

FOREIGN DIRECT INVESTMENT AND THE MANUFACTURING SECTOR OUTPUT IN NIGERIA: A PRE AND POST SAP ANALYSIS

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ABSTRACT

The study investigated the relationship between Foreign Direct Investment and Manufacturing industries within the pre and post-SAP framework. The Chow test provided justification for splitting the data into the pre and post-SAP framework. Ordinary least squares (OLS) and the Cochrane-Orcutt transformation was used to estimate the model in the pre-SAP era, while the Granger Representation Theorem and VECM were used for the post-SAP era. The Cochrane-Orcutt results show that FDI has a positive and significant impact on Manufacturing Sector Output in the pre-SAP era, and the Engle-Granger cointegration ascertained the existence of a long run relationship among the variables. The vector error correction model estimated the long run relationship between FDI and the manufacturing industries performance and also reported a positive relationship between Foreign Direct Investment and Manufacturing Sector Output. The causality test of the variables for the two periods shows no causality between FDI and the Manufacturing Sector Output in the pre-SAP era and bidirectional causation in the post-SAP era. The study therefore, recommends that the government of Nigeria should as a matter of priority contain insurgency in the country so as to attract foreign direct investment into Nigeria. The study also recommends expedient action from the government to encourage the manufacturing sector through incentives such as favorable policies, tax holidays and adequate policing of the nation's borders to prevent dumping in the economy.

Keywords: FDI, manufacturing sector, SAP, multinationals, Chow Test Cochrane-Orcutt, Granger Representation Theorem

1. INTRODUCTION

The world economy has opened up and borders have become less of a barrier to trade (Biller, 2004). There has been a growing trend of spreading investments into different nations around the globe. This diffusion of investment is often directed towards developing countries where inputs such as labor and raw materials are cheap compared to the developed countries of

the world. This international flow of capital has led to debates on the impact it has on the growth of the economies of the receiving nation and other areas and these views are provided later on in the work.

Global annual Foreign Direct Investment inflows tend to fluctuate with U.S. and global business cycles. This is substantiated by the fact that \$230 billion in 2011, of Foreign Direct Investment in the United States, dropped by 28 percent in 2012 and was also below the amount invested in 2010. The worldwide investment flows followed a similar pattern. Globally, annual FDI totaled \$1.35 trillion in 2012, saw a contraction of 18 percent from the previous year, according to the United Nations Conference on Trade and Development (UNCTAD) in its World Investment Report (WIR) 2013, as cited by (Organization for International Investment, 2013).

Insah, (2013) observed that at the continental level, FDI flow into Africa is attracted largely by natural resource endowment. Almost 40% of FDI has been in the primary sector, particularly oil and mineral extraction business. Other countries such as Mauritius and Seychelles have managed to attract FDI through liberalization, export orientation, tax and other incentives, while some African countries have attracted FDI due to their proximity with South Africa (Haile, and Asseta, 2006).

In Nigeria, a national quest for scientific and technological know-how through FDI which is required for achieving sustainable development has gathered momentum in recent years. According to Dutse, Okwoli and Kurfi, (2011) Nigeria after decades of restricting FDI like other developing nations is now making frantic efforts to attract external investors, and spending large sums of money to attract foreign companies. Explanations for the justification of these efforts have been proffered by authors such as Oman, (2000) who explained that multinational companies MNCs are thought to bring not just employment and capital, but also new skills and technological knowledge for domestic firms.

The Nigerian government laid much emphasis on the manufacturing sector because it envisage that the modernization of the sector requires a deliberate and sustained application and combination of suitable technology, management techniques and other resources to move the economy from the traditional low level of productivity to a more automated and efficient system

of mass production of goods and services (Malik, Teal and Baptist, 2006). Despite these attributes, the controversy on whether or not Foreign Direct Investments constitutes ladder to development rages on (Adejumo, 2013). In the midst of this controversy arises the need for country- specific assessments of the role of Foreign Direct Investment in national industrialization efforts, with particular emphasis on the manufacturing sub-sector. The choice of the manufacturing sector is hinged on the importance of the sector in resource utilization and its role in achieving the vision 20:2020.

Literature on the impact of FDI on economic growth in Nigeria is vast and there seems to be a consensus that FDI has a positive impact on economic growth in Nigeria. For instance Olayiwola and Okodua, (2012) employed cointegration and vector error correction using data from 1980-2007. Their findings reveal that FDI affects economic growth positively in the longrun. Other studies such as Shiro, (2007), Ekperiware (2011) are also in agreement with the above exposition. On sectoral basis, there is also a consensus that FDI negatively impacts the manufacturing sector in Nigeria and has been confirmed by Adeolu, (2007), Imuodu, (2012), Opaluwa, Ameh, Alabi and Abdul (2012) and Adejumo, (2013). However these studies have failed to take note of the existence of the structural break in 1986 in the form of the Structural Adjustment Programme (SAP). It is in this light that this study intends to complement the ongoing debate in establishing the effects that exist between Foreign Direct Investment and the manufacturing industry subsector within a pre and post Structural Adjustment Programme framework.

The paper is divided into five sections; the first section is the introduction, followed by the review of literature, methodology, presentation and interpretation of results and the conclusion.

2. LITERATURE REVIEW

2.1 Conceptual clarification

The Organization for Economic Cooperation and Development, (2008) defines Foreign Direct Investment as reflecting the objectives of establishing a lasting interest by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is

resident in an economy other than that of the direct investor. This implies the interest of the long term relationship between the direct investment enterprise and a significant degree of influence on the management of the enterprise. The direct or indirect ownership of 10 percent or more of the voting power of an enterprise resident in one economy by an investor resident in another economy is evidence of such a relationship. Disagreements exist, that in some cases an ownership of as little as 10 percent of the voting power may not lead to the exercise of any significant influence, while on the other hand, an investor may own less than 10 percent but have an effective voice in the management.

Multinational Corporations (MNC) are also referred to in literature as Transnational Corporations (TNC) or Multinational Enterprises (MNE). Detomasi, (2007) defines a Multinational Corporation as an enterprise that engages in Foreign Direct Investment and that owns or control value added activities in more than one country. A firm is not really a multinational if it just engages in overseas trade or serves as a contractor to foreign firms. There are a number of ways of assessing the degree of multi-nationality of a specific firm. Firms are considered to be multinationals if they have many foreign affiliates or subsidiaries in foreign countries; they operate in a wide variety of countries around the globe, the proportion of assets, revenue or profits is high; their employees, stockholders, owners and managers are from different countries; their overseas operations are much more ambitious than just sales offices, including a full range of manufacturing and research and development activities.

Anyanwu, Oyefusi, Oaikenan and Dimowo, (1997), aver that the manufacturing industry is a subset of the industrial sector (others being processing, craft and mining subsectors). Manufacturing thus involves the conversion of raw materials into finished consumer goods or intermediate or producer goods. Manufacturing like other industrial activities, creates avenues for employment, helps boost agriculture, helps to diversify the economy, while helping the nation to increase its foreign exchange earnings, enabling local labor to acquire skills. In addition, it minimizes the risk of overdependence on foreign trade and leads to the fullest utilization of available resources.

Adejumo, (2013) posits that the manufacturing sector is particularly important in the process of industrialization because of its multidimensional benefit to the development process.

Other authors like Rajnesh, (1992) defined industrialization in terms of an increase in the share of the gross domestic product contributed by the manufacturing sector. Anyanwu, (2000) identified the problems the manufacturing sector in Nigeria prior to SAP include a low level technology, low level capacity building, low investment, poor infrastructure and high cost of production. Ku, Mustapha and Goh, (2010) also availed that the problems faced by the manufacturing sector in Nigeria in the 1960s and 70s were dependency on oil income, weak infrastructure, lack of proper management and planning and lack of skilled labor. These problems necessitated the introduction of SAP.

Anyanwu, Oyefusi, Oaikenan and Dimowo, (1997) further posits that the first response of Nigeria's government to the deteriorating economic conditions in the country was to introduce some stabilization, austerity and counter-trade measures between 1982 and 1984. In order to secure foreign assistance to solve its balance of payment problems, the government approached the International Monetary Fund for a three year extended facility loan in 1983. The International Monetary Fund on its own part introduced conditionalities These were 60 percent devaluation in the national currency, rationalization in the size of the public service, trade liberalization and removal of petroleum subsidy. The government in a bid to secure legitimacy threw the matter to the general public. The Nigerian public rejected the loan proposal however; the Babangida's government in July 1986 adopted an externally packaged Structural Adjustment Programme (SAP).

Obadan and Ekuehare, (1989) noted that the Nigeria's Structural Adjustment Programme is intended to discourage primitive accumulators and to encourage capitalist accumulators in the economy. The emerging structure of dependent capitalism envisages only a supportive role for the government in a refurbished economic environment of highly reduced government ownership and control of agricultural and industrial enterprises. Philips, (1987) outlined in specific terms the objectives of the Structural Adjustment Programmes to include, first to restructure and diversify the productive base of the economy in order to reduce dependency on the oil sector and on imports, secondly to achieve fiscal and balance of payment viability over the period, in the third place to lay the basis for a sustainable non-inflationary growth and lastly to reduce the

dominance of unproductive investment in the public sector, improve the sectors efficiency and enhance the growth potentials of the private sector.

The inflow of FDI into the Nigerian economy is broken down into seven sectors. These include mining and quarrying, manufacturing and processing, agriculture; forestry and fisheries transport and communication, building and construction, trading and business services and lastly miscellaneous services. FDI in Nigeria has traditionally been concentrated in the extractive industries. The mining and quarrying sector seems to have been next to the extractive sector in receiving FDI attention. According to Imuodu (2012) the average share of this sector in total FDI between the periods 1980-2009 was about 26 percent. The manufacturing and processing sector received enormous attention in 1980-84, its share of total FDI stood at 38.3 percent; it reached the peak of 43.7 percent between the periods 1990-94, fell to 23.6 percent in 1995-99 and rose to 40.7 percent in 2005-09. Its average total all through the period was, however, 34.8 percent in 1980-2009. FDI in trading and business and other miscellaneous services also received some boost but not as much as the two sectors already mentioned. FDI on building and construction was not encouraging as it averaged 4.2 percent in the entire period under consideration. The worst hard-hit was the agriculture, forestry and the fisheries sector. From 1.4 percent in 1980-84, it rose marginally to 1.7 percent in 1990-94, fell to the trough of 0.4 percent in 1995-99 and rose to all record high of 2.1 percent in 2005-09.

Dutse, Okwoli and Kurfi (2011) pointed out that the developments in the manufacturing sector have been attributed to some policy initiatives aimed at promoting the performance of some firms within the manufacturing subsector. The policy initiatives includes granting of licenses for importation of quality raw materials for industrial use, provision of capital allowance incentives for incurring excessive capital expenditure, granting of input loan by ministry of commerce and industries in collaboration with the Central Bank of Nigeria and commercial banks, provision of 2-3 years duty free period of importation of machinery, equipments and spare parts during the phase of plant building and commencement of production.

2.2 Theoretical framework

Different theoretical explanations that developed over time have been integrated by Dunning (1981), in his **OLI-paradigm**, which has become the standard theoretical framework for studies on Foreign Subsidiaries of Multinational Corporations.

This work is anchored on the OLI-paradigm. The O-L-I Paradigm explains Foreign Direct Investment (FDI) by merging three isolated theories of international production, the monopolistic advantage (ownership advantage), the location advantage and internalization theories, in a single approach; hence it is often called an **eclectic theory**. The idea of the eclectic theory of Dunning is a simple, yet profound construct, which rests on a tripod set of conditions for Foreign Direct Investment (FDI) to take place. It avers that the extent, geography and industrial composition of foreign production embarked on by Multinational Corporations (MNCs) is determined by the collaboration among a set of three sub-paradigms. Each of these sub paradigms has implicit implication for spillovers in the host economy.

2.3 Empirical Review

Many scholarly literatures exist on the role of Foreign Direct Investment in the economy. Adejumo, (2013) studied the relationship between Foreign Direct Investment and the manufacturing sector performance in Nigeria (1970-2009) using autoregressive distributed lags (ARDL) and cointegration. He found that Foreign Direct Investment impact negatively on manufacturing value added, the proxy used in measuring manufacturing industries performance. The effect of Foreign Direct Investment on manufacturing value added was significant at 10 percent. The results imply that a 1 percent increase in Foreign Direct Investment leads to a 0.47 percent decrease in manufacturing value added in the long run.

In a similar research, Chandran and Krishnan, (2008) researching on Foreign Direct Investment and manufacturing growth in Malaysia from 1970-2003 using cointegration and autoregressive distributed lag. The study found that Foreign Direct Investment had a positive and significant contribution to manufacturing value added and significant at 1 percent. The result meant that an increase in Foreign Direct Investment by 1 percent contributed to a 0.084 unit increase in manufacturing value added.

Opaluwa, Ameh, Alabi and Abdul, (2012) conducted research on the effect of Foreign Direct Investment on the Nigerian manufacturing sector employing from 1970-2010 employed Vector Autoregression (VAR), cointegration and error correction techniques to establish the relationship between Foreign Direct Investment and the growth of the manufacturing sector.

Their findings show that Foreign Direct Investment has a negative effect on the manufacturing productivity and it is statistically significant.

Imodu, (2012) studied the impact of Foreign Direct Investment on Nigeria's economic growth 1980-2009: evidence from the Johansen cointegration approach, using vector error correction model (VECM) and Johansen cointegration test. The findings show that the impact of Foreign Direct Investment on manufacturing, agriculture, mining and petroleum were minimal, except for the telecommunication sector which had a good and promising future in the long run.

Insah, (2013) wrote on Foreign Direct Investment inflows and economic growth in Ghana from 1980-2010 using dynamic ordinary least squares and Vector Error Correction Models (VECM) found a positive relationship between economic growth and Foreign Direct Investment. He also found that lagged values of Foreign Direct Investment have inverse relationship with economic growth in Ghana.

Onyeagu, (2013) in a similar research on an econometric analysis of the impact of Foreign Direct Investment on economic growth in Ghana: the role of human capital development from 1975-2008, using Johansen and Juselius cointegration and Error Correction Model (ECM) also found that Foreign Direct Investment has a positive and significant effect on economic growth in Ghana in the long run, which implies that Foreign Direct Investment potential in Ghana has positive relationship with the growth of Ghanaian industries.

Olayiwola and Okodua, (2012) researched on Foreign Direct Investment nonoil exports and economic growth in Nigeria; a causality analysis from 1980-2007, using Vector Error Correction (VEC), cointegration and granger causality test found a unidirectional causation flowing from Foreign Direct Investment to nonoil exports. The study also found that Foreign Direct Investment affects economic growth positively in the long run, though at an unimpressively low rate.

Ogbanje, Okwu and Saror, (2012) in an analysis of Foreign Direct Investment in Nigeria: the fate of Nigerias' agricultural sectors from 1970-2010, used Duncan multiple range tests, correlation analysis and least squares. The findings showed a positive and strong relationship

exist between Foreign Direct Investment and Agricultural Gross Domestic Product (AGDP). Specifically, Agricultural Gross Domestic Product increased by 87.9 percent with a 1 unit increase in Foreign Direct Investment and significant at 0.01 level of probability. The study also found that the agricultural sector gets the least average Foreign Direct Investment in Nigeria.

Castejon and Woerz, (2005) carried out a cross country analysis on the influence of Foreign Direct Investment on output growth from 1987-2002, using panel estimation and generalized least squares methods. They found that Foreign Direct Investment had a significant effect on the food, petroleum, chemicals, plastic and rubber industries. The most significant effect was however observed in the transport sector. They concluded that the impact of Foreign Direct Investment is often weak, but Foreign Direct Investment is an important contributor to growth in combination with investment or exports.

Nwanko, (2013) studied the impact of Foreign Direct Investment on the power sector of Nigeria: 2000-2001, using Johansen cointegration and error correction mechanism established a positive and statistically significant effect between inward Foreign Direct Investment and the power sector in Nigeria. The findings imply that an increase in Foreign Direct Investment inflow will bring about a rise in power sector output in Nigeria. The researcher recommended that Foreign Direct Investment should focus more on Nigeria's power sector because of the strategic relevance of the sector to the nation's economy. This will mitigate capital constraint faced by the key actors in the power sector of the Nigerian economy.

Biller, (2004) in his thesis on the impact of Foreign Direct Investment on Mexico's agricultural sector and forests, from 1970-2002 using Ordinary Least Squares (OLS) in Mexico found that Foreign Direct Investment affects labor markets in Mexico in such a way that it causes preferences to forms of employment in other sectors of the economy rather than agriculture leading to labor mobility away from the sector.

Majekwu and Samson, (2012), used cointegration and error correction model to examine the relationship between Foreign Direct Investment and challenges of sustainable development in Nigeria: 1970-2010. The study revealed that there exist a long-run relationship between the

dependent variable and explanatory variables, and that gross capital formation has a positive and significant relationship with economic growth in Nigeria.

Ekperiware, (2011) in his research on oil and nonoil Foreign Direct Investment and economic growth in Nigeria from 1970-2008 using Ordinary Least Squares (OLS) found that nonoil Foreign Direct Investment is more statistically significant and has more positive effect on the Nigerian economy on the average compared to oil Foreign Direct Investment. The extractive sector that attracts higher Foreign Direct Investment in the Nigerian economy has less impact to economic growth.

From the review of the empirical works above, it is obvious that a gap exist in literature which is the absence of a study that takes account of the structural break and incorporates it in the analysis of the effects of FDI on MSO. This research thus fills this void in literature.

3. METHODOLOGY

3.1 Types and Sources of Data

Secondary data was used for the study. The variables required were Manufacturing Sector Output (MSO), Foreign Direct Investment (FDI), Domestic Savings (DS) Trade Openness (TO), Exchange Rate (EXR) and Interest Rate (INTR). Data for the variables were sourced from the Central Bank of Nigeria statistical bulletin various issues.

3.2 Model Specification

To test the impact of Foreign Direct Investment on the manufacturing subsectors performance, a single equation model influenced by the OLI-Paradigm theory of (Dunning, 1981) was postulated to ascertain the impact of the explanatory variables on the dependent variable in the Pre Structural Adjustment Programme and the post Structural Adjustment Programme era.

The model is specified in line with that used by Adejumo, (2013) with slight modifications which are the introduction of Domestic Savings and Exchange Rate and exclusion of Total Factor Productivity. The implicit model to account for the effect of Foreign Direct Investment in the Pre and post Structural Adjustment programme era is expressed below.

$$MSO = f(FDI, DS, TO, INTR, EXR) \dots \dots \dots (3.1)$$

The model in its explicit form is expressed in its natural logarithm form in order to denominate all variables in a common unit.

$$\ln MSO = \alpha_0 + \beta_1 \ln FDI + \beta_2 \ln DS + \beta_3 \ln TO + \beta_4 \ln INTR + \beta_5 \ln EXR + u_t \dots \dots \dots (3.2)$$

Where

α_0 is the intercept

$\beta_1 - \beta_5$ is the coefficient of the variables

U_t is the stochastic error term

MSO is the Manufacturing Sector Output.

FDI is Foreign Direct Investment. Data on Foreign Private Investment will be obtained for FDI

DS is domestic savings in the economy

TO is trade openness defined as the level of a country's integration to the world's economy and will be measured by Nigeria's ratio of trade to Gross Domestic Product (Adejumo, 2013).

INT is Interest Rates defined as the price of investment.

EXR is the rate of interest, the rate at which the naira exchanges with the US dollar.

3.3 Method of Data Analysis

3.3.1 Chow Test of structural break

When we use a regression model involving time series, it may happen that there is a structural change in the relationship between the regressand Y and the regressors. By structural change it is meant the values of the parameters of the model do not remain the same through the entire time period (Gujarati and Porter, 2009). To overcome errors in estimation, we use the chow test which is carried out using the following formula

$$F = \frac{(RSS_R - RSS_{UR})/k}{(RSS_{UR})/(n_1 + n_2 - 2k)}$$

3.2.2 Augmented Dickey-Fuller Test (ADF)

This study employed Augmented Dickey-Fuller test to test the individual stationary properties of the series. The standard Augmented Dickey-Fuller test is stated below:

$$\Delta P_{it} = \beta_1 + \beta_2 t + \sigma P_{it-1} + \alpha \sum_{i=1}^m \Delta P_{it-1} + \varepsilon_{it} \text{-----}(3.5)$$

The null hypothesis is that, there is no stationarity in the series.

3.2.3 Regression Analysis

The Cochrane-Orcutt Method of OLS estimation was adopted in this work. This procedure in econometrics, adjusts a linear model for serial correlation in the error term. If it is found via the Durbin–Watson statistic that the error term of the classical least squares specified above is serially correlated over time, then standard statistical inference as normally applied to regressions is invalid because standard errors are estimated with bias. To avoid this problem, the residuals must be modeled. If the process generating the residuals is found to be a stationary first-order autoregressive structure, $\varepsilon_t = \rho\varepsilon_{t-1} + e_t$, $|\rho| < 1$, with the errors $\{e_t\}$ being white noise, then the Cochrane–Orcutt procedure can be used to transform the model by taking a quasi-difference:

$$y_t - \rho y_{t-1} = \alpha(1 - \rho) + \beta(X_t - \rho X_{t-1}) + e_t \text{-----}(3.7)$$

In this specification the error terms are white noise, thus statistical inference is valid. Then the sum of squared residuals (e_t^2) is minimized with respect to (α, β) , conditional on ρ . (Wikipedia, 2014)

3.4.4 Cointegration Analysis: This study adopted the Engel Granger Representation Theorem. According to this theorem, if two or more variables y and x are cointegrated, then the relationship between them can be expressed as an error correction model (ECM), in which the error term from the OLS regression, lagged once, acts as the error correction term. In this case the cointegration provides evidence of a long-run relationship between the variables, while the

ECM provides evidence of the short-run relationship. A basic error correction model would appear as follows:

$$\Delta y_t = \chi_0 + \chi_1 \Delta x_t - ECM(u_{t-1}) + \varepsilon_t \text{-----}(3.8)$$

Where ECM is the error correction term coefficient, which theory suggests should be negative and whose value measures the speed of adjustment back to equilibrium following an exogenous shock. The error correction term u_{t-1} , which can be written as: $(y_{t-1} - x_{t-1})$, is the residual from the cointegrating relationship in the model. This is done in order to evaluate if there exists some linear combination of these variables that converge to a long-run relationship over time, the usage of any particular method depends largely on the order of integration reported by the ADF result. If the order of integration is uniform, the application of Johansen Cointegration is considered most appropriate and if otherwise, the Engle-Granger approach is applied (Gujarati and Porter, 2009).

3.2.5 Vector Error Correction Model

Cointegration series have an error correction representation. Engle and Granger (Engle and Granger, 1987) reveal that, if the series are cointegrated, then the probability of the omitted variable bias, autocorrelation and endogeneity is ruled out. The specification of the vector error correction is for the observation of the short run properties of the series (Short run dynamics).

Relying on the Presence of a cointegration vector, the subsequent can be written as follows:

$$\begin{aligned} \Delta Y_{1t} = & \phi_1 + \sum_{k=1}^{p-1} \alpha_{11,k} \Delta Y_{1,t-k} + \sum_{k=1}^{p-1} \alpha_{12,kj} \Delta Y_{2,t-k} + \sum_{k=1}^{p-1} \alpha_{13,k} \Delta Y_{3,t-k} + \sum_{k=1}^{p-1} \alpha_{14,k} \Delta Y_{4,t-1} \\ & + \sum_{k=1}^{p-1} \alpha_{15,k} \Delta Y_{5,t-1} + \sum_{h=1}^r \alpha_{1,h} ECM_{h,t-1} + \varepsilon_t \text{-----} -3.9 \end{aligned}$$

3.2.6 a priori expectations

On a priori expectation, β_1, β_2 and $\beta_3 > 0$, while β_4 and $\beta_5 < 0$

4. DATA PRESENTATION AND ANALYSIS

Table 4.1 below gives the descriptive statistics of the variables used in the work. The descriptive statistics of data series gives information about simple statistics such as mean, median, minimum value, maximum value and the distribution of the sample measured by skewness, kurtosis and the Jaque-Bera statistic.

Table 4.1 Descriptive statistics

| | MSO(₦m) | FDI(₦m) | DS(₦m) | TO | EXR (₦) | INTR (%) |
|--------------|----------|----------|----------|----------|----------|----------|
| Mean | 255010.5 | 146447.1 | 877130.8 | 0.804843 | 49.19857 | 16.54318 |
| Median | 134007.4 | 16378.10 | 46427.50 | 0.721468 | 13.60395 | 17.62500 |
| Maximum | 823860.0 | 951534.5 | 5030144. | 2.494319 | 159.7000 | 36.09000 |
| Minimum | 3784.000 | 0.500000 | 411.8000 | 0.061603 | 0.500000 | 6.000000 |
| Std. Dev. | 247715.1 | 219041.7 | 1594507. | 0.438338 | 61.26687 | 7.938656 |
| Skewness | 0.653453 | 1.948629 | 1.664424 | 1.690654 | 0.741755 | 0.298640 |
| Kurtosis | 2.094043 | 6.506752 | 4.031303 | 7.487684 | 1.741675 | 2.279082 |
| Jarque-Bera | 4.636066 | 50.39088 | 22.26550 | 57.88301 | 6.937671 | 1.606854 |
| Probability | 0.098467 | 0.000000 | 0.000015 | 0.000000 | 0.031153 | 0.447792 |
| Sum | 11220463 | 6443673. | 38593754 | 35.41309 | 2164.737 | 727.9000 |
| Sum Sq. Dev. | 2.64E+12 | 2.06E+12 | 1.09E+14 | 8.262037 | 161406.1 | 2709.957 |
| Observations | 44 | 44 | 44 | 44 | 44 | 44 |

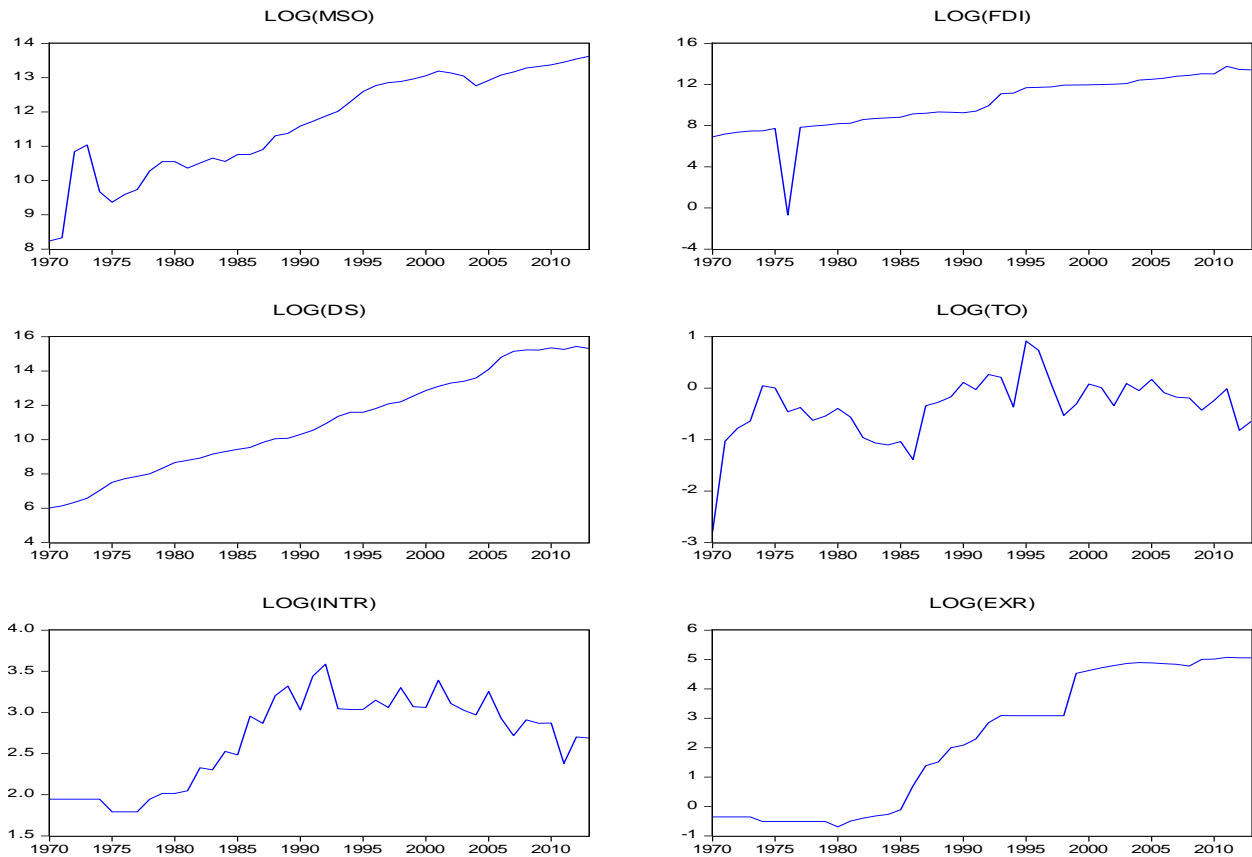
Source: Authors Computation using eviews 7.1

A look at the observation shows that MSO, FDI, DS, TO, EXR and INTR had mean values of ₦255010.5, ₦146447.1, ₦877130.8, 0.804, ₦49.199 and 16.45%, with minimum values of ₦3784, ₦0.5, ₦411.8, 0.062, ₦0.5 and 6% and maximum values of ₦823860, ₦951534.5, ₦5030144, 2.49, ₦159.7, 36% respectively and a standard deviation of ₦247715.1 ₦219041.7 ₦1594507 0.44 units ₦61.27 and 7.97% respectively.

The Jacque-Bera test of normality for the variables shows bias for MSO, FDI, DS, TO EXR and no bias for INTR as revealed by the probability values, as well as low and high skewness and kurtosis values.

4.2 Trend Analysis

The figures below shows the trend of the variables used in the study all variables are in logs.



Source: author's construction using eviews7

The figures above reveal the trends for MSO, FDI, DS, TO, EXR and INTR in Nigeria from 1970-2013. Manufacturing sector output has grown steadily, as well as Foreign Direct Investment and Domestic Savings. The index of trade openness and interest rates showed a fluctuating trend, though the rate of interest was relatively stable between 1970-1980, while the exchange rate rose sharply and has been on a steady rise. As at 2010, the growth rate of MSO, FDI, DS, TO, EXR and INTR were 5.02%, -1.89%, 13.77%, 20.95%, 0.94% and 0.34% respectively.

4.3 Chow test

The Chow test reported a calculated F-statistic value of 11.07 and a critical F-statistic value of 2.42 providing sufficient evidence to reject the null hypothesis of the existence of

parameter stability in favor of the alternative hypothesis of a structural change and conclude that the regressions are different.

4.4 Unit Root Test (Augmented Dickey Fuller Test ADF)

Following the result of the ADF test, all variables MSO, FDI, DS, TO, EXR and INTR were of the order I(0) in the pre-SAP era. The study adopts the technique of ordinary least squares for the regression analysis. This is based on the premise that, all the variables in the data set are stationary and can yield best linear unbiased estimates (BLUE). However for the post-SAP era the variables were found to have a mixed of order I(1) and I(2) which led to the adoption of the Engle-Granger Representation Theorem for the post-SAP analysis.

4.5 Result of OLS Regression Analysis

Following the Chow Test and result of the Augmented Dickey Fuller (ADF) unit root test, OLS was applied on the first model and the result is presented in table 4.2.

Table 4.2: Impact of Foreign Direct Investment on manufacturing industries in Nigeria 1970-1985 (Ordinary Least Squares Technique)

| Dependent Variable | Explanatory Variable | | | | |
|--------------------|----------------------|-------------|------------|-------------|--------|
| | | Coefficient | Std. Error | t-Statistic | Prob. |
| MSO | FDI | 1.0357 | 0.2021 | 5.1254 | 0.0140 |
| | DS | 0.8166 | 0.3444 | 2.3710 | 0.0390 |
| | TO | 0.6090 | 0.1879 | 3.2415 | 0.0215 |
| | INTR | 1.4999 | 2.3416 | 0.6405 | 0.5362 |
| | EXR | -0.8820 | 0.2906 | -3.0349 | 0.0254 |
| | C | 6.2406 | 0.4330 | 1.8179 | 0.0991 |

$\bar{R}^2 = 0.21$ **D.W = 1.25** **F -Statistic = 1.786** **Prob(F-Stats) = 0.203**

Source: Authors computation using eviews 7.1

The results in Table 4.2 shows that with an adjusted R^2 of 0.21, only 21 percent of the systematic variations in Manufacturing Sector Output, (proxy for manufacturing industries) were explained by the explanatory variables. This is a poor fit further buttressed by an F – Statistic of 1.786 and the overall insignificant probability of the F-statistics (0.203) and a Durbin Watson (DW) statistic of 1.25 shows the presence of serial correlation.

4.6 Cochrane-Orcutt transformation Technique

The poor results from the OLS regression necessitated the use of the Cochrane–Orcutt method. The Cochrane–Orcutt AR(1) which converged after 11 iterations produced better results as reflected in table 4.3 below.

Table 4.3: Impact of Foreign Direct Investment on Manufacturing industries in Nigeria 1970-1985 (Cochrane – Orcutt Method AR 1)

| Dependent Variable | Explanatory Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|----------------------|-------------|------------|-------------|--------|
| MSO | FDI | 1.0788 | 0.2579 | 3.5667 | 0.0086 |
| | DS | -0.7067 | 0.3025 | -2.3365 | 0.0272 |
| | TO | -2.3478 | 0.7582 | -3.0965 | 0.0147 |
| | EXR | -1.4069 | 1.7735 | -0.7933 | 0.4505 |
| | C | 13.6743 | 3.6899 | 3.7059 | 0.0060 |
| | AR(1) | 0.4645 | 0.1017 | 4.5695 | 0.0018 |

$\bar{R}^2 = 0.72$ **D.W = 1.856** **F-Statistic = 7.458** **Prob(F-Stats) = 0.044560**

Source: Authors computation using Eviews 7

Here, one of the variables INTR (Interest rate) was dropped as it consistently performed poorly in terms of individual test of significance. This is not surprising because most financial institutions at the time in question were not under any strict regulation from the apex bank [Central Bank of Nigeria (CBN)].

An adjusted R^2 of 0.72 shows that 72 percent of the systematic variations in economic growth was accounted for by all the explanatory variables put together. The robustness of this result is further buttressed by an F-statistic of 7.4576 and a Durbin-Watson Statistic of 1.86 which clearly indicates the near absence of autocorrelation.

On the performance of the individual variables FDI, DS and TO passed the t-test at the 5 percent level of significance. The result shows that two variables FDI and EXR correctly meet expectation in terms of their signs, while DS and TO did not meet expectation with respect to their signs. The justification for the behavior of these variables can be explained thus, first low education and underdeveloped financial institutions accompanied with a weak apex bank are responsible for the poor savings attitude of Nigerians during this period. With respect to TO corruption, profit repatriation and porous borders which encouraged smuggling are responsible for the behavior of this variable. The positive impact of FDI shows the importance of the international flow of capital in form of direct investment in the Pre-SAP era.

The results further show that a unit increases in FDI and DS variables will result in 1.08 and -0.71 unit increases in MSO growth rate in Nigeria respectively. A unit rise in TO and EXR variables brings about -2.35 and -1.41 units decrease in MSO respectively.

4.7 Tests for Cointegration (Engle-Granger Representation Approach)

Applying the Engle-Granger representation theorem because of the mixed order of integration, the results revealed are documented below.

Table 4.4: Cointegration Test (1986-2013)

| Variable | ADF t-statistics @ Level | Critical value | | | Order of integration | Prob. |
|----------|-----------------------------|----------------|---------|---------|-------------------------|--------|
| | | 1% | 5% | 10% | | |
| Residual | -4.7247 | -3.6999 | -2.9763 | -2.6272 | I(0) | 0.0081 |

Source: Authors computation using Eviews 7

The process above produced an ADF t-statistic of -4.7247 at levels for the Residual which is less than the 5% critical value of -2.9763 thereby leading to the rejection of the null hypothesis of non-stationarity in favor of stationary time series with the conclusion that, the error term is stationary and the

variables under study are cointegrated.

4.8 Vector Error Correction

In this case of the post-SAP era (1986-2013) the cointegration provides evidence of a long-run relationship between the variables, while the ECM provides evidence of the short-run relationship. Below is the result of the vector error correction within the framework of Engel-Granger Representation theorem.

Table 4.4 Vector Error Correction

Dependent Variable: MSO (1986-2013)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|--------------------|-------------|--------|
| FDI | 2.4782 | 0.5541 | 4.4724 | 0.0093 |
| DS | 1.2741 | 0.4157 | 3.0649 | 0.0317 |
| TO | 0.8746 | 0.3271 | 2.6737 | 0.0475 |
| EXR | -0.7489 | 0.2471 | -3.0306 | 0.0350 |
| INTR | 0.5772 | 0.1470 | 3.9264 | 0.0241 |
| ECM(-1) | -0.2141 | 0.0470 | -4.5544 | 0.0084 |
| C | 3.8339 | 1.2081 | 3.1735 | 0.0275 |
| R-squared | 0.745 | F-Statistic | | 11.250 |
| Adjusted R-squared | 0.661 | Durbin-Watson stat | | 1.954 |
| Prob(F-statistic) | 0.000120 | | | |

Source: Authors computation using Eviews 7

The cointegrating relationship in table 4.6 above provides information for the long run relationship.

From the model, the intercept is 3.83 units implying that, the growth of the manufacturing sector is independent of the model variables by 3.83 units, meaning that, if all the variables are held constant, MSO will grow by 3.83 irrespective of exogenous influences in the short run. Foreign Direct Investment (FDI) is positively related to MSO in the long run and is statistically significant at the 10% level of significance as shown by the low probability value of 0.0093 this is consistent with the results Ebong,

Udoh and Obafemi, (2013). A unit change in FDI affects MSO positively by 2.49 units. Domestic Savings (DS) also affects MSO positively in the long run. A unit change in DS increases MSO by 1.27 units and is significant at 10% as shown by its probability value 0.0317 and is consistent with the findings of Imuodu, (2012). The index of trade openness TO also exerts a positive influence on MSO this is in agreement with (Ebong, Udoh and Obafemi, 2013). A unit change in TO increases MSO by 0.87 units in the long run and is statistically significant at 10% given the probability value of 0.0475. The rate of interest (INTR) negates a priori expectation affecting the economy positively and is statistically significant at 10% given the low probability value of 0.0241. A unit change in INTR affects the economy positively by 0.58 units. One justification for this behavior could be the activities of the Monetary Policy Committee (MPC) which pegs the lending rate called the Monetary Policy Rate, (MPR) thus distorting the free working of the market with regards to the lending rate. Finally, exchange rate (EXR) is negatively related to MSO and is also statistically significant at 10%. A unit change in EXR reduces MSO by 0.75 units meaning that, if the rate of exchange increases, more local currency is required for foreign transaction which adversely affects the growth of the economy.

For the short run analysis, the ECM provides evidence of the short-run relationship with the coefficient of -0.21 implying that, it will take roughly a period of 6 years for the variables to re-align to equilibrium in the event of an exogenous shock. The ECM is also known as the speed of adjustment.

The coefficient of determinations (R^2) is 0.75 and the adjusted value is 0.66 which indicates that about 66% of total variation or a change in the present value of MSO is explained by changes in the explanatory variables while the remaining 34% is explained by other variation outside the model that is the error term. The Durbin Watson statistic of 1.95 is indicative of the near absence of autocorrelation in the model. The robustness of the model is further buttressed by the high value of the F-Statistic (11.25) which explained the overall significance of the model.

On individual grounds, all the variables passed the t-test of significance at 5% level of significance evidenced by small standard errors, high t-statistics and minimal probability values.

4.9 Granger Causality Test

In order to ascertain the direction of causality between MSO and FDI, the study employed Pair wise Granger causality. The results of the test are presented in the table 4.4:

Table 4.4 causality test of variables in the pre-SAP era

Pairwise Granger Causality Tests

Date: 09/13/14 Time: 07:50

Sample: 1970 1985

Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|--------------------------------|-----|-------------|--------|
| FDI does not Granger Cause MSO | 14 | 2.52679 | 0.1346 |
| MSO does not Granger Cause FDI | | 0.92242 | 0.4321 |

Source: Authors computation using Eviews 7

The pairwise granger causality test shows the causal relationships that exist among the dependable variable and the exogenous variables. The result as shown by the table above reveals that FDI does not granger cause MSO and MSO does not granger cause FDI at the 10% which shows that in the pre-SAP era, FDI and MSO were not sensitive to each other’s movement.

Table 4.5 Granger causality test of variables in the post-SAP era

Pairwise Granger Causality Tests

Date: 09/09/14 Time: 20:53

Sample: 1986 2013

Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|--------------------------------|-----|-------------|--------|
| FDI does not Granger Cause MSO | 26 | 56.4476 | 4.E-09 |
| MSO does not Granger Cause FDI | | 8.57445 | 0.0019 |

Source: authors computation with e-views 7

The pair wise granger causality test revealed the following results. A bidirectional causal relationship was found to exist between MSO and FDI within the period of 1986 to 2013.this implies that FDI granger causes MSO and MSO granger causes FDI at 10% significance level. In this period as captured by (Adejumo, 2013) both variables became sensitive to each other’s movement in the early 1990s onward.

5. Conclusions and policy recommendations

This research examined the relationship between Foreign Direct Investment and manufacturing

industries performance within a pre and post SAP framework. The causality test showed zero causality between FDI and MSO in the pre-SAP era while bidirectional causation existed between the two variables in the post-SAP era. The justification for the latter case can be explained by the introduction of the indigenization policy of the government at that time, which discouraged foreign ownership of some particular industrial ventures. The Cochrane-Orcutt and granger representation theorem results highlight the fact that given the existence of a structural break 1970-1985 and 1986-2013 which is the Structural Adjustment Programme, Foreign Direct Investment had a positive and significant effect on the Manufacturing Sector Output in both periods. Comparatively, FDI had a higher impact on MSO in the post-SAP era leading the study to draw the conclusion that FDI fared better after the introduction of the Structural Adjustment Programme in Nigeria. The finding of this research is inconsistent with the findings of other researchers like (Ebong, Udoh and Obafemi, 2013); due to the fact that these researchers did not recognize the existence of a structural break in the form of the Structural Adjustment Programme. Thus the observed difference can be accounted for by the methodology adopted for this research which differs from the methodology used by the above mentioned researchers.

In the light of the foregoing, the study recommends the following.

Firstly, the federal government of Nigeria should as a matter of priority contain insurgency in the country to create a safe haven for foreign investors. This is necessary to continue to reap the positive spillover effects of Foreign Direct Investment in Nigeria as seen in the pre and post-SAP era.

Secondly, the government should sustain the liberal foreign trade policy in place so as to reap the gains of international trade as seen in the post-SAP era.

In addition, efforts should be geared towards sustaining the value of the naira, because a high exchange of the naira to other foreign countries currencies places the economy at a poor bargaining power position in international trade as evidenced during seen pre= SAP era.

Further, there should be clear guidelines in government policy regarding priority sectors that require foreign investment in Nigeria amongst which should include like agriculture, mining and manufacturing.

The policy of interest rate regulation by the CBN should be encouraged to reap the benefits as seen

in its positive impact on the manufacturing sector output in the pre-SAP era

Finally, the study recommends expedient action on the part of the government to encourage the manufacturing sector through favorable policies, tax holidays and adequate policing of the nation's borders to avoid smuggling and stem corruption by border officials.

References

- Adejumo, A. V. (2013). "Foreign Direct Investment and the manufacturing sector performance in Nigeria". *Australian Journal of Business and management Research*, Vol.3 No4.
- Adeolu, B. A. (2007). "Foreign Direct Investment and economic growth: evidence from Nigeria". *African economic research consortium*, papers No. 165 Nairobi, Kenya.
- Anyanwu, C. M. (2000) productivity in the Nigerian manufacturing industry
- Anyanwu, J. C, Oyefusi, A. Oaikenan, H. and Dimowo, F. A. (1997). The structure of the Nigerian economy (1960-1997),[1st] Onitsha: Joanee Educational Publishers, pp.454.
- Ayodele A. S. and Falokun G.O (2003) The Nigerian Economy and Pattern of Development. Printoteque, 32, Shipeolu Street, Palmgroove, Lagos.
- Biller, T. (2004). "The impact of foreign direct investment on Mexico's agricultural sectors and forests" *An honors thesis for the department Economics*, Tufts University, 2004.
- Castejon, C. F. and Woerz, J. (2005). "Good or bad? The influence of Foreign Direct Investment on output growth. An industry level analysis". Tinbergen institute, Erasmus University, Rotterdam.
- Chandran, V. G. R. and Krishnan, G. (2008) "Foreign Direct Investment and manufacturing growth: the Malaysian experience". *International Business Research* vol.1, No.3
- Detomasi, D. A. (2007) "the multinational corporation and global governance: modeling global public policy network" *Journal of Business ethics*, Vol.71.issue3, pp321-334
- Dunning, J. H. (1981) "Explaining the international direct investment position of countries: Towards a dynamic or developmental approach", *Weltwirtschaftliches Archiv*, vol. 122, pp. 667-677.
- Dutse, A.Y. Okwoli, A.A. and Kurfi, A.K. (2011). "promoting FDI-related technology spillovers in Nigeria's manufacturing sector: Active firms targeted policy approach". Conference paper presented at the international conference on sociality and Economics development. Singapore (2011).
- Ebong, F. Udoh, E. and Obafemi, F. (2013) "Globalization and the industrial development of nigeria: evidence from time series analysis" *international review of social science and humanities* vol. 6, 2(2014), pp 12-24
- Ekperiware, C. M. (2011). "oil and nonoil Foreign Direct Investment and economic growth in Nigeria" *Journal of emerging trends in economics and management sciences*. 2(4):333-343
- Granger, C.W. (1987) "Co-integration and error correction: Representation, estimation and testing" *Econometrica*, 55(2) (1987), 251-276.

- Gujarati, D. N. and Porter, D, C (2009) Basic Econometrics McGraw-Hill international edition. Fifth edition.
- Haile, G. and Asseta, H. (2006). “Determinants of foreign direct investment in Ethiopia: a time-series analysis” Conference paper presented at the 4th international conference on the Ethiopian economy, 10-12 Jun.2006.
- Imoudu, E. C. (2012). “The impact of Foreign Direct Investment on Nigeria’s economic growth 1980-2009: evidence form Johansen cointegration approach”. *International journal of business and social science*, vol. 3 No 6 (special issue – March 2012).
- Insah, B. (2013). “Foreign Direct Investment inflows and economic Growth in Ghana”. *International journal of economic practices and theories*, Vol.3, No.2, 2013.
- Ku, H. Mustapha, U. M. and Goh, S (2010) “a literature review of past and present performance of Nigerian manufacturing sector” proceedings of IMechE, part B: *Journal of Engineering Manufacture*, 2010 vol 224, no. 12 pp.1894-1904
- Majekwu, J. N. and Samson, O. (2012). “Foreign Direct Investment and the challenges of sustainable development in Nigeria”. *Journal of research in international business and management*, 2(7), 190-198.
- Malik, A. Teal, F. and Baptist, S. (2006). “The performance of Nigerian manufacturing firms: report on the Nigerian Manufacturing Enterprise Survey”. Center for the study of African economies University of Oxford; <http://www.gprg.org/pubs/reports/pdfs/2006-04-malik-teal-baptist.pdf>
- Nwankwo, O. (2013). “The impact of Foreign Direct Investment on Power sector in Nigeria: 2000-2011”. *Journal of management research* ISSN 1941-899X, Vol.5, N0.3
- Obadan, M. I. and Ekuehare, B. U. (1989) “the theoretical basis of SAP in Nigeria: An appraisal”. *International Social Science Journal*, Vol. XII, No 2.
- Ogbanje, E. C. Okwu, O. J. and Saror, S. F. (2010) “an analysis of Foreign Direct Investment in Nigeria, the fate of Nigeria’s agricultural sector”. A publication of Nassarawa State University Keffi, 6(2), 15-25
- Olayiwola, K. and Okodua, H. (2012). “Foreign Direct Investment, non oil exports and economic growth in Nigeria: a causality analysis”. *The African Finance Journal*, vol. 11, part 1.
- Oman, C. (2000). “Policy competition for FDI: a case study of competition to attract FDI”. Organization for economic cooperation and Development Paris. <http://www.oecd.org/dataoecd/9/27/2089936.pdf>
- Onyeagu, A. N. (2013). “An econometric analysis of the impact of Foreign Direct Investment on economic growth in Ghana: the role of human capital development” international journal of Humanities and social science invention ISSN 2319-7722 <Http://www.ijhss.org> vol.2 issue 8.

- Opaluwa, D. Ameh, A. A. Alabi, J. O and Abdul, M. (2012) “the effect of Foreign Direct Investment on Nigeria’s manufacturing sector”. *International journal of business and management*, 4(2), 140-148
- Organization for Economic Cooperation and Development, (2008). “Benchmark Definition of Foreign Direct Investment” fourth edition.
- Organization for International Investment (2013). “Foreign Direct Investment in the United States. 1225 Nineteenth Street, NW, suite 501, Washington DC 20036
- Philips, A. O (1987). “a general overview of the Structural Adjustment Programme” *NISER*, Ibadan, 1-12.
- Rajnesh, C. (1992). “Industrialization and Development in the third world”. Rutledge, London.
- Shiro, A. A. (2007). “the impact of Foreign Direct Investment on the Nigerian economy”. Department of Finance, University of Lagos Nigeria.
- Wikipedia, (2014) “Cochrane-Orcutt estimation” Wikipedia the free encyclopedia