

Foreign Direct Investment and Economic Growth in Ghana

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Abstract

The relationship between Foreign Direct Investment (FDI) and Economic Growth has been a topical issue for several decades. Policymakers in a large number of countries are engaged in creating all kinds of incentives to attract FDI, because it is assumed to positively affect economic growth. This paper investigates the effect of FDI on economic growth in Ghana. The paper, test for the presence of the long run linear relationship between FDI inflows and Economic Growth (GDP) for Ghana. The study employs various econometrics tools such as Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests, Vector Auto Regression (VAR) and Johansen Co-integration test on time series data from the first quarter of 2001 to the fourth quarter of 2010. The results reveal that a long run relationship exists between the variables, and that FDI is positively related to economic growth in Ghana. Ghana should therefore continue to reform its economic and foreign policy to attract more investors which can help boost its economy.

Keywords: Foreign Direct Investment, Economic Growth, Vector Auto Regression (VAR), Co- Integration, and Unit Roots

1. 1 Background of the Study

The classical economists are of the view that most developing countries are endowed with numerous natural resources, which when refined, could serve as engine of growth and development. They argued that, because of the low income base and the high propensity to consume, their levels of savings are low, which further translate to low capital formation and low productivity hence, the existence of high rate of poverty. These groups of thinkers therefore, suggested that to break this vicious circle theory of poverty, foreign direct investment (FDI) must be encouraged to complement domestic investment so as to provide these developing countries with their desired growth and development.

Foreign direct investment (FDI) as a growth enhancing component has received great attention of developed countries in general and less developed countries in particular in recent decade. It has been a matter of great concern for many economists of how FDI affects economic growth of the host country. In a closed economy, with no access to foreign saving, investment is financed solely from domestic savings. However, in open economy investment is financed both through domestic savings and foreign capital flows, including FDI. FDI enables investment-receiving (host) countries to achieve investment levels beyond their capacity to save.

Over the last couple of decades FDI has remained the largest form of capital flow in the developing countries far surpassing portfolio equity investment, private loans, and official assistance. In 1997, FDI accounted for 45 percent of net foreign resource flows to developing countries, compared with 16 percent in 1986 (Perkins, 2001). Moreover, the World Bank (2002) reported that in 1997 developing countries received 36 percent of total FDI flows. Most developing countries now consider FDI as an important source of development, but its economic effects are almost impossible to either predict or measure with precision. However, many empirical studies have shown significant role of FDI in economic growth and development of host developing countries, through its contribution in human resources development, technological transfer, capital formation and international trade.

During the past two decades, FDI has become increasingly important in the developing world, with a growing number of developing countries succeeding in attracting substantial and rising amounts of inward FDI. Economic theory has identified number of channels through which FDI flows may be beneficial to the host economy. Yet, the empirical literature has lagged behind and has had more trouble identifying these advantages in practice. Most prominently, a large number of applied papers have looked at the FDI- Growth nexus, but their results have been far from conclusive. However, with the availability of better data, the last few years have seen an especially large number of empirical papers devoted to the question (Khaliq and Noy, 2007).

The economic progress of countries depends to a large extent on the opportunity of making profitable investments and accumulating capital. Having access to foreign capital and investments allow a country to invest in both human and physical capital and to exploit opportunities that otherwise could not be used. Recent experiences with opening capital accounts in emerging and developing economies, however, have proved to be a mixed blessing, as it is becoming increasingly clear that not all types of capital imports are equally desirable.

Short-term credits and portfolio investments run the risk of sudden reversal, if the economic environment or even just an investor's perception changes, giving rise to financial and economic crises. It is therefore frequently advised that such countries should primarily try to attract foreign direct investment (FDI) and be very careful about accepting other sources of finance (Prasad, 2003).

Foreign direct investment (FDI) plays an extraordinary and growing role in global business. It can provide a firm with new markets and marketing channels, cheaper production facilities, access to new technology, products, skills and financing. For a host country or the foreign firm which receives the investment, it can provide a source of new technologies, capital, processes, products, organizational technologies and management skills, and as such can provide a strong impetus to economic development. Foreign direct investment, in its classic definition, is defined as a company from one country making a physical investment into building a factory in another country.

In the past decade, FDI has come to play a major role in the internationalization of business. Reacting to changes in technology, growing liberalization of the national regulatory framework governing investment in enterprises, and changes in capital markets profound changes have occurred in the size, scope and methods of FDI. New information technology systems, as well as decline in global communication costs have made management of foreign investment far easier than in the past. The sea change in trade and investment policies and the regulatory environment globally in the past decade, including trade and tariff liberalization, easing of restrictions on foreign investment and acquisition in many nations, and the deregulation and privatisation of many industries, has probably been the most significant catalyst for FDI's expanded role.

The most profound effect has been seen in developing countries, where yearly foreign direct investment flows have increased from an average of less than \$10 billion in the 1970's to a yearly average of less than \$20 billion in the 1980's, to explode in the 1990s from \$26.7 billion in 1990 to \$179 billion in 1998 and \$208 billion in 1999 and now comprise a large portion of global FDI. Driven by mergers and acquisitions and internationalization of production in a range of industries, FDI into developed countries rose to \$636 billion, from \$481 billion in 2008 (UNCTAD, 2008).

Many governments, especially in industrialized and developed nations, pay very close attention to foreign direct investment because the investment flows into and out of their economies can and does have a significant effect. In the United States, the Bureau of Economic Analysis, a section of the U.S. Department of Commerce, is responsible for collecting economic data about the economy including information about foreign direct investment flows. Monitoring this data is very helpful in trying to determine the effect of such investment on the overall economy, but is especially helpful in evaluating industry segments. State and local governments watch closely because they want to track their foreign investment attraction programs for successful outcomes (Jeffrey P. Graham and R. Barry Spaulding, 2004).

Numerous studies have shown that the inflow of foreign direct investment (FDI) can be quite beneficial for the host country (Alfaro, 2006; Mwillima, 2003; Noorzoy, 1979 etc.). This applies particularly to developing countries. Traditionally, foreign firms locate in developing countries with one or more of these intentions in mind: resource, efficiency or market-seeking objectives. For a mining firm, for example, the availability of natural resources is the key reason to invest in a particular country. Therefore, the resource-seeking objective is paramount for such firms. In terms of the efficiency-seeking objective it goes beyond the natural resource pull of countries. Multinational Enterprises (MNEs) aim to take advantage of diverging factor resource costs across countries (Tang, Selvanathan and Selvanathan, 2008). For example, many MNEs may outsource the production of labour-intensive products (or parts of the production process) to low-wage, developing countries to reduce overall production costs. Finally, MNEs might be interested in supplying a market through local production rather than through exports (market-seeking FDI). Obviously, larger and or fast-growing markets are more attractive for this type of FDI.

It is important to note that the positive (growth) effects of these different forms of FDI in the host country vary considerably, depending on the particular country and the policy environment (Nunnenkamp and Spatz 2004). From a development perspective, developing countries might be better off if they attract efficiency-seeking FDI in the form of full-scale plants with cutting-edge technology and management practices, strong export orientation and substantial integration in the supply chain of the multinational enterprise. Such investments offer higher developmental benefits than FDI in the form of sub-scale plants that produce for the local market, may not use the latest technology, and are protected from international competition (Moran 2006). Against this background, this study aims to examine the effects of FDI in Ghana.

1.2 Statement of the Problem

Policymakers believe that foreign direct investment (FDI) produces positive effects on host economies. Some of these benefits are in the form of externalities and the adoption of foreign technology. Externalities here can be in the form of licensing agreements, imitation, employee training and the introduction of new processes by the foreign firms (Alfaro, 2006).

According to Tang, Selvanathan and Selvanathan (2008), multinational enterprises (MNEs) diffuse technology and management know-how to domestic firms. When FDI is undertaken in high risk areas or new industries, economic rents are created accruing to old technologies and traditional management styles. These are highly beneficial to the recipient country. In addition, FDI helps in bridging the capital shortage gap and complement domestic investment especially when it flows to a high risk areas of new firms where domestic resources are limited (Noorzoy, 1979).

From the above, it is obvious that there is a relationship between FDI and economic growth or development and FDI has positive effect on economic growth or development of most developing countries. The question that comes to mind is, do these FDIs actually contribute positively to economic growth in Ghana? This becomes the reason for conducting this study to know the effect (positive or negative) of FDI on economic growth in Ghana. The general objective is therefore to determine the relationship that exists between FDI and economic growth

2.1 Theoretical Literature

In an attempt to capture the true insight of the place of FDI in Ghana's economic performance, it is pertinent and critical to look at some of the theories associated with FDI. These theories include: Capital Arbitrage or the Cost of capital Theory, Theory of the Firm, Product Cycle Theory, External Capital Requirement Theory (ECRT), and Two-Gap Model (2GM).

Capital Arbitrage or the Cost of Capital Theory is linked to international trade. It postulates that prospective foreign investors move their capital resources in response to changes in rates of returns on investment. By this, capital is expected to flow from a capital surplus to a capital deficit country in response to a higher productivity of capital until the rates of returns are equalized. This theory also sees the existence of foreign direct investment from the ground that investing enterprise has management skill or technological advantage, which it can exploit in the foreign economies (Forgha, 2009). This theory states some of the factors (rates of return on investment, higher productivity) that determine the inflow of foreign direct investment into developing countries.

The second theory under consideration is the Theory of the Firm. It assumes perfect market conditions and also postulates that transactional corporations invest abroad when their investments at home have reached an optimal level whereby further investments are likely to suffer from diminishing returns to scale. Here, it is expected that the desire to add to the existing plants would expand output as long as there exist a profitable future market for the products. Therefore, FDI is a function of market factors and marginal efficiency of capital (Forgha, 2009). Therefore, this theory makes it clear that foreign entrepreneurs invest in developing countries in order to expand their scale of production and to enjoy economies of scale and huge profit.

Next is the Product Cycle Theory. This theory propounded by Raymond and Vernon (1966), Hirsch (1967) explains that the early life of a product, innovations tend to be centred in a richer industrialized country and later extends to other countries. Vernon (1966), further argued that once a product has evolved in a standard form and competing products have been developed, the firm might decide to expand its production frontiers overseas. The resulting expansion tends to capture lower cost locations and new markets in form of exports. This theory also sees investment innovation in three phases. Phase one, called the innovative stage. Here, firms are located in the most advanced industrial countries. Phase two; called the maturing or process development stage where manufacturing process keeps improving. Here, similar firms arise producing the same product in other industrially advanced economies due to increase foreign demand for such product. The third phase called the mature or standardization phase allows for the installation of plant and machineries for production in LDCs. Therefore, based on the above, the product cycle theory provides a useful point of departure for the causes of international investment in the form of foreign direct investment (FDI).

The fourth theory is the External Capital Requirement Theory (ECRT). This theory is of the opinion that the extent to which foreign direct investment can be substituted for other forms of capital inflow differs amongst countries. These differences could be accounted for by variations in their economic structure, which comprises attractiveness to foreign investors as well as diversity in the existing macroeconomic causes of the need for these capital inflows. That is to say, larger countries that are better endowed in resources and possess a dynamic industrial sector have the privilege to substitute foreign borrowing from international financial market for FDI. FDI is also attracted into countries having existing international corporations affiliate; the theory further explains that countries having small internal market, relatively underdeveloped infrastructure and limited export potentials may have difficulties in attracting FDI in substantial magnitude into their economies irrespective of any existing incentive schemes. It can be deduced from this theory why FDI is low in Brong Ahafo Region.

The Two-Gap Model (2GM) is the fifth theory. This model expands out of the adaptation of Harrod-Domar growth hypothesis to the open economy by planners, is interested in exports, imports, savings, investment and foreign aid. This two-gap comprises of the foreign exchange gap and the domestic savings gap. Hollis (1968) concur that domestic savings and foreign exchange gaps are separate and have independent constraints towards achieving growth in the LDCs. To fill these gaps, Chenery (1966) sees its expedients to source for foreign aid in order to achieve economy's target growth rate. He further postulates a fixed relationship between targeted

foreign exchange requirement and net export earnings. If the latter fall short of the former, a foreign exchange gap prevails, which can be obviated by foreign aid. To explain this phenomenon, the national income accounting identity is employed thus: $E = Y = I - S = M - X = F$. Where; E = National Expenditure, Y = National Output or Income, I = Investment, S = Savings, M = Import, X = Export and F = Capital inflow. Therefore, an economy is said to be in a foreign exchange gap or savings constraints depending on the most prevailing one. However, foreign aid eliminates foreign exchange gap by allowing new investment project, importing plant and machineries, technical assistance and intermediate goods. In the long – run, the foreign aid required equals the difference between increase in investment and savings increase caused by increasing income. The elimination of savings gap brings about sustained growth rate. The vital issue is how beneficial or detrimental foreign aid is to the growth of LDCs. Appropriate utilization of foreign aid enhances rapid growth of a debtor country. This reflects through increase in investment level at a faster rate than it could otherwise have been, if the source of investible funds were to be domestic savings of the recipient country. Also, the size of the rate of investment increases depending on the assumed savings function. On the other hand, foreign loan could be detrimental if it is spent on unproductive investment like political campaign, buying and maintenance of luxuries cars, houses etc at the expenses of necessities and consumption not likely to raise enough funds for debt servicing (Forgha, 2009).

2.2 Empirical Studies

Studies conducted by Njimah (2009) and Adeolu (2007) have shown a positive relationship between foreign direct investment and economic growth. Chenery and Strout (1966) observed that most countries before 1966 were able to achieve economic transformation by clamouring for foreign aid and foreign debt. To them, to achieve accelerated growth, countries must improve in the areas of skills, domestic savings and foreign exchange earnings. However, since in most developing countries, the savings rate is low, to overcome poor growth and development, they see foreign aid as the only source of their economic transformation. Hans (1948), Nurske (1953), Olaniyi (1995) and Singer (1949), identified capital insufficiency as one of the causes of Less Developed Countries (LDCs) low income. To them, the LDCs suffer from vicious cycle of low production and insufficient tools and equipment among other things, which helps to accelerate their low productivity. The resulting situation as argued by singer (1994) is mass poverty. The neo-classical economists therefore, recommend that for these developing countries to escape this vicious circle of poverty and achieve rapid economic growth and development, they must massively go in for foreign funds to augment domestic savings (Olaniyi, 1995).

Other views observed that in the 20th century, the rapid growth of America had been through the large supplied of men and funds from Europe particularly from Britain. Presbich (1937) pointed out that FDI would be of help to LDCs as a convenient package of enhancing their capital base, technology, access to export markets and management skills to foster their industrial development. These benefits attracted to FDI support the governments of LDCs in their quest for economic empowerment through the demand for foreign capital investment. It is also worth pointing out here that policies to attract and maintain foreign direct investment through various fiscal incentives have been adopted in a number of developing countries among which are Ghana, Nigeria, Cameroon, Morocco, Kenya, Egypt, Gambia, Tanzania, Uganda, and others in Africa. These countries target what is usually called the complementary hypothesis.

However, the substitution hypothesis postulated by Haavelmo (1963) maintains that, FDI rather than acting as a complement to domestic savings instead operates to discourage it, hence enhance wide gaps and economic inequalities between the rich North and the poor South. Furthermore, some writers from the dependency school of thought see especially multinational corporations, which are a component of FDI as a new form of dependency replacing colonialism centred on peripheral relationships. To them, multinational companies are merely profit-oriented outfits without concern for the welfare of the people. Still from the substitutional hypothesis viewed point, foreign direct investment should not be relied upon as means of promoting national growth and economic development because it crowds out domestic savings by allowing domestic residents to increase their consumption of goods and services at the expense of further investment. Consequently, policies to discourage foreign capital inflow have been implemented in some countries. In fact, in some countries, there has been open hostility to foreign investment and all kinds of restrictions have been put in place to discourage portfolio investment, private direct investment, foreign debt, and even foreign aid. To them, foreign aid is neither a necessary nor a sufficient condition for economic growth and development or poverty alleviation parameter (Jhingan, 1995).

Based on the above arguments put forward, while Chenery and Strout (1966) observed that for most developing countries to overcome poor growth and development, they see foreign aid as the only source of their economic transformation. The neo-classical economists in support recommend that for these developing countries to escape the vicious circle of poverty and achieve rapid economic growth and development, they must massively go in for foreign funds to augment domestic savings (Olaniyi, 1995). In addition, Presbich (1937)

pointed out that FDI would be of help to LDCs as a convenient package of enhancing their capital base, technology, access to export markets and management skills to foster their industrial development. He said the benefits attracted to FDI support the governments of LDCs in their quest for economic empowerment through the demand for foreign capital investment. It is also worth pointing out that policies to attract and maintain foreign direct investment through various fiscal incentives have been adopted in a number of developing countries among which Ghana is inclusive.

The substitution hypothesis postulated by Haavelmo (1963) on the other hand maintains that, FDI rather than acting as a complement to domestic savings instead operates to discourage it, hence enhance wide gaps and economic inequalities between the rich North and the poor South. The dependency school of thought in support also see especially multinational corporations, which are a component of FDI as a new form of dependency replacing colonialism centred on peripheral relationships. To them, multinational companies are merely profit-oriented outfits without concern for the welfare of the people. Still from the substitution hypothesis viewed point, foreign direct investment should not be relied upon as means of promoting national growth and economic development. To them, foreign aid is neither a necessary nor a sufficient condition for economic growth and development or poverty alleviation parameter (Jhingan, 1995). It is therefore obvious that FDI has both positive and negative effects, but none of the sides have weighed these positive and negative effects of FDI so as to know its relative effect. This becomes the reason for conducting this study to know the relationship between FDI and economic growth in Ghana.

3. 1 Theoretical Model

For the purpose of this study, the entire process of Co-integration will involve two major steps. In the first step, we try to find out whether the series is stationary or otherwise. The nature of time series data indicates that these data may be influenced by a number of trend and movements which implies that the assumptions upon which the application of Ordinary Least Square (OLS) is based maybe violated rendering results from such regression to be spurious. The possible implication of a spurious regression is the presence of bogus significant relationship between variables. One such violation relates to the expected value of the mean and variance of the error term, as well as its correlation with error terms in other period. However, the developments of the unit root testing techniques have enhanced the reliability of estimations involving time series analyses.

3. 2. 1 Models Used for the First Step:

A. Unit Root Test:

Most of the time series variables are non-stationary and using non-stationary variables in the models might lead to spurious regressions (Granger 1969). The first or second differenced terms of most variables will usually be stationary (Ramanathan 1992). Thus, the first step in this exercise involves performing Dickey-Fuller (DF) Unit Root Test and subsequently based on the results, we might also conduct Augmented Dickey-Fuller (ADF) test.

B. Dickey Fuller (DF) Test:

Let the variables for the test be Y_t , the DF Unit Root Test are based on the following three regression forms:

i. Without Constant and Trend:

$$\Delta Y_t = \phi Y_{t-1} + \varepsilon_t \dots\dots\dots (1)$$

ii. With Constant

$$\Delta Y_t = \alpha + \phi Y_{t-1} + \varepsilon_t \dots\dots\dots (2)$$

iii. With Constant and Trend

$$\Delta Y_t = \alpha + \beta_t + \phi Y_{t-1} + \varepsilon_t \dots\dots\dots (3)$$

Testing Hypothesis for Unit Root:

H_0 : = 0 (Presence of Unit Root)

H_1 : = 1 (No Unit Root)

The Decision rule:

- a. If t stat values > ADF critical value, = we fail to reject null hypothesis, i.e., unit root exists.
- b. If t stat values < ADF critical value, = we fail to accept null hypothesis, i.e., unit root does not exist.

C. Augmented Dickey Fuller (ADF) Test:

Sometimes, even after using the above mentioned three different propositions we may fail to attain the expected results; it subsequently leads to more confusion to determine whether the series is stationary or otherwise. In these circumstances, we use ADF method. This method takes the lag transformation into consideration. This can be specified as follows:

$$\Delta Y_t = \alpha + \beta_t + \phi Y_{t-1} + \sum \delta_i \Delta Y_{t-1} + \varepsilon_t \dots \dots \dots (4)$$

3. 2. 2 Model Used for the Second Step:

A. Econometric Model for Estimating Long Run Linear Relationship:

We use co-integration econometric model to examine the long run association between FDI inflows and GDP. Apart from this, we also introduce lag transformation of independent variable to see its effect on dependent variable. The finding that many macro time series may contain a unit root has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be co integrated. The stationary linear combination is called the co integrating equation and may be interpreted as a long-run equilibrium relationship among the variables. There are several methods of co-integration research. The purpose of this study will make use of Vector Auto-Regression (VAR) Estimates called Johansen procedure or JJ test. At the beginning, according to the theory model the relationship of the equation can be built by choosing OLS regression and then we apply ADF test to decide the stationary of residual. If the residual is stationary, that is the co-integration exists between two variables. These two variables have the stable long run equilibrium. On the other hand, if the null hypothesis is not rejected, there is no co-integration between them and the stable long run equilibrium does not exist. Therefore, we now proceed ahead in introducing econometric model to be estimated.

$$GDP_t = \lambda FDI_t + \mu_t \dots \dots \dots (5)$$

Where,

GDP_t = Gross Domestic Product at time t

FDI_t = Foreign Direct Investment inflow at time t,

λ = Constant parameter,

μ_t = Error term

4. 1. Results of Unit Root Test

The results of the unit root tests are presented in below tables and we have used Augmented Dickey Fuller (ADF) tests to find the existence of a unit root in each of the time series of FDI and GDP.

Table 2.1: Unit root tests results for FDI at current levels from 2001Q1 to 2010Q4
 Null Hypothesis: FDI has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.293866	0.0000
Test critical values: 1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Table 2.2: Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(FDI)
 Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-1.034013	0.164289	-6.293866	0.0000
C	5944.376	5264.781	1.129083	0.2661
R-squared	0.517052	Mean dependent var		16.73127
Adjusted R-squared	0.503999	S.D. dependent var		45931.30
S.E. of regression	32348.19	Akaike info criterion		23.65642
Sum squared resid	3.87E+10	Schwarz criterion		23.74174
Log likelihood	-459.3003	Hannan-Quinn criter.		23.68703
F-statistic	39.61274	Durbin-Watson stat		2.001802
Prob(F-statistic)	0.000000			

The results in Table 2 suggest that FDI inflows in the region have found to be stationary in their current levels. This is because it has probability of 0.0000 which is highly significant at 95% confidence interval. Thus we fail to accept the null hypothesis that the variables are significantly difference from zero (stationary). The results suggest that FDI inflows have been found to be stationary at the current levels as the critical value were less than the ADF Statistics at 1%, 5% and 10% levels of significance.

Table 3: Unit root tests results for GDP at current levels from 2001Q1 to 2010Q4

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.077394	0.0029
Test critical values: 1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Table 3: Continued

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.626450	0.153640	-4.077394	0.0002
C	2.773539	0.802657	3.455445	0.0014
R-squared	0.310025	Mean dependent var		-0.029744
Adjusted R-squared	0.291377	S.D. dependent var		3.072949
S.E. of regression	2.586800	Akaike info criterion		4.788641
Sum squared resid	247.5868	Schwarz criterion		4.873951
Log likelihood	-91.37849	Hannan-Quinn criter.		4.819249
F-statistic	16.62515	Durbin-Watson stat		2.092220
Prob(F-statistic)	0.000232			

Table – 3 also captures the results of unit root test of GDP and it suggests that GDP is stationary at the current levels. Thus, it has a probability of 0.0029, and the critical value was less than the ADF Statistics at 1%, 5% and 10% levels of significance. Therefore, we refuse to accept the null hypothesis.

4.2 Vector Autoregression (Var) Estimates

The Vector Autoregression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system. Thus, VAR Estimates is used in model selection. For co integration to be valid, the VAR Estimates is used to determine the lag length criterion and the Lag Exclusion Wald Tests. The information displayed in the table below is used in the model selection.

Table 4: Result of Vector Autoregression (VAR) Estimates
Vector Autoregression Estimates
Standard errors in () & t-statistics in []

	GDP	FDI
GDP(-1)	0.300508 (0.17099) [1.75746]	-2051.559 (2069.43) [-0.99137]
GDP(-2)	0.135322 (0.17066) [0.79291]	4255.485 (2065.48) [2.06029]
FDI(-1)	-9.33E-06 (1.4E-05) [-0.68890]	-0.029348 (0.16390) [-0.17906]
FDI(-2)	-8.26E-06 (1.4E-05) [-0.60577]	-0.028668 (0.16497) [-0.17378]
C	2.643926 (0.99355) [2.66110]	-3785.367 (12024.5) [-0.31480]
R-squared	0.171542	0.117365
Adj. R-squared	0.071123	0.010379
Sum sq. resids	233.3680	3.42E+10
S.E. equation	2.659278	32184.19
F-statistic	1.708265	1.097015
Log likelihood	-88.40524	-445.6499
Akaike AIC	4.916065	23.71842
Schwarz SC	5.131537	23.93389
Mean dependent	4.505789	5901.918
S.D. dependent	2.759209	32352.53
Determinant resid covariance (dof adj.)		7.26E+09
Determinant resid covariance		5.47E+09
Log likelihood		-533.8763
Akaike information criterion		28.62507
Schwarz criterion		29.05601

4.3.1 Lag Structure

E-Views offer several views for investigating the lag structure of your equation.

4.3.2 Lag Exclusion Test

Normally, lag exclusion test is performed for each lag in the variable. For each lag, the Wald test statistics for the joint significance of all variables at that lag is reported for each equation separately and jointly. This is found on the last column of the table below.

Table 5: Results of VAR Lag Exclusion Wald Tests.
 VAR Lag Exclusion Wald Tests

Chi-squared test statistics for lag exclusion:
 Numbers in [] are p-values

	GDP	FDI	Joint
Lag 1	3.664017 [0.160092]	1.002467 [0.605783]	4.390905 [0.355680]
Lag 2	1.000762 [0.606300]	4.278870 [0.117721]	5.670861 [0.225114]
df	2	2	4

From the above table, the p-values are in parenthesis in the last column. The p-values of both lags (lag1 and lag2) are greater than the 5% error level. This implies that, we need not to lag the variables.

4.3.3 Lag Length Criteria

This computes the various criteria for selecting the lag order of an unrestricted variable. The table below displays various information criteria for all lags up to the specified maximum by the researcher. The researcher then report on the Akaike information criteria and the smaller value of the criteria is preferred.

Table 6: Results of VAR Lag Length Criteria

VAR Lag Order Selection Criteria

Endogenous variables: GDP FDI

Exogenous variables: C

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-526.2987	NA*	8.65e+09*	28.55669*	28.64376*	28.58739*
1	-523.5092	5.126755	9.24e+09	28.62212	28.88335	28.71421
2	-520.5275	5.157400	9.79e+09	28.67716	29.11255	28.83066
3	-519.3039	1.984281	1.14e+10	28.82724	29.43677	29.04213

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

It is clear from table - 6 that, the smallest value of the Akaike information criterion (28.55669) is at lag zero. This implies that, there is no need to lag the model or variables since it achieves stationarity at lag zero (0).

4.4 Co- Integration Assumptions Summary

Cointegration test is said to be valid only when series are known to be stationary (not time dependent). The Augmented Dickey Fuller (ADF) test is used to ensure stationarity in both variables. The results are display in table 1 and 2. Also, our series may have non-zero means and deterministic trends as well as stochastic trends. In addition, the cointegrating equation may have intercepts and deterministic trends. The E-view software state that, asymptotic distribution of LR test statistics for cointegration does not have the usual X^2 distribution and depends on the assumptions made with respect to deterministic trends and intercepts. Therefore, in order to carry out the cointegration test, you need to make an assumption regarding the trend and intercept underlying the data. But if one is not certain with the trend and intercept of data, the Johansen Cointegration Test Summary helps us to know the trend and intercept that is most appropriate for the data.

Table 7: Results of all Summarize Set of Assumptions (Test Summary)

Series: GDP FDI

Lags Interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	
Quadratic	Test Type	No Intercept	Intercept	Intercept	
Intercept	Intercept				
	No Trend	Trend	No Trend	Trend	Trend_
Trace	0	0	0	0	1
Max-Eig	0	0	0	0	1

*Critical values based on Mackinnon-Haug-Michelis (1999)

Information Criteria by Rank and model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Models (columns)					
0	-525.5105	-525.5105	-524.7590	-524.7590	-523.1694
1	-523.6587	-520.3907	-519.6565	-515.1012	-513.5255
2	-523.5689	-5193039	-519.3039	-513.0490	-513.0490
Akaike Information Criteria by Rank (rows) and Models (columns)					
0	28.83841	28.83841	28.90589	28.90589	28.92808
1	28.95453	28.83193	28.84630	28.65412	28.62300*
2	29.16589	29.04345	29.04345	28.81346	28.81346

Table 7: Continued

Schwarz Criteria by Rank (rows) and Model (columns)					
0	29.18671*	29.18671*	29.34128	29.34128	29.45054
1	29.47699	29.39793	29.45584	29.30719	29.31961
2	29.86250	29.82714	29.82714	29.68423	29.68423

Table – 7 shows the summary of all the five (5) set of assumptions. Reporting from the Akaike information Criteria at rank one (1), the Co integrating equation have both intercept and trend and the data trend is quadratic.

4.5 Co-Integration Test

We now use the Co-integration test to examine the long run relationship between FDI and GDP

Table 8: Results of Co integration Test.

Trend assumption: Quadratic deterministic trend

Series: GDP FDI

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.406248	20.24078	18.39771	0.0274
At most 1	0.025425	0.952890	3.841466	0.3290

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.406248	19.28789	17.14769	0.0241
At most 1	0.025425	0.952890	3.841466	0.3290

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

Table 8: Continued

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

GDP	FDI
0.751569	0.000224
-0.098223	0.000461

Unrestricted Adjustment Coefficients (alpha):

D(GDP)	-1.744136	0.082099
D(FDI)	-554.1693	-4692.062

1 Cointegrating Equation(s): Log likelihood -513.5255

Normalized cointegrating coefficients (standard error in parentheses)

GDP	FDI
1.000000	0.300297 (0.00014)

Adjustment coefficients (standard error in parentheses)

D(GDP)	1.310838 (0.29783)
D(FDI)	-416.4962 (4038.81)

The test above suggests that there is a positive relationship between FDI and Economic Growth (GDP). Reports on the Normalized co-integrating coefficients indicate that, a 1% change in FDI will result in 0.300297% change in Economic Growth (GDP). This implies that, Foreign Direct Investment is statistically significant in explaining Economic Growth in the region. Thus, we fail to reject the null hypothesis (H_0) that FDI promotes Economic Growth and there is a positive relationship between the variables in the region.

4.6 Impulse Response

A shock of one variable does not directly affect that variable, but also affects other endogenous variables through the dynamic (lag) structure of the VAR. An impulse response function traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables. If the innovations are contemporaneously uncorrelated, interpretation of the impulse response is straightforward. Innovations, however, are usually correlated, and may be viewed as having a common component which cannot be associated with a specific variable.

Response to Cholesky One S.D. Innovations ± 2 S.E.

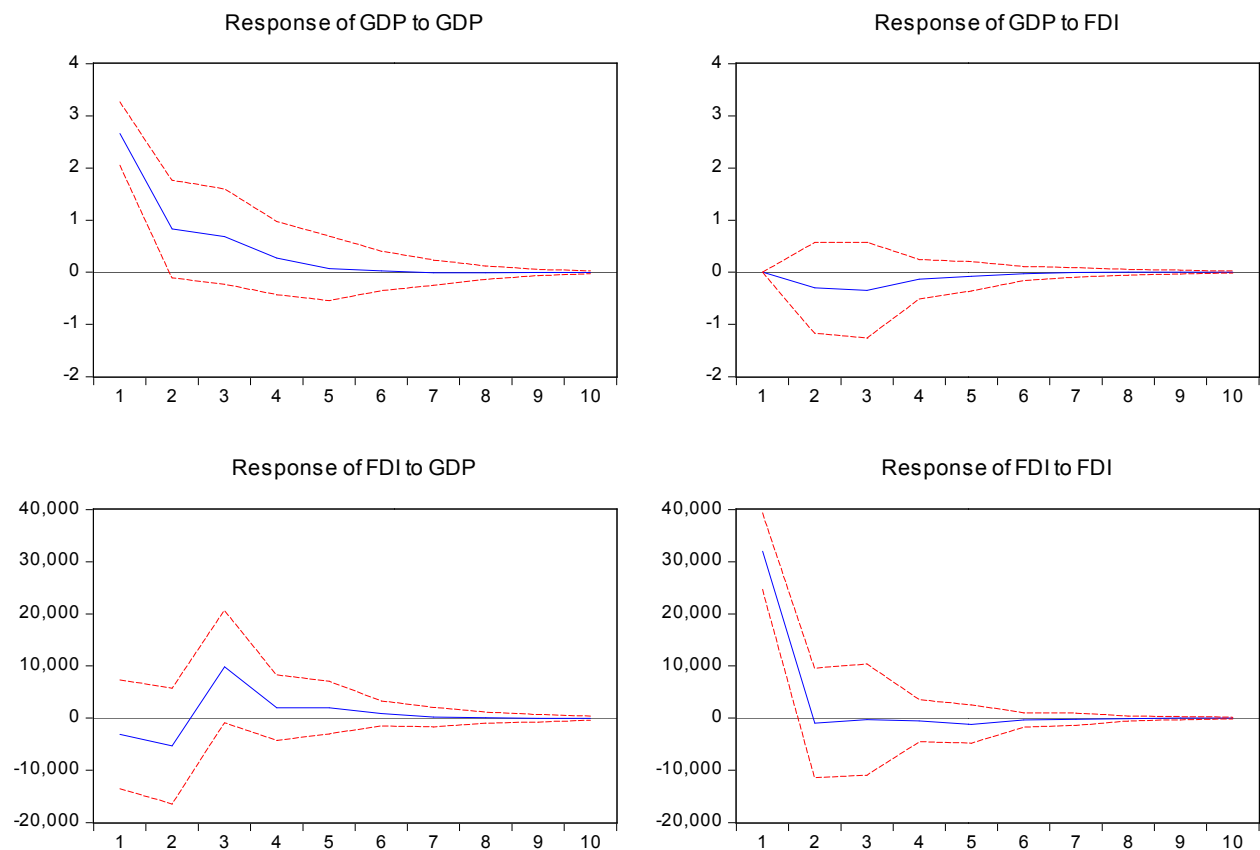


Figure 1: Impulse Response

The figure above represents the responsiveness of a shock in a variable to the other variable as well as to the variable itself. From the figure, as the year goes by, the responsiveness of variables becomes favourable. This is indicated by the broken lines that move closer to the zero line. Thus, taking GDP and FDI for instance, GDP becomes better off with a shock in FDI.

4.7 Summary and Conclusions

Foreign direct investment can be a valuable source of technology, capital, and connections to world markets. Policies attractive to foreign investors include macroeconomic stability, protection of property rights (including intellectual property rights), a stable and transparent regulatory environment, and liberal access to foreign exchange for profit remittances and imported inputs and services. The entrances of these global enterprises in the country are considered as key factors that affects the economy of Ghana. Analysis shows that foreign direct investments have helped Ghana to boost their economy. The research has been able to find out that, there is positive relationship. This kind of good climate for investment is likely to be superior to special incentives, such as tax holidays, which may attract footloose industries. The results of our estimation conclude that there is a positive relationship between FDI and economic growth. The findings and views of Njima (2009), Adeolu (2007) and Chenery and Strout (1966) are therefore supported.

Furthermore, the study has also indicated that, FDI promotes GDP in the region in the long run.

4.8 Recommendations

As can be seen, FDI is of particular significance in this respect as it can provide not only much needed additional capital for the host economy but also access to technological advancements and managerial expertise. It also provides an essential access to international markets. Such assets are considered to be vital for economic growth and development for a host country and for better integrating developing nations much more in the competitive area of the global economy.

FDI can directly contribute to the uplifting of the productive skills in developing countries like Ghana. As some policy makers tackles the ever changing world of market scenes caused by globalization, there is a keen need for effective strategies to attract more FDI to put it to its maximum effect. Hence, in order to ensure that Ghana will only make good benefits of FDI, it is recommended that the country should shrug aside the antipodal debate about the merits and demerits of globalisation and find ways on how Ghana can attract more and more foreign direct investments.

Most of the top FDI source nations have large, strong, and open economies. Taking consideration of the current statistical data of Ghana, it suggests that the country has had a mixed experience regarding foreign direct investments. Throughout the years, the economy of Ghana has grown enormously from year 1989 onwards. This can be attributed to the major policy efforts of the country to attract more foreign capital. Within the premise of the International Monetary fund and World Bank, Ghana's economic reform programmes has been able to provide widespread economic freedom in a bid to attract more foreign direct investments inflows and resolve the issues of economic stagnation and economic fall. With this, it is recommended that Ghana should continue to reform its economic and foreign policy to attract more investors which can help boost its economy.

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