

Foreign Direct Investment and Resources Utilisation: Implications for Nigeria's Economic Development

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Authors' contributions

This study was carried in collaboration between all authors. Authors KEU, FEE and IDN designed the introduction, review of literature, method of data analysis, interpretation, recommendations and conclusion. All authors read through and approved the final manuscript.

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ABSTRACT

The paper focuses on the effects of resources used by foreign investors and its implications on the economic development of Nigeria from 1980-2012. The annual time series data on foreign direct investment, average manufacturing capacity utilisation, unemployment rate and real gross domestic product were investigated for stationarity using Augmented Dickey-Fuller test. A Johansen Co-integration test revealed one co-integrating relationship. Vector Error correction model was employed to analyse the formulated equations. Findings show that unemployment is indeed growth retarding. Impressively, foreign direct investment including all other variables impacted significantly on economic development. On the innovation accounting, variations in RGDP are explained more by unemployment in the longer period of about 21%. This implies that economic development is accelerated by creating jobs for the teeming populace. On that basis, we made the following recommendations, among others: Security of life and property must be resolved

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once and for all; crime rate must be seriously and sincerely addressed by the Federal Government; cost of doing business should be drastically minimised to encourage both domestic and foreign investors; and the power sector has to be practically tackled.

Keywords: Foreign direct investment; resources; vector error correction model; economic development.

1. INTRODUCTION

One of the determinants of the desirable level of economic development of a country can be perceived from the nature of its factor endowments including human and natural resources. So, with a population of over 162 million people [1] and a large reserve of petroleum¹ in abundance, Nigeria has been able to attract a substantial inflow of foreign investors in its economy. This is in the spirit to accelerate a robust macroeconomic development. The realization of these aspirations had informed the radical and pragmatic economic reforms introduced since the mid 1980's. The reforms which include the adoption of a liberal and market oriented economic policies, the stimulation of increased private sector participation and elimination of bureaucratic obstacles that hinder private sector investment and long term profitable business operations were designed to increase the attractiveness of Nigeria's investment opportunities and foster the growing confidence of investors in the economy. For instance, the existence of foreign multinationals and other private investors in some strategic sectors like the oil industry, banking industry and communication industry, among others [2].

Unequivocally, Nigeria as a developing economy is aware of its deficiency in tackling the numerous challenging macroeconomic and rising political problems which influence adversely the living standards. Besides, there is under-utilisation and improper use of resources arising from inadequacy of capital and technical ability. These, among others, have compelled the country to adopt a policy of openness of its economy to foreign investors. [3] point out that the country has abundance of human and natural resources but is devoid of sufficient capital to propel the economy to sustainable

development. This is obvious when one examines the extent of industrial establishments which are far below the rising population. It is sufficient to state that human labour available in the country is not fully and efficiently employed. Fertile soil and mineral resources are yet to be fully harnessed and utilized due to insufficient factor input, especially capital.

On this note, [4] posits that it is now widely recognized that the future development of sub-Saharan Africa (SSA) depends considerably upon the success of individual economies in attracting relatively large inflows of foreign direct investment (FDI) into high potential growth sectors. This is not only because of the general paucity of investment resources exacerbated by the debt crisis facing many countries, but also because FDI brings with it the new technologies and related skills essential for sustained export-led economic growth. [5] asserts that the benefit of appropriate industrial base for an economy depends on its combination of suitable technology, management techniques and other resources in order to move the economy from traditional and low level of production to a more automated and efficient system of mass processing and manufacturing of goods and services.

At different point in time, many scholars in both developed and developing countries such as [6-12], among others have researched on the resultant effects of the foreign direct investment of any kind on the host economies. Some concluded that FDI has impacted positively on economic development through technology transfer and other activities while others pointed its negative effects due to remittance of income by operators, among others. However, many researchers are convinced that foreign direct investment (FDI) is associated with benefits of lower costs of production and higher productive efficiency than the domestic economy of the investors. Some of the studies made policy makers to have the conviction that FDI encourages and promotes economic development of host economies. Different authors employed different methods in their data

¹Nigeria is the 7th world largest producer of crude oil. Its oil wealth has financed major investments in the country's infrastructure. See [14,15]

analysis and arrived at different results. For instance De Mello (1999) found a weak positive relationship between FDI and economic growth. [13] found that economic growth is enhanced by FDI if and only if the trade regime and macroeconomic stability are considerably robust.

In his study on FDI and economic growth in Nigeria, [16] found causality relationship between FDI and the growth of gross domestic product in the pre-deregulation era (1970-1986); but such causality relationship was not found in the post deregulation era (1986-2010). The study period of 1970-2010 showed bi-directional relation between FDI and economic growth. However, in this our study, it is intended to focus on the extent of resources utilisation resulting from foreign direct investment in Nigeria. Issue of resources utilisation due to foreign direct investment has not been given extensive empirical investigation by researchers. Besides, in view of the degree of attention given by the Nigerian government in promoting trade openness and foreign investment which is expected to reduce unemployment and increase raw materials use, it is pertinent an empirical investigation be conducted to ascertain this belief. So, this study intends to empirically unravel the extent of resources utilisation due to the activities of foreign investors in Nigeria.

One may be compelled to ask, given the existence of foreign direct investment in Nigeria over the years, to what extent has manufacturing capacity utilization, employment of labour, net export and aggregate economic activity increased toward improving the living standard of the populace.

So, the broad objective of this study is to ascertain the influence of foreign direct investment on economic development of Nigeria. The specific objectives are as follows:

- i) To ascertain the effect of foreign direct investment (FDI) on unemployment reduction in Nigeria.
- ii) To examine the impact of FDI on manufacturing capacity utilization in Nigeria.
- ii) To find out the influence of FDI on real gross domestic product.

In consideration of the specific objectives, it is our intention to present the paper thus: section one is the review of related literature while section two is a brief review of the Nigerian

economy and section three is model specification, results presentation and evaluation while the final section four is on discussion of results, policy implications and conclusion.

2. REVIEW OF RELATED LITERATURE

2.1 Theoretical Literature

Foreign direct investment stems from international economics, with the sub-areas as international trade, international monetary economics and international finance. Investments by economic agents of a country in other countries can be referred to as foreign investment. [17] points out that foreign direct investment is the physical investment such as construction of factory or acquisition of lasting management interest in business venture by individuals, organisations or the government of one country in another country. It leads to inflow of foreign resources such as capital, technology, managerial and marketing expertise into another country. Investment can take various forms depending on the interest of the investor. Foreign direct investment is the organisation of a business venture or an enterprise by a foreigner beyond the domestic boundary. [18] points out that investment is the net addition to stock of capital. The term capital includes those items like machinery, equipment, constructions and inventories. It also includes education, skilled manpower, consumer durables, research and development and from a nation's point of view includes public constructions like roads, railways, dams, bridges, canals, schools, hospitals and so on.

Considering countries' resources situation and trade, [19] came up with his international trade theory of absolute cost advantage. It was pinpointed by Smith that it would be beneficial for a country to specialise in the production of commodities which it can produce most efficiently. He stressed on absolute cost advantage as the basis for international trade. The theory is based on assumptions that labour is the only factor of production.

The shortcoming of Smith's argument brought in [20] comparative cost theory and he notes that even if a country has absolute cost advantage in production of all the commodities and another country has same, so far as there is comparative cost benefit in the production of any of the commodities in the economy, international trade will still be beneficial if each country should

specialise (i.e. produce and export the commodity that has comparative cost advantage and import the good that has comparative cost disadvantage).

This classical theory was opposed on the basis of the assumption of labour being the only cost of production, which is taken to be unrealistic. Concerned with solving the problem of invalid theory of value [21] developed the theory of opportunity cost. His basic idea of opportunity cost is that relative prices of different commodities are determined by the overall cost differential. Cost refers to the alternative production that has to be forgone to allow for the production of the commodity in question. That is, the value of each commodity is taken to be equal to its opportunity cost [18]. The theorist was concerned with output production using what is available. The trend has remarkably changed.

Still on the basis of unrealistic assumptions of the classical theory on trade, the Heckscher-Ohlin theory was made to give a more realistic message for the existence of differences in comparative costs between countries. [22] first formulated the theory but it was later modified by his student [23]. They asserted that they are two factors which explain the international differences in comparative costs. Different factors of production are endowed to various countries. Some countries have abundant capital while others, abundant labour. Secondly, production of different goods requires different combinations of factor input. To them, differences in relative factor endowment are the most important single cause of international differences in price structures [18,24].

The views of the classical economists have been widened by scholars to include more than exchange of goods and services. The theory of vent-for-surplus stresses on the opening of world markets to remote agrarian communities or regions, creates opportunities not to relocate fully employed resources as in the traditional models, rather to utilise formally under-employed land and labour resources to produce larger output for export to foreign markets. The opening up of the nation to foreign markets (probably as a result of colonization and globalisation) enables an economic power or incentive to make use of idle resources, mainly excess land and labour, and enlarge the production of primary products exportable, hence advancing the economy towards enlargement of the production possibility curve. There is the believe that the vent-for-

surplus theory offers a more realistic analytical state of affairs of the historical trading experience of many developing countries than either the classical or neoclassical models [24,25,26].

[27] notes that there has been an enormous increase in financial resource flows to developing countries during the last three decades as the world economy has liberalised and become financially more integrated. World Bank figures indicate that net resource flows to all developing countries rose from a mere US \$11billion in 1970 to more than US \$80billion in 1980 and to just over US \$100 billion in 1990. Net resources flows to developing countries recorded a quantum leap between 1990 and 1995, rising to nearly US \$240 billion in the latter years.

[28] points that openness generates economic benefits under free trade since productive resources tend to be reallocated toward activities where they are used with comparatively greater efficiency and away from less efficient activities. Openness among other things may lead to improved allocation of resources among sectors due to the elimination of distortions; facilitates the acquisition of new inputs, intermediate goods, and improved technologies which enhance overall productivity of the economy.

2.2 Empirical Literature

It is a commonly accepted fact by many economists and researchers that foreign direct investments bring about positive output effects in the host economies. This is premised on the introduction of foreign technology and technical knowledge capable of domestic manpower reform, new method of raw material processing, and new products from foreign firms which gives room for linkages with domestic firms. However, empirical studies to an extent contradict this theoretical proposition [29,30,31]. It has been pointed that by some scholars that foreign direct investment has the capability to transform a developing economy. However, studies have shown that improved local financial market or the level of education of a country is a prerequisite for a domestic economy to have the advantages derivable from foreign direct investment. This realisation is attributed to the works of [32-34].

The pioneer studies on foreign direct investments by [35,36] asserts that the expected benefit from foreign investment is so small compared to what is remitted back to the parent company outside the host economy. Besides, in [37] investigation

of the impacts of foreign direct investment (FDI) by United State companies on the host economy's growth showed a negative relationship due to the fact that the evacuated profits were more than the level of new investment for each of the period investigated 1965-1969.

In his empirical investigation of foreign direct investment on economic growth, [38] employed Error Correction Model. The study revealed among others that private and foreign capital have insignificant effects on economic growth; export, labour force and human capital have a positive and statistical significant impact on growth while financial development measured by the ratio of broad money supply and gross domestic product has negative significant effect on growth.

In his examination of the effect of FDI on economic growth of less developed economies 1970-1980, [39] empirical analysis results showed a negative correlation between FDI and growth. The finding conforms to some other studies which assert that the level of output of the host nation lacks growth owing to FDI under use of labour, thereby impacting on income generation and low level of consumption and consequently stagnant growth. On the contrary, in his empirical verification of FDI and growth relations in China, [40] realised two potential paths through which FDI impacts on economic growth thus: rate of physical capital accumulation and productivity growth. In his study, it was pointed that FDI does not only bring capital for investment financing but contributes significantly to raising productivity.

In the analysis of the relationship between FDI and economic growth for 72 economies for the period 1960-1995, [41] revealed that for both developed and developing economies, FDI inflows did not impact an independent significant effect on economic growth.

In his study of FDI impacts on the different sectors of the economy (primary, manufacturing and services, [42] found different effects. FDI inflows into the primary sector exert negative effects on growth while a positive impact on the manufacturing sector. The effect on the service sector was not clear based on statistical results. In addition, [7] also investigated the relationship between FDI and economic growth for few chosen transition countries and the result of empirical analysis revealed that foreign direct investment does not have significant effect on

economic growth for transition economies at the period of study. In other words FDI does not contribute any strong effect on growth.

[43] points out that total inflows of FDI in Africa is US\$8 billion in telecommunication, tourism, textiles, mining/quarrying, food / beverage, and total outflows is US\$ 0.5 billion. FDI has grown by 6 times in the last 10 years but only in a small number of countries and at a low level compared to international flows. Problems of extortion and corruption indicate a vital need for democratisation, transparent regulation and improved rule of law to support inflows to the region

[44] examined the causal relationship between FDI and economic growth using innovative econometric method of test for causality in three countries and found that it is the GDP that causes FDI to promote economic growth in the case of Chile while in Malaysia and Thailand, there is evidence of a bi-directional causality between the variables. [45] in his study of foreign direct investment and economic growth in Bolivia, 1980-1998, using ordinary least square method found that the real effective multilateral exchange rate, the ratio of external debt to GDP, and a dummy representing capitalization inflows have significant effect on FDI, while FDI, and other variables such as terms-of-trade, the ratio of private sector credit to GDP, and the ratio of government spending to GDP have a statistical significant impact on per capita GDP growth. [42] investigated FDI and economic growth: the role of local financial markets using cross-country quarterly data with the intention of ascertaining whether countries with better financial system can exploit FDI more efficiently. The study found that FDI plays a doubtful role in contributing to economic growth but the results were robust to different measures of financial market development. [46] investigated the impact of economic and political uncertainty on foreign direct investment flow to Africa using Generalised Autoregressive Heteroscedastic (GARCH) model. The results of the study revealed, among others, that the impact of uncertainty on the flow of FDI from all source countries was insignificant and economic factors such as labor, trade connection, size of export sector, external debt, and market size are also significant in affecting FDI flow to African economies.

Besides, [47] found that the effect of foreign direct investment on economic growth is a function of the extent of efficiency of local firms.

So, the long-term effect of growth rate is based on the rate of time preference, productivity of domestic capital and the extent of harmonious co-existence between host economy and foreign technologies. Whereas, [48] focused on the application of the Endogenous Growth model and considering the rate of technical progress as the major determinant of long term growth rate associated with FDI. The study asserted that new technology introduction by FDI and adequate human capital levels are the two main determinants of economic growth. In addition, human capital growth process is based on the synergy between FDI and capital.

In the examination of the relationship between foreign direct investment and economic growth in Romania, [49] employed simultaneous equation model and found evidence of bi-directional link between FDI and economic growth. This implies that FDI plays a great role in encouraging economic growth, and conversely high level gross domestic products catches the attention of foreign investors.

Some studies buttress the fact that foreign direct investment (FDI) is essential and impact positively on the growth and development of an economy in consideration of various roles it plays in terms of western knowledge transfer such as management qualities application, positive business ethics, admirable entrepreneurial attitudes, improvement of host human capital and high yielding production technology capable of revamping a depressed economy. Consequently, contributing positively on macroeconomic variables such as increased resources utilization, more investment capital, quality human capital and unemployment reduction [50-55] This positive expectation is one of the motivating factors for many developing economies policies design aimed at attracting foreign investment.

However, contradictory outcome of foreign direct investment vis-à-vis economic growth and development have also been articulated by other researchers. The relationship between FDI and domestic investment showed a negative relationship [47]. In a similar vein, [56] found a positive and insignificant impact of FDI on Nigeria's economic growth while domestic investment is positively and significantly affected by FDI at the period of study. The protagonists of dependency theory see foreign direct investment as a strategy for ensuring economic dominance that deters development. This view is also based on the conception that the integration of

developing economies with the world capitalist system gives rise to underdevelopment and exploitation.

The activity of FDI in export promotion has been quite debatable in that it bothers on investment motive [57]. A commonly accepted view by many scholars is that the positive effect of FDI depends on host economy's ability to assimilate the introduced new foreign technology and the existing domestic atmosphere conducive for the new introduction [58]. From the theories, it is obvious that most developing country such as Nigeria lacked efficient telecommunication and infrastructure needed for smooth business operation and attraction of foreign investors until the period of civilian regime piloted by President Obasanjo in early 2000. In addition, insufficient quality labour force imposed some constraints on the part of foreign investors; hence, additional costs of retraining of manpower were incurred by some foreign investors.

The accepted views in the literature somehow favoured FDI encouragement of increase in growth emanating from gains by domestic firms in productivity and efficiency. However, the empirical evidence [59,60] do not entirely support this view. But some evidence from developed countries appear to substantiate the fact that productivity of domestic firms is positively related to the presence of foreign firms. On the other hand, the evidence of FDI effect on developing countries are vague, given the findings which imply that FDI impacts positively, negatively and insignificantly on domestic economy [61,62] whereas others such as [63] showed limited evidence and while others do not have any evidence of positive short term impact coming from foreign direct investment. [64] investigated the causal links existing among foreign direct investment, exports and economic growth in Burundi by employing bootstrap causality tests, but found no influence of FDI on exports and economic growth of the country. This implies that foreign direct investment is yet to play a role in improving aggregate economic activity at the period of study. In a related study, [65] examined the relationship between foreign direct investment and export in Malaysia from 1980-2011. The study used the method of Autoregressive Distributive Lag to ascertain the extent of growth impact by FDI and export on the economy. The outcome revealed a positive impact in terms of growth by FDI and export, but export has a larger contribution to growth in Malaysia vis-à-vis FDI.

It is equally assumed that FDI is capable of crowding out domestic firms given its ability to reduce the size of aggregate industry, thereby affecting employment of resources and aggregate income generation [50]. This view was opposed by [66] in the sense that crowding out is unusually possible considering the advantages inherent in foreign direct investment

In consideration of the existing literature, it can be inferred that the roles of FDI in countries are not the same due to differences in level of economic activity in countries, institutional set up, absorptive capacity of host economy, and macroeconomic variables situation. In other words the positive or negative effect of FDI in every economy seems specific to each country and cannot be generalized. So, given the serious attention to foreign direct investment by the Nigerian government as one of the required keys for development, and in consideration of the various views of researchers on the beneficial effects and adverse impacts of foreign direct investment in various economies, it becomes imperative to empirically investigate the FDI influence in resource use in Nigeria.

3. FDI AND THE NIGERIAN ECONOMY

Major history of FDI in Nigeria is connected to the colonial era where various investments were made on infrastructure, and services. Following the independence in 1960, the First National Development plan² was made and aimed at repositioning the economy for industrial take-off. Various policies and decrees were also designed by the government thereafter towards encouraging FDI into the country [67]. It is quite clear that, to realize or improve the state of existing foreign investment, there is the need for reforms of policy and programmes. This is to ensure compliance of investment by investors. [68] press release shows that recent steps towards macroeconomic stabilization and trade liberalization must be supported by credible structural reforms if Nigeria is to regain international confidence and improve the standards of living of the population. But the country had taken steps in this direction. In 1986, Nigeria introduced the Structural Adjustment Programme (SAP). One of the aims was to encourage and promote foreign investment in Nigeria. [69] notes that SAP has it as a main

element, to rationalize and restructure the tariff regime in order to aid the promotion of industrial diversification. SAP actually forms the bedrock upon which the nation's industrial policy and her revised attitude towards foreign direct investment have been built. Apart from this, the Federal Government has employed debt conversion, which was not only to reduce the country's external debt situation but also to attract foreign investors so as to improve the level of industrialization and employment of the citizens.

Poor economic status and low living standard is a result of several factors. A country endowed with abundance of resources may lack the required ability and capability to efficiently harness and utilise the resources. The idle abundance resources in Nigeria have led many foreign investors to come into Nigeria for production in various sectors of the Nigerian economy. Production involves the use of factors input bestowed to a country. The existence of foreign investors is believed to increase the use of resources of the country and bring about increased production, other things being equal. Table 1 below reports the socio-economic indicators for Nigeria from the year of the adoption of the Structural Adjustment Programme (SAP) till 2010. From the table, a general overview of the economic and social indicators in Nigeria has taken different trends. Between 1987 to 1996 and 1997 to 2006, ratio of export to GDP increased from 40% to 46% while ratio of imports also rose from 33% to 37% respectively. Real GDP also showed an increasing trend from 4.1% in 1987-1996 to 4.5% in 1997-2006. As at 2010, real GDP growth rate is about 8%

Critics assert that foreign investment creates income inequality, discourages self-reliance and repatriates capital from the economy to the home country thereby denying the developing economy of the opportunity to grow. But Nigeria is not bothered by this and has designed the operating environment to encourage foreign investment. In the recent past, foreign private investment dominated virtually all the sectors of the Nigerian economy. A typical example was in the 1970s, out of the total manufacturing and processing establishments, 57.3% and 52.5% belonged to foreigners while only 42.7 and 47.3% were owned by Nigerians. This situation was changed through the indigenization Act of 1977, hence ownership structure changed in 1980 with foreign firms owning 47.6% while Nigerians owned 52.4%. However, there was a reversal after 1980

²Between 1962 and 1968, about N400million was estimated as proceeds from FDI. However, the implementation of the plan was cut short due to military intervention in 1966 and the civil war of 1967-1970

Table 1. Key economic and social indicators in Nigeria

Indicators	1987-96	1997-2006	2010
Population (Millions)	98.9	129.8	158.4
Population Growth(%)	2.7	2.6	2.5
Real GDP Growth(%)	4.1	4.5	7.6
GDP per capita(USD)	270	453.1	540.3
Exports of goods and services (% GDP)	38.9	46.8	39
Imports of goods and services (% GDP)	33.3	37.2	26
Trade(%GDP)	72	85	65
FDI Flows (% GDP)	3.3	3.7	8.4

Source:[70]

with the intention to encourage foreign investors; consequently foreign firms owned 50.7% and Nigerians 49.3 % [71].

Furthermore, a look into the economy indicates that Nigeria is dominated remarkably by FDI inflows across the sub-Saharan Africa and African continent at large. Table 2 shows that a substantial FDI inflow was recorded in 1970 and 2011 at 21 and 24% respectively. However, 1980 saw a negative inflow of FDI given the world financial crisis and economic meltdown of that period. Presently with the inclusion of South Africa, a 16% was recorded for 2011 reaching about USD\$8.9 million.

3.1 The Data

Actually, it can be pointed out that if the resources of Nigeria in use by foreign investors are considerable, they will reflect on the output of the country. In other words, the outcome should impact positively and significantly. To ascertain this relationship, an annual time series data of 1980-2012 within the VAR framework will be employed. Our data was sourced from [72 , 73]. In this regard, it is our intention to ascertain the relationship between unemployment rate (UER), foreign direct investment (FDI); average manufacturing capacity utilisation (AMCU), government consumption expenditure (GCE) as a ratio of real gross domestic product (RGDP) on

aggregate economic activity measured by real gross domestic product (RGDP). As a result, RGDP would be a standard measure of economic performance seen as an endogenous variable, unemployment rate (UER) basically looks into the human side of resource utilization and average manufacturing capacity utilisation (AMCU) is a proxy for other forms of resource use. Furthermore, government consumption expenditure (GCE) presents a proxy to ascertain the extent of government's participation in the public sector, [see 45]. The intuition behind these is the conviction that increased use of labour, raw materials as a result of activity of FDI will help to reduce the teeming unemployment, raise the use of raw materials from various sectors of the economy and also generate more output in Nigeria. We shall use Eviews 7 and JMulTi4 softwares to run our analysis. Particularly, JMulTi is a special software applied to time series analysis.

Descriptive statistics Table 3 shows average unemployment rate for the entire period is 9% with a maximum of 24%, average manufacturing capacity has shown to be about 46% also having a maximum value of 73% while on average, 21% of output goes into the public consumption. See Fig. 2 in the appendix for a time series plot of all variables.

Table 2. FDI Inflows (current prices) as a percentage of SSA and Africa's FDI

Year	Nigeria (USD millions)	Africa excluding South Africa (USD millions)	SSA (USD millions)	% for SSA	% for Africa
1970	205	932	832	25	21
1980	(-739)	411	257	-	-
1986	193	1820	638	30	10
2000	1310	8784	6813	19	14
2011	8915	36844	36902	24	24

Source: [70]

4. METHODOLOGY

4.1 Unit Root Tests

It is imperative we embark on unit root test for time series data so as to ascertain the stationarity of the variables. Non stationary series that has unit root suffers permanent or prolonged effects from random shock that is, series follows a random walk. Non stationarity variables would produce a spurious result if used in analysis: that is a result that is not valid for forecasting or prediction. If non stationary series are co integrated the regression result is not spurious. To fully investigate the data generating process, we first assess the time series properties of model variables using the Augmented Dickey-Fuller test (ADF).

The ADF test regression equations with constant are:

$$\Delta Y_T = \alpha_0 + \alpha_1 Y_{T-1} + \sum_{j=1}^n a_j \Delta Y_{T-1} + \varepsilon_T \dots$$

where Δ is the first difference operator ε_T is random error term that is $n =$ number of lagged differences $Y =$ the variable. In the equation above the null hypothesis holds as: $H_0: \alpha_i = 1$ (unit root), $H_1: \alpha_i < 1$ (level stationary). On the basis of the order of stationarity, we proceed to examine for co-integration so as to ascertain the long-run relationship of the simple equations stated using Johansen co-integration test.

4.2 Vector Error Correction Model (VECM)

A possible presence of co-integration amongst the variables would necessitate estimating a Vector Error Correction Model. This model is represented thus:

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \Gamma_2 \Delta y_{t-2} + \dots + \Gamma_\rho \Delta y_{t-\rho+1} + C d_t + u_t$$

where $\Pi = \alpha\beta'$,

$$y_t = (RGDP_t, RFDI_t, AMCU_t, GCE_t, UER_t),$$

Δ the differencing notation, the deterministic components is represented with d_t while u_t is white noise. Furthermore, the matrix α , together with the speed of adjustment parameters will be estimated including the matrix β to be the co-integrating parameters even as Γ_i , will represent the short run parameters and C the parameter for

deterministic terms. The model is built in such a way that the very term describes the long-run relationship running across the variables such that y_t responds to any one period from long-run equilibrium or still stochastic shocks.

Furthermore, residual analysis of the model will be tested for adequacy especially for autocorrelation, conditional heteroschedasticity (ARCH effects), [74] and chow tests for parameter stability [75]. Similarly, an impulse response function including Forecast Error Variance Decomposition is also estimated so determine the dynamic relationships amongst key variables [76]³.

5. EMPIRICAL FINDINGS AND DISCUSSIONS

Findings from Augmented Dickey Fuller Tests (ADF) as shown on Table 4 (Fuller (1976), Dickey and Fuller (1979)) show that all series variables are non-stationary at their level forms but have all become stationary after taking first differences $I(1)$ at 5% significance level. The lag length was decided according to Schwartz information criteria which suggested maximum of 8 lags.

Johansen test based on Johansen (1995) for cointegration shows a 1 cointegration relationships between the variables as shown in Table 5 below, hence our choice model should be the Vector Error Correction Model (VECM). Our null hypothesis of $r=1$ is not rejected at both 10 and 5% confidence intervals.

5.1 Vector Error Correction Model (VECM)

Having established a one cointegration relationship, VECM is estimated as shown below:

Lag lengths are set through minimizing the HC and SIC using two stage estimations. First stage being the Johansen approach while second is the Estimated Generalized Least Squares (EGLS). Systems of equation is represented as:

$$y_t = (RGDP_t, RFDI_t, LAMCU_t, GCE_t, UER_t)$$

From the p-values (Table 6), it is obvious that all coefficients are highly statically significantly different from zero with positive values, except the unemployment rate coefficient. Particularly, the

³Also see [77]

impacts of foreign direct investment and ratio of public consumption to RGDP on economic development is minimally positive but also less than 1% while the period rise in RGDP is equally positive. Surprisingly, the manufacturing capacity utilization coefficient explains the highest positive effects on economic development.

With respect to the speed of adjustment to long-run equilibrium relationship, Table 7 reports that unemployment rate and ratio of public consumption to output has to fall to a large extent so as to revert the system back to equilibrium. In the same vain, foreign investors should rise to about 70% to sustain the economy back to equilibrium.

Table 3. Summary of statistics

Variables	Mean	Std. dev.	Minimum	Maximum
RGDP	47968.18	20760.39	24988.65	98889.1
AMCU	46.82	11.90	29.3	73.3
UER	9.43	6.53	1.9	23.9
GCE	21.95	22.69	5.15	71.63
RFDI	1830.66	687.2831	973.93	3583.5

Table 4. ADF Test results

Variable	Deterministic term	No. of lagged differences	Teststatistic	5%critical value
$LRGDP_t$	c & t	1	-1.567	-3.562
$LRFDI_t$	c & t	3	-2.887	-3.574
$LAMCU_t$	c & t	0	-3.177	-3.687
GCE_t	c & t	2	-1.808	-3.562
$LUER_t$	c & t	0	-1.993	-3.562
$\Delta LRGDP_t$	c & t	0	-5.554	-3.562
$\Delta LRFDI_t$	c & t	2	-4.025	-3.562
$\Delta LAMCU_t$	c & t	0	-3.857	-3.562
$\Delta LGCE_t$	c & t	0	-6.330	-3.562
ΔUER_t	c & t	0	-7.051	-3.562

Note : c & t implies Constant and Trend

Table 5. Johansen Cointegration Tests for $y_t = (RGDP_t, RFDI_t, LAMCU_t, GCE_t, UER_t)$

Variables	Deter. Terms	No of Lagged differences	H_0	Trace Statistic	Critical 90%	Value(s) 95%
RGDP	c,t,	2	$r=0$	95.05	84.27	88.55
			$r=1$	52.68	60.00	63.66

Table 6. Estimated Long-run Cointegration Vector (1984-2012; T=29)

$LRGDP_{t-1}$	$LRFDI_{t-1}$	$LAMCU_{t-1}$	GCE_{t-1}	UER_{t-1}	T_{t-1}
1.00	-0.0442	-1.780	-0.003	0.084	-0.81
	(0.048)	(0.107)	(0.007)	(0.007)	(0.002)
	{0.000}	{0.000}	{0.000}	{0.000}	{0.000}

Note: Figures in () show the standard errors while those in {} are the p-values

The model is further subjected to tests for possible autocorrelation, normality and univariate ARCH effects. We therefore applied the portmanteau test statistics using $H_0; E(u_t, u_{t-1}) = 0$ where $i=1...h$ against the alternative that autocorrelation is not zero for the presence of any possible autocorrelation⁴ in the residuals. Also tested for is the LM type test and is the Lomnicki- Jargue-Bera statistic (LJB) based on Lutkephol (1993). Results in Table 8 and 9 show no presence of autocorrelations in the residuals and normal.

5.2 Innovation Accounting

As shown in the impulse response figure presents the dynamic relationship existing between the variables. It can be inferred, a unit impulse to a shock in both foreign investments and manufacturing capacity utilization will impact positively on economic development. On the other hand, one time rise in unemployment will impact negatively on output throughout the period. We have reported the proportions of forecast on real output in Table 10.

Majority of the forecast error variance in RGDP is self-explained in the short-run and decreases gradually in the longer horizon. Hence short-run output growth can raise RGDP more than in the long-run. Also about a 1% and 2% variation in output is explained by foreign direct investment and manufacturing capacity utilizations in the 7th which also increased (AMCU) to 4% in the longer periods. Further variations in RGDP are explained more by unemployment in the longer period of about 21%. This implies that economic development is accelerated by creating jobs for the teaming populace. Also the impulse-response functions as reported in Table 1, Fig. 1 show that output reacts positively to a one standard deviation change in manufacturing capacity utilization, but negative to a one standard deviation change in unemployment.

In addition, foreign direct investment has overall positive effect on the real gross domestic product in Nigeria at the period of study. The significant effect is at the subsequent period of the establishment of such firms. In other words, development of Nigeria is significantly affected by foreign direct investment as the results show. It really buttresses the essence of government's

emphasis on openness and also the provision of fiscal incentives to foreign investors by the Nigerian government.

6. POLICY IMPLICATIONS

Given the result of our analysis, it can be discerned that the desirable level of the use of resources in Nigeria by foreign investors is yet to be attained. This could be based on the operation and nature of the Nigerian economy. It means that much is still needed to be done to attract more foreign direct capital inflow which will increase the use of our resources in Nigeria so as to encourage development of the economy. On this note, it is imperative that the government of Nigeria should take drastic action on the following:

- i) In consideration of the empirical results and events in Nigeria over the years, security of life and property must be resolved once and for all. Crimes, including the kidnapping of foreigners must be addressed. No sane investor would wish to invest where he is not sure of the survival of human and physical capital.
- ii) The empirical results presupposes repositioning certain situations in Nigeria so as to attract and sustain foreign investors. This involves actions by the government to minimise cost of doing business so as to encourage both domestic and foreign investors. Taxes and port duties should not be made to impede prospective investors. Investors usually embark on feasibility study before establishing any business.
- iii) The power sector needs more attention to ensure regular power supply. Irregular power supply is highly inimical to any form of economic activity. Sabotage and unfulfilled promises on the part of the government should stop forthwith. Efforts should be made in reviving the sector.
- iv) Good road network, adequate water supply and efficient transportation must be addressed. They are among the important considerations by investors.
- v) The country has to eradicate all impediments to foreign investment as the positive effect will go a long way to enhance our manufacturing capacity utilization, and increase employment of resources, which have associated desirable advantages in bringing the needed development.

⁴This test is peculiar to Ljung-Box statistic for the univariate case.

Table 7. Speed of adjustment coefficients for RGDP (1984-2012)

Equations	RGDP COEFFICIENTS, e_{t-1}	t-statistics
$\Delta RGDP$	-0.255	-6.071
$\Delta RGDP$	-18.172	-3.389
$\Delta RFDI$	0.732	2.709
ΔUER	-8.1	-4.248

Table 8. Diagnostic test for VECM for RGDP

Test	Q_{10}	Q_{10}^*	LM_3	LJB
Test statistic	264.94	364.94	67.01	11.22
p-value	0.99	0.15	0.055	0.331

Note: Q_{10} is the Portmanteau test statistic at lag 10, Q_{10}^* is the adjusted Portmanteau statistic for small samples, LM is the LM-type test for autocorrelation with 3 lags

Table 9. Univariate ARCH-LM Tests

Residuals	Test statistic	P-value
u_1	14.90	0.135
u_2	16.46	0.087
u_3	4.40	0.927
u_4	7.29	0.697
u_5	1.99	0.990

Table 10. Proportions of forecast error in LRGDP

Forecast Horizon	LRGDP	LRFDI	LAMCU	GCE	UER
1	1	0.00	0.00	0.00	0.00
5	0.80	0.00	0.01	0.01	0.15
7	0.78	0.01	0.02	0.02	0.17
11	0.70	0.01	0.03	0.05	0.20
15	0.64	0.01	0.04	0.11	0.21

VECM Forecast Error Impulse Responses

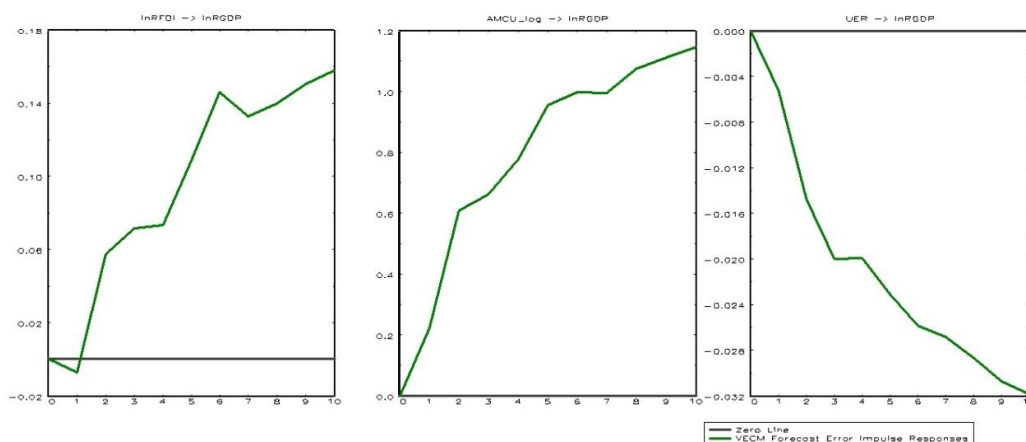


Fig. 1. Impulse-response functions

7. CONCLUSION

The study has examined the effect of resources use in Nigeria by foreign investors and its implications on the development of the Nigerian economy using the method of Vector Error correction model in data analysis. The result revealed that a reasonable effects have been made by FDI over the years in influencing aggregate economic activity, in spite of some business operation constraints in the country. It further shows that a lot needs be done to reposition the country so as to encourage the attraction of more foreign investors in order to reap more benefits. The study confirms the empirical findings of some researchers that foreign direct investment promotes growth. However, the result is at variance from most of the assertions by scholars that FDI impacts negatively on the host economy. In Nigeria, FDI is playing a significant role to aggregate economic growth.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

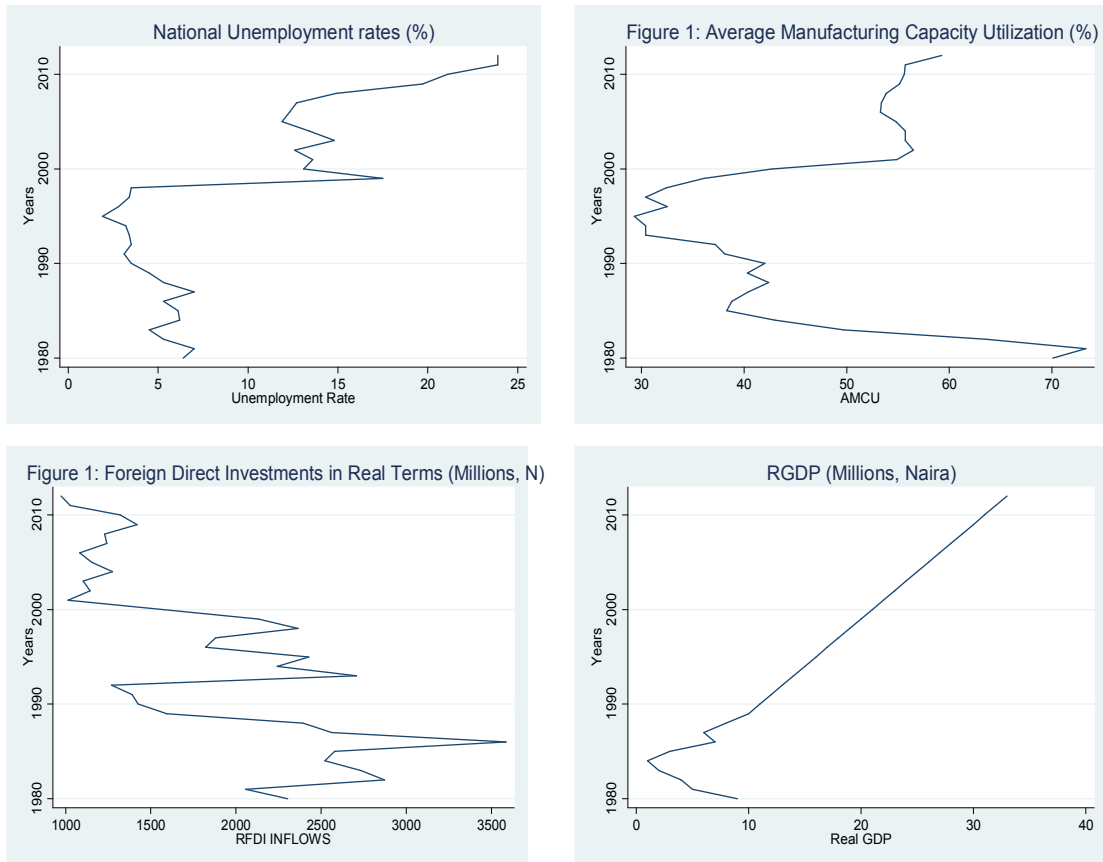


Fig. 2. Graphical Display of variables

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