

term all have statistically insignificant Wald coefficients. FDI has a Wald f-statistic of 1.746 with 0.2194 probability value, domestic savings has f-statistic of 0.728 with 0.0.5563 probability value while the interactive term has a Wald f-statistic of 1.082 with a probability value of 0.3717.

In model III (table 4), official development assistance is positive and statistically significant with a Wald f-statistic coefficient of 5.673 and a probability value of 0.0255. Both domestic savings and the interactive term are however statistically insignificant. They have Wald f-statistic coefficient 0.793 with a probability value 0.5277 and 1.890 with a probability value of 0.2063 respectively. This

indicates that though official development assistance influences index for human development positively in the short run, domestic savings and their interactive term do

Table 4: Short Run Results for Models III and IV

Dependent Variable: IHD

Variable	Model III				Model IV			
	Coeff	SE	t-Stat	Prob	Coeff	SE	t-Stat	Prob
D(IHD(-1))	-2.051*	0.780	-2.628	0.0303	1.034*	0.306	3.380	0.0081
D(IHD(-2))	-37.67*	8.005	-4.705	0.0015	0.803*	0.251	3.194	0.0109
D(IHD(-3))	0.447	0.427	1.046	0.3181	0.236	0.193	1.224	0.2520
D(CAPS(-1))	0.227	0.223	1.019	0.3303	0.133*	0.055	2.446	0.0370
D(CAPS(-2))	39.62*	8.220	4.820	0.0013	0.124*	0.044	2.811	0.0204
D(CAPS(-3))	0.276	0.139	1.991	0.0776	-	-	-	-
D(LABF(-1))	-0.240	0.206	-1.16	0.2745	-0.459*	0.167	-2.751	0.0224
D(LABF(-2))	-	-	-	-	-0.301	0.177	-1.704	0.1227
D(LABF(-3))	-	-	-	-	0.100	0.155	0.645	0.5349
D(RD(-1))	0.167*	0.075	2.224	0.0481	-6.311*	1.841	-3.429	0.0075
D(RD(-2))	-0.001*	0.001	-2.630	0.0234	1.295	0.701	1.846	0.0980
D(RD(-3))	-0.002*	0.001	-3.787	0.0030	-2.719	1.764	-1.541	0.1577
D(FCI(-1))	-	-	-	-	0.140	0.249	0.564	0.5866
D(FCI (-2))	-	-	-	-	0.382	0.221	1.728	0.1182
D(SAV(-1))	-0.521	0.440	-1.184	0.2666	-	-	-	-
D(SAV(-2))	-0.271	0.377	-0.717	0.4915	-	-	-	-
D(SAV(-3))	1.233	0.819	1.505	0.1665	0.365	0.161	2.271	0.0486
D(FCI*SAV(-1))	0.276	0.139	1.991	0.0776	0.249*	0.064	3.861	0.0038
D(FCI*SAV(-2))	0.183	0.096	1.903	0.0894	0.094	0.047	2.001	0.0765
D(FCI*SAV(-3))	-	-	-	-	-0.209*	0.075	-2.792	0.0210
ECM(-1)	-0.867*	0.681	-4.213	0.0023	-0.625*	0.442	-5.941	0.0002

Notes: Models 1II and IV represent the estimation of the model with FCI = ODA and FDI respectively. * denotes the significance of the individual coefficient at 5%.

not influence index for human development in the short run. In fact, apart from official development assistance, only research and development produces a statistically significant coefficient, exerting a positive influence on index for human development in the short run while all other variables are insignificant.

In model IV however, both domestic savings and its interaction with foreign direct investment are statistically significant. The only domestic savings variable, SAV(-3), has a t-statistic of 2.271 and a

probability value of 0.0486 while the interactive term has a Wald f-statistic coefficient of 5.172 with a probability value of 0.0238. Foreign direct investment is insignificant; its Wald f-statistic coefficient is 1.499 and a probability value of 0.2742. Concerning other variables in the model, lags of index for human development, capital and research and development are also statistically significant at 5%. Their Wald f-statistic coefficients and probability values are 4.820 (probability value of 0.0287), 5.728 (probability value of 0.0249) and 4.870 (probability value of 0.0280) respectively. Labour force is on the other hand statistically insignificant.

Long Run ARDL Regression Results

In evaluating whether the effect of savings on economic development depends on foreign capital inflows, the interactive models are estimated and the coefficients are obtained. In addition, the marginal effects of domestic savings and foreign capital inflows on respective dependent variables are estimated in the models. Empirical results are discussed in two separate parts. The first part of the analysis is devoted to the coefficients of the interactive effect and the second part focuses on the marginal effects. The empirical analysis begins with the economic interpretation of the coefficients - domestic savings, official development assistance (as foreign capital inflows variable) and their interactive terms when economic development is proxied by gross domestic product growth rate in model I. The result is presented in the first part of table 5.

The long run estimation results show that domestic savings has a positive and significant impact on economic growth (GDP) (t = 4.851, p < 0.05). Its coefficient is significant at 5%. An increase in domestic savings ratio to GDP by 1 percent on the average increases economic growth by 2.4% approximately. The interactive term's coefficient is positive and significant at 5% (t = 4.892, p < 0.05) showing that a percentage increase in interactive term promotes economic growth in Nigeria by 40.88%. This shows that official development assistance complements domestic savings to have a greater effect on economic growth. This result is consistent with a priori expectation that foreign capital inflows complements domestic savings to promote economic growth and development. The result is also in line with Saibu (2014) and Kohpaiboon (2003).

Concerning other macroeconomic variables included in the model, capital is found to have a negative and significant effect (t = -3.540, p < 0.05) on economic growth as against theoretically prediction of the effect. Labour force and research and development however don't only have negative coefficients, the coefficients are also insignificant with respect to economic growth model (t = -1.249, p > 0. 05 and t = -1.356, p > 0. 05 respectively).

In model II, where economic growth is regressed on its independent variables and foreign direct investment is used as the component of foreign capital inflows, both domestic savings and foreign direct investment are individually positive and significant at 5% significance level (t = 3.359, p < 0. 05 and t = 4.300, p < 0.05 respectively). A percentage increase in each of domestic savings and foreign direct investment ratio to GDP has 30.07% and 45.71% effects on economic growth respectively. The interactive term (FDI*SAV) is significantly different from zero at 5% (t = -2.187, p < 0.05). Interestingly, it has a negative coefficient. The interpretation of the result is that even though domestic savings and foreign direct investment individually promotes economic growth, the negative sign of the interactive term depicts that foreign direct investment adversely affects the positive impact of domestic savings. Rather than complementing domestic savings in promoting economic growth, it crowds out the positive effect of domestic savings on economic growth. The result may not be surprising, Todaro

and Smith (2012) argues that foreign direct investment rather than complementing domestic savings, it crowds out domestic savings in the economy.

As to the other variables, both capital and labour force are significantly influencing economic growth (t = -2.960, p < 0. 05 and t = 3.872, p < 0.05 respectively). While labour force is found to influence economic growth positively, capital as in model I, has a negative effect on the Nigeria's economy. Research and development is again not significant and also negatively signed (t = -1.698, p < 0.05). Table 6 presents the results of the interactive effect of domestic savings and official development assistance (official development assistance being an indicator of foreign capital inflows) on index

Table 5: Long Run Results for Models I and II

Dependent Variable: GDPGR

Variable	Model I				Model II			
	Coeff	SE	T-stat	Prob	Coeff	SE	T-stat	Prob
C	-136.1*	26.58	-5.119	0.0006	-0.498	0.263	-1.894	0.0849
CAPS	-0.498*	0.141	-3.540	0.0063	-0.651*	0.220	-2.960	0.0130
LABF	-0.821	0.657	1.249	0.2431	2.771*	0.716	3.872	0.0026
RD	-2.204	1.626	-1.356	0.2082	-3.117	1.836	-1.698	0.1177
FCI	-	-	-	-	45.71*	10.63	4.300	0.0013
SAV	2.418*	0.499	4.851	0.0009	30.07*	8.951	3.359	0.0064
FCI*SAV	40.88*	8.207	4.982	0.0008	-0.397*	0.182	-2.187	0.0367

Notes: Models 1 and II represent the estimation of the model with FCI = ODA and FDI respectively. * denotes the significance of the individual coefficient at 5%.

for human development, (a proxy for economic development) in models III and IV. The results in model III show that domestic savings is positive and significant at 5% (t = 3.841, p < 0. 05). A percentage increase in domestic savings ratio to GDP increases index for human development by 0.29 unit. However the interactive coefficient (FDI*SAV) is not significant at 5% level, in addition the coefficient is also negative (t = -0.513, p > 0.05). The implication of this result is that the interaction of domestic savings and official development assistance has no effect on IHD. Labour force is also significant in model III, and it is also positively signed (t = 4.237, p < 0.05). A percentage increase in labour force ratio to GDP, on the average, leads to an increase of 1.47 unit in index for human development. The coefficient of capital and that of research and development are again insignificant though they are positive this time around (t = 1. 041, p > 0.05 and t = 0.895, p > 0.05 respectively).

Model IV employs foreign direct investment as foreign capital inflows variable while index for human development is used as an indicator of economic development. Here, both domestic savings and foreign direct investment are positive and significant (t = 5.401, p < 0.05 and t = 3.171, p < 0.05 respectively), thus promoting the welfare of the people. The interactive term, FDI*SAV is also significant just as in the case of GDP growth model and its coefficient is positive (t = 2.303, p < 0.05)

as expected. Foreign capital inflows thus complement domestic savings in promoting index for human development in Nigeria. Concerning other variables, only the coefficient of capital is significant at 5% but it is negatively signed (t = -6.092, p < 0.05). Labour force and research and development are not significant (t = -2. 033, p > 0.05 and t = 1.956, p > 0. 05 respectively).

Table 6: Long Run Results for Models III and IV

Dependent Variable: IHD

Variable	Model III				Model IV			
	Coeff	SE	t-Stat	Prob	Coeff	SE	t-Stat	Prob
C	1.065*	0.226	4.712	0.0006	-34.30*	7.879	-4.353	0.0018
CAPS	0.200	0.192	1.041	0.3201	-0.302*	0.050	-6.092	0.0002
LABF	1.473*	0.348	4.237	0.0014	-0.249	0.122	-2.033	0.0725
RD	0.657	0.735	0.895	0.3902	4.561	2.332	1.956	0.0822
FCI	-	-	-	-	5.951*	1.877	3.171	0.0114
SAV	0.290*	0.076	3.841	0.0027	0.773*	0.143	5.401	0.0004
FCI*SAV	-0.931	1.814	-0.513	0.6180	0.668*	0.2901	2.3027	0.0418

Notes: Models III and IV represent the estimation of the model with FCI = ODA and FDI respectively. * denotes the significance of the individual coefficient at 5%.

In the IHD model, domestic savings is positive and significant at 5% (t = 3.841, p < 0. 05) but its interactive term with official development assistance is not significant (t = -0.513, p > 0.05). The implication of this result is that the interaction of domestic savings and official development assistance has no effect on IHD.

Economic Interpretation of Marginal Effects

It was argued under methodology that domestic savings and foreign capital inflows are not independent of each other. Hence it is required that their economic development effects be examined through the conditional marginal effect of the variables. The coefficients of domestic savings and the interactive terms are used to obtain the conditional marginal effect as specified under methodology. As obtained from tables 5 and 6, the coefficient of domestic savings is positive and significant in all the four models. However, the interactive terms are only significant in models I, II and IV, hence the marginal effect interpretation is left out in model III.

From table 5, the coefficient of domestic savings in model I (where GDP growth is the dependent variable and foreign capital variable is official development assistance) is 1.995. It is significant at 5%, indicating that its marginal effect on economic growth is positive. The coefficient of the interactive term of domestic savings and official development assistance is also positive (3.277) and by the sign of the interactive term, it can be concluded that official development assistance complements domestic savings to have a greater effect on economic growth.

In model II (where GDP growth is the dependent variable and foreign capital inflows variable is foreign direct investment), the coefficient of domestic savings is 30.070, it is also significant at 5%, showing that its marginal effect on economic growth is also positive. The coefficient of the interactive term of domestic savings and foreign direct investment is however negative (-0.397), hence by the sign of the interactive term, it can be concluded that foreign direct investment adversely affects the positive impact of domestic savings. Rather than complementing domestic savings in promoting economic growth, it crowds out the positive effect of domestic savings on economic growth.

In model IV (where index for human development is the dependent variable and foreign direct investment, the foreign capital inflows variable), the coefficient of domestic savings is positive (0.773). Its significance at 5% also indicates a positive effect on index for human development. The coefficient of the interactive term of domestic savings and foreign direct investment is positive (0.668) and by the sign of the interactive term, it can be concluded that foreign direct investment complements domestic savings in exerting positive effect on peoples' welfare as measured by index for human development.

From the results obtained on the marginal effect of domestic savings on economic development in the presence of foreign capital inflows, it can be concluded that when foreign capital inflows is proxied by official development assistance, foreign capital inflows complements domestic savings in promoting economic growth. When foreign capital inflows is proxied by foreign direct investment however, the reverse is the case. As for the effect on index for human development, when foreign capital inflows is proxied by foreign direct investment, foreign capital inflows complements domestic savings in promoting index for human development in Nigeria.

Diagnostic Tests

Various diagnostic tests are conducted to ensure goodness of fit of the ARDL model. These tests include serial correlation, normality, heteroscedastic, ramsey specification and stability tests. The results for serial correlation, normality, heteroscedastic and ramsey specification tests are presented in table 7.

Table 7: Diagnostic Tests

Variable	Model I $F-stat$	Model II $F-stat$	Model III $F-stat$	Model IV $F-stat$
Serial Correlation LM Test	1.4714 (0.3020)	1.5430 (0.2654)	1.5114 (0.2847)	0.7349 (0.5132)
Normality (Jarque-Bera Stat)	0.4917 (0.7820)	0.1234 (0.9402)	3.0399 (0.2187)	1.9629 (0.3748)
Heteroscedasticity	1.3173 (0.3593)	0.5456 (0.8936)	0.7847 (0.6996)	0.4356 (0.9496)
Ramsey Reset	0.0372 (0.8531)	0.0724 (0.6013)	0.0541 (0.8228)	0.0787 (0.7163)

Notes: The dependent variable for Models I and II is GDP while that of Models III and IV is IHD. Figures in parenthesis are probability values.
Source: Authors' Computation, 2023.

As it can be seen from the table, diagnostic tests suggest that the estimations' results for all models I to IV are free from serial correlation with F stat of 1.471 with a probability value of 0.302 for model I, 1.543 with a probability value of 0.265 for model II, 1.511 with a probability value of 0.285 for model III, and 0.735 with a probability value of 0.513 for model IV.

The residuals are normally distributed with Jacque-Bera statistic of 0.492 (probability value of 0.7820), 0.123 (probability value of 0.9402), 3.040 (probability value of 0.2187) and 1.963 (probability value of 0.3748) respectively for models I to IV. The results are also found to be heteroscedastic free with Breusch-Pagan-Godfrey F-statistic of 1.317 (probability value of 0.3593), 0.546 (probability value of 0.8936), 0.785 (probability value of 0.6996) and 0.436 (probability value of 0.9496) respectively for models I to IV.

In the case of specification, the results are also found to be free from specification error with Ramsey Reset F-statistic of 0.0372 (probability value of 0.8531), 0.0724 (probability value of 0.6013), 0.0541 (probability value of 0.8228) and 0.0787 (probability value of 0.7163) respectively for models I to IV. The stability of the models are examined through CUSUM and square of CUSUM graphs. The plot of CUSUM and square of CUSUM for each of the model I to IV fall within critical bound of 5% confirming the long run association among the variables as well as stability of the coefficients in the models.

Conclusion and Recommendations

The study investigated the interactive effects of savings and foreign capital inflows economic growth and development in Nigeria. A model was developed to estimate the interactive effects of the variables with autoregression distributed lag (ARDL) estimation technique. The findings from the ARDL estimation reveal domestic savings and official development assistance exert significant positive effect on economic growth individually. They influence the growth of the economy positively. The same also replicate itself in the IHD equation. Individually, savings and official development assistance are factors that aid the growth and development of the economy positively. The interactive term's coefficient of domestic savings and official development assistance is positive and significant in the GDP growth equation. The term is however insignificant in the IHD equation. Official development assistance therefore complements domestic savings to have a greater positive effect on the growth of the nation but the effect is not felt in the area of the development of the economy.

Domestic savings and foreign direct investment equally exert positive and significant effects on both economic growth and development individually. The coefficients of the two variables are individually positive and significant. While the interactive term's coefficient of domestic savings and foreign direct investment is positive and significant in the IHD equation, the term's coefficient is significant but negative in the GDP equation. The implication here is that foreign direct investment complements domestic savings to exert a greater positive effect on the development of the nation even though foreign direct investment crowds out the positive effect of domestic savings on economic growth.

Policy Recommendations

From the empirical investigation and findings of this study, foreign direct investment has positive and significant coefficient in both GDP growth and IHD equations. It is also found to complement savings to exert positive effect on IHD. Government should therefore embark on policies that attract foreign direct investment. Government should provide conducive business environment that is capable of attracting foreign investors. Nigeria is a good foreign direct investment destination country for the

western countries because of the country's population and resources. Hence effort of the government should be geared towards investing in the power sector to increase generation and distribution of electricity, provision of adequate security should also be ensured so as to curb banditry, kidnapping and other terrorist attacks especially against foreign investors.

Also, official development assistance itself is insignificant in the GDP and IHD equations. However the coefficient of its interaction with domestic savings is positive and significant, thereby increasing the positive effect of domestic savings on GDP. Based on these findings, more official development assistance should be attracted into the country to complement domestic savings. However, government should monitor its disbursement. It should not be used for consumption purpose, efforts should be intensified to ensure that corruption and embezzlement are curbed and to ensure its judicious use. This can be done through effective monitoring of government agencies by Economic and Financial Crime Commission (EFCC) and Independent Corrupt Practices and Other Related Offenses Commission (ICPC).

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