IMPACT OF MACROECONOMIC FACTORS ON FOREIGN DIRECT INVESTMENT IN GHANA: A COINTEGRATION ANALYSIS

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Abstract

The paper examined the determinants of foreign direct investment inflows to Ghana. The main objective of this study was to find out the major macroeconomic determinants of foreign direct investment in Ghana between the periods 1980 to 2012. All the variables considered were integrated at first order, as a result the Johansen's cointegration approach was used and the result showed that the variables were not cointegrated. Therefore, the vector autoregressive model was estimated. The result showed that the first past year of foreign direct investment , the last two years of exchange rate and trade openness were statistically significant. Based on the findings we recommend that policies that encourage foreign direct investment, moderate exchange rate depreciation and increasing trade openness should be implemented.

Keywords: Foreign Direct Investment, Macroeconomic Variables, Cointegration Analysis

1.0 Introduction

This study determines the macroeconomic factors that influence foreign direct investment inflows to Ghana using cointegration analysis. Foreign direct investment (FDI) can be understood as a package of resources that complements the financial flows and makes a distinctive contribution to the development process. Foreign direct investment projects typically involve a transfer of technology and managerial skills from the source country to the receipt country. They can also provide greater access to world market for the recipient country’s exports.

Foreign direct investment can help the economic prospects of Ghana in several ways. First, it serves as a source of development finance. Foreign direct investment helps to finance investment in the economy. Second, it increases the level of technical progress in the host country and in turn plays an important role in the process of economic development. Third, apart from being a source of development finance and a channel for technology transfer, foreign direct investment has a number of proven attributes. It improves managerial knowledge and skills and efficiency in productivity. It also provides a wide array of goods and services to the economy. Furthermore, foreign direct investment promotes exports and hence can have a positive impact on the country's balance of payment.

In addition to these benefits, there are employment and income generating effects of the investment and immediate or long-term balance of payment implications. A more detailed analysis of derived benefits which can have significant impact on a host country's economy is provided later in this study. There are of course, socioeconomic costs which foreign direct investment projects impose and which must therefore be weighed against the benefits. Foreign debt is likely to adversely affect the inflow of foreign direct investment because debt overhang signals the possibility of future economic crises.

Ghana has a checked history of economic and political development which reflects in the erratic inflows of foreign direct investment, changes in political and policy regime as well as uneven growth patterns. Since the early 1980s, Ghana implemented several economic reform policies such as the Structural Adjustment Programme (SAP) in 1983 and recently, the enhanced HIPC (Heavily Indebted Poor Countries) Initiatives. These policies were adopted primarily to reverse the post independence economic decline, reduce the impact of the 1980 debt crisis and facilitate the attraction of value-added foreign direct investment inflows to Ghana. Several qualitative and quantitative analyses of available evidence reveal that the adoption of the SAP has led to an increase in the number of multinationals investing in Ghana. Other studies have also concluded that SAP has been successful in many areas including the lowering of inflation, promotion of an environment of financial stability, elimination of the licensing requirement, the opening of previously closed sectors, removal of tariff barriers that prohibit foreign direct investment inflows, abolishing of exchange controls and reducing opportunities for the foreign exchange black market (U.S. Library of Congress, 1998).

In spite of these reform successes, there are still serious challenges that hamper the massive attraction of foreign direct investment inflows to Ghana as compared to other developing countries such as South Africa, Malaysia, and Thailand (Ibrahim, 2005). Understanding this situation

requires an understanding of the links between these macroeconomic variables. Hence, our focus in this study is to identify the main determinants of foreign direct investment in Ghana.

The main objective of the study is to find out the major determinants of foreign direct investment in Ghana.

The following hypotheses will be tested:

i. Gross domestic product (GDP) growth influences foreign direct investment.
ii. Inflation influences foreign direct investment.
iii. Exchange rate influences foreign direct investment.
iv. Trade openness influences foreign direct investment.

2.0 Theoretical Literature Review

Macro-Economic Theories Of Foreign Direct Investment

One of the first theoretical approaches to understanding foreign direct investment is the neoclassical growth theory. Solow (1956) attempted to express a growth model into a simple production function and to explore key variables that could provide steady growth rates. In his model, he captures variables determining FDI in growth rates. On the other hand, within the endogenous growth theory, FDI flows may contribute either directly or indirectly to the economic growth of an economy. Wang (1990) discerns the effects of FDI activity into direct positive home-country effects, by stepping up production and transferring knowledge to local suppliers and indirect effects by upgrading the quality of their workforce. FDI is considered to be the major source of economic growth for the less developed countries (Balasubramanyam et al., 1996) while relative similarities are also observed in European Union (EU). Indeed, FDI inflows have contributed to the EU economic growth since foreign affiliate's exhibit relative greater propensity to undertake research and development (R&D) expenditures and the relative higher productivity while undertaking investment in EU than in their domestic market (Barrell and Pain 1997). Other studies have also found that FDI affects the recipient country's economic growth through new inputs (Feenstra and Markusen, 1994) , new technologies and subsequent spillovers to domestic firms (Krugman, 1979) and through knowledge transfers (de Mello and Sinclair, 1995). The advent of endogenous growth theory (Romer, 1990; Barro & Sala-i-Martin, 1995) has enabled research into channels through which FDI can be expected to promote growth in the long run.

Furthermore, we have the gravity model which was originally used to explain bilateral trade flows between countries in an analogy to Newton's law of motion (see Breuss and Egger, 1997). The basic gravity model postulates that trade between two countries is a function of the size of their economies as measured by the gross domestic product and population, the

geographical distance between the two countries, and some preferential trade considerations. Many researchers have modified this specification in line with theoretical advances. In the case of FDI, the existing theoretical literature tends to support Linnemann's view in principle. However, there are significant differences in the interpretation of these specific gravity- related factors. First, in the case of FDI, the concept of the market should be wider than in the case of trade as the markets of foreign affiliates may extend beyond that of the host country. Second, when using gravity model as an FDI determinant, qualifications have to be made with regard to the theoretical basis of the distance factor. In the case of trade, distance is clearly an impediment. For FDI, distance can be both an impediment as well as an incentive.

In sum, the gravity model identifies market-related variables, distance-related variables and endowment-related variables as important determinants of FDI. For market- related variables, GDP of the host country has been identified as an indicator of market volume, the level of development as an indicator of the degree of product differentiation and population size as an indicator of the size of the host country. Distance-related variables include geographical distance between capitals of economic centres and factors affecting economic distance between the countries. Endowment-related variables include wages in the host country (indicators of labour cost), skills of employees in the host country and GDP per capita as an indicator of technology and general development levels.

On the other hand, the models provide important insight into the mechanics of the MNEs (multi-national enterprises) decision-making behaviour but treat exchange rate fluctuation as exogenous and isolating them from macroeconomic shocks that simultaneously affect demand. Consequently, theoretical arguments based on these models are divided as to whether exchange rate uncertainty will increase or decrease FDI. Authors proposing that exchange rate variations could promote investment abroad assert the long-standing result in trade theory that cross-border investment is a substitute for trade when tariffs or other barriers prevent the free flow of goods (Goldberg and Kolstad, 1994, 1995; Cushman, 1985 and 1988). Mundell (1957) provides the first mathematical proof of this result. Numerous studies provide evidence that exchange rate uncertainty may function as a de facto trade barrier, implying by default that it should increase FDI. Assuming that exchange rate fluctuations are exogenous, multinational firms can take advantage of them by shifting production to the countries where the value of the local currency makes input costs look cheapest, ceteris paribus. In an earlier work, Itagaki (1981) developed a financial flexibility argument. He posits that an increase in exchange rate risk may incite a firm to invest abroad as a way of hedging against a short

position in its balance sheet. A depreciation of the firm's home currency might reduce the value of domestic assets relative to foreign liabilities, but would simultaneously increase the value of assets and revenue streams for its affiliates in foreign countries.

However, theoretical models exist predicting that exchange rate uncertainty will instead suppress FDI. These arguments assert that unpredictable fluctuations in the exchange rate introduce added uncertainty into both the production costs and future revenues of overseas operations, deterring potential investors. Several studies (Rivoli and Salorio, 1996 and Campa, 1993), rooted in the work of Pinkyck (1988) and Dixit and Pinkyck (1994), declare that currency volatility deters the entry of multinational firms by increasing the option value associated with waiting before incurring the sunk costs necessary to produce overseas. They consider that a firm effectively holds an option to invest overseas in any given period. A fixed cost paid in advance (sunk) acts as an exercise price. The return from exercising the option is the expected present discounted value of profits earned from production in the foreign country. Exchange rate risk introduces uncertainty about the size of the return, increasing the value of holding on to the option to wait and motivating the firm to postpone investing until a future period. A salient feature of this literature is that the results hold even for risk-neutral firms, as the key engine is the sunk cost. Without it, there would be no cost to producing when the prevailing exchange rate allows positive returns and exiting when it does not, eliminating any value attached to waiting.

3.0 Empirical Literature Review

Holland et al (2000) reviewed several studies of Eastern and Central Europe, producing evidence of the importance of market size and growth potential as determinants of foreign direct investment.

Tasi (1994) analysed the decades of 1970 and 1980 and addressed the endogeneity problem between foreign direct investment and growth by developing a system of simultaneous equations. When foreign direct investment was alternately measured as a flow and as a stock, market size turned out to be more important foreign direct investment inflow than growth. The trade surplus presents a negative sign and is significant for foreign direct investment, while the flow of foreign direct investment decreases as the nominal wage decreases.

Satomi K. at el (2007), in their study on Macro Determinants of Foreign Direct Investment Inflows to Japan found a positive relationship between source country size and foreign direct investment because, larger economies imply greater availability of capital resources and intangible assets (technical knowledge and marketing expertise) that can be used to

establish foreign production to meet consumer demand in a target country. Therefore, they suggest that countries with a large number of competitive multinational firms should be able to make larger investments in the international market.

Dunning (1970) also wrote on the determinants of US direct investment in Europe and found market size to be the most influential factor. Loree and Guisinger (1995) studied the determinants of foreign direct investment in the United States and concluded that variables related to host country were significant in developed countries; only infrastructure was an important determinant in all regions.

A causality test between foreign direct investment and product growth was proposed by Nair-Reichert and Weinhold (2001) based on panel data for 24 developing countries between the years of 1971 and 1985. The main conclusion here was that the relation between investments, whether foreign or domestic and product growth was strongly heterogeneous, and that foreign direct investment efficiency was positively influenced by a country's degree of trade openness.

Cheng and Kwan (2000) in their empirical evidence on governmental capabilities and resources found that governments are major source for economic restructuring and location attraction of inward foreign direct investment. For example, when the Chinese government launched an open door policy in 1993, it influenced positively on China to become the largest recipient of foreign direct investment in the world followed by US.

However, empirical literature concerning the impact of educational level on foreign direct investment inflow is not yet conclusive. Cheng and Kwan (2000) argued that none of the education variables have a positive and significant effect on foreign direct investment. This argument was also supported by Cheng and Zhao (1995).

According to Benassy-Quere et al (2001) on the study of the impacts of exchange rate on foreign direct investment flows, the impact of exchange rate on foreign direct investment flows depends on the type of investment (horizontal foreign direct investment or vertical foreign direct investment). In the case of horizontal foreign direct investment, a depreciation of the host country's exchange rate will have a positive impact on the flows it receives through reduced cost of capital; and the appreciation of the local currency will also increase the flows of foreign direct investment because the local consumers will have a higher purchasing power. In the case of vertical foreign direct investment, an appreciation of a local currency has a negative effect on foreign direct investment inflows because items produced locally are becoming expensive abroad. The depreciation of a local currency, on the other hand, has a positive effect on foreign direct investment inflows because the products are less expensive. Other authors such as Aliber (1993) also

support this argument. He stated that a depreciation of US dollars will increase foreign direct investment while appreciations of US dollars will foreign direct investment.

Nunnenkamp and Spatz (2002), examined a sample of 28 developing countries during the 1987 to 2000 period and found significant spearman correlations between foreign direct investment flows and per capita GDP, risk factors, years of schooling, foreign trade restrictions, complementary production factors, administrative bottlenecks and cost factors. Population, GDP growth, firm entry restrictions, post-entry restrictions, and technology regulation all proved to be non-significant. However, when regressions were performed separately for the non-traditional factors, in which traditional factors were controlled for, only factor costs produced significant results and, even so, only for the 1997 to 2000 period.

Anyanwus's (1998) study of the economic determinant of foreign direct investment in Nigeria shows the positive role of domestic market size in determining foreign direct investment inflows into the country. This study noted that the abrogation of the indigenization policy in 1995 significantly encouraged the flow of foreign direct investment into the country and that more effort is required in raising the nation's economic growth so as to attract more foreign direct investment.

Iyoha (2001) examined the effects of macroeconomic instability and uncertainty, economic size and external debt on foreign private investment inflows. He shows that market size attracts foreign direct investment to Nigeria whereas inflation discourages it. The study confirms that unsuitable macroeconomic policy acts to discourage foreign investment inflows into the country.

Barthel et al, (2008), in their study of the characteristics and determinants of foreign direct investment in Ghana came out with factors influencing foreign firm destination. They particularly based their studies on data retrieved from the World Bank 2007 enterprise service (616 firms were surveyed) and partly on their own survey of 54 multinational enterprises operating in Ghana. From their findings, the most important factors influencing the choice of Ghana as an investment destination is the macroeconomic and political environment and the most important macroeconomic and political factors influencing investment today are political stability with 33% of the responses, followed by economic growth performance (20.1%) and exchange rate regime (16.5%). The potential for growth of the Ghanaian market was the most important variable regarding the extent to which the market acts as a pull for foreign investment (42%). With the investment plan for the medium term, 81% of the survey firms said they will increase their investment over the market three or five years. However, 8% of the firms said they will decrease their investment over the

period. A further 11% of the firms said they were unsure about which direction their investment will go over the next three to five years. According to Fabian et al, the main constraint to maximizing foreign direct investment in Ghana is access to land, about 62% of the firms said this was a problem.

From the literature review, the macroeconomic factors that may affect FDI flows to a country include market size, economic growth, exchange rate, and degree of openness, human capital, labour cost, government stability and much more.

4.0 Methodology

Specification of the Model

In order to find out the major determinants of FDI inflows to Ghana, we estimate the impact of gross domestic product growth, exchange rate, inflation and trade openness on foreign direct investment the paper used VAR model which is specified as:

$$fdi_t = a_0 + \sum_{i=1}^{p} b_i\, fdi_{t-1} + \sum_{i=1}^{p} c_i\, gdpg_{t-1} + \sum_{i=1}^{p} c_i\, exrate_{t-1} + \sum_{i=1}^{p} d_i\, \inf_{t-1} + \sum_{i=1}^{p} e_i\, tradeop_{t-1} + \varepsilon_t$$

where *fdi* is foreign direct investment (FDI) measured as FDI as a percentage of GDP, *gdpg* is GDP growth, *exrate* is exchange rate, *inf* is inflation, *tradeop* is trade openness is measured as sum of export and import as a percentage of GDP and t is time, p is the optimal lagged length and ε_t is the error term assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which influence economic growth but are not captured in this model.

Explanatory variable	Expected sign
GDP growth	Positive (+)
Exchange rate	Negative (-)
Inflation	Negative (-)
Trade openness	Positive (+)

Method of Analysis

Unit Root Tests

The Augmented-Dickey-Fuller (ADF) test is used to test for stationarity of the endogenous and exogenous variables. If all the variables are integrated of order one then the Johansen Cointegration Test will be carried out. The purpose of the cointegration test is to determine whether a group of non-stationary series is cointegrated or not. This study applied the Johansen Cointegration Maximum Likelihood Method of Cointegration developed by Johansen (1988) and applied by Johansen and Juselius (1990) to determine the number of cointegrating vectors. In this study, the maximum eigenvalue test is applied. According to Ender, 2004, this is usually preferred for trying to pin down the number of cointegrating vectors.

If this test shows that there is no cointegrating vector then the paper will estimate VAR model, however, if the variables are cointegrated the vector error correction (VEC) model will be estimated.

The directions of the relationships between the variables are tested using Granger causality test, Granger (1996). This is used to examine the linear causation between the concerned variables. The test is based on the model specified below as;

$$Y_i = \alpha_0 + \sum_{j=1}^{m} \beta_i Y_{t-j} + \sum_{i=1}^{n} \delta X_{t-i} + \mu_t,$$

If X_t Granger cause Y_t, then the current values of Y_t are determined by past values of X_{t-1}. The test of H_0: $\delta_i = 0$, is carried out using the F- test.

Source Data

The data used in this study is sourced from World Development Indicators for Ghana from 1980 to 2012.

5.0 Empirical Findings

The result of the Augmented Dickey-Fuller (ADF) test for the variables in this study is shown in table 1 below. From the table, all the variables are stationary at 5 percent level of significance with constant but no trend. Therefore, all the variables, foreign direct investment (fdi), GDP growth (gdpg), exchange rate (exrate), inflation (inf) and trade openness (tradeop) are integrated of order one, I(1). As a result, the Johanson's cointegration approach can be used to determine whether the variables are cointegrated or not, if cointegrated then the number of cointegrating equation must be determined.

Table 1: The results of Augmented Dickey-Fuller test (ADF) for unit root.

	None			Constant			Constant and Trend		
	Level	1st dif	conclusion	Level	1st dif	conclusion	Level	1st dif	conclusion
	t-obs	t-obs		t-obs	t-obs		t-obs	t-obs	
fdi	0.112213	-4.35798	I(1)	-0.68131	-4.39574	I(1)	-2.71154	-4.35865	I(1)
p-value	0.7112	0.0001		0.8375	0.0016		0.2391	0.0084	
gdpg	0.870109	-12.2044	I(1)	3.090826	-12.6197	I(1)	-1.82864	-3.42692	I(1)
p-value	0.8922	0		1	0		0.6636	0.068	
exrate	4.956019	-0.62031	I(0)	3.120238	-3.16064	I(1)	-0.12846	-4.33744	I(1)
p-value	1	0.4399		1	0.0323		0.992	0.0091	
inf	-1.84925	-4.719	I(1)	-4.46394	-3.88514	I(1)	-2.8518	-3.79386	I(1)
p-value	0.0622	0		0.0012	0.0067		0.1913	0.0334	
ltradeop	-1.95717	-2.15051	I(1)	-1.50025	-4.59861	I(1)	-0.69648	-3.13716	I(0)
p-value	0.0497	0.0325		0.5176	0.0009		0.9627	0.119	

Note: The null hypothesis is that the variable has a unit root. The rejection of the null hypothesis for ADF test is based on the Mackimon (1996) critical values and p-values at 5 or 10 percent.

Vector Autoregressive, VAR, is used to determine the optimal lag length for the Johanson cointegration test which is based on the AIC as shown in table 2. From the result, the optimal lag length is 2. Using this optimal lag length, the likelihood ratio test which depends on the Maximum Eigen values of the stochastic matrix of the Johanson (1991) procedure for exploring the number of cointegrating vectors was used.

Table 2: Selection of Optimal Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-273.0756	NA	77.40953	18.53837	18.77190	18.61308
1	-150.9350	195.4249	0.122490	12.06234	13.46353*	12.51059
2	-118.3746	41.24316*	0.086115*	11.55831*	14.12717	12.38011*
3	-94.78974	22.01257	0.146292	11.65265	15.38918	12.84800

* indicates lag order selected by the criterion

Table 3 shows the results for the cointegrating test. From the table, the Maximum Eigenvalue statistics show that there is no cointegration vectors at 5 percent level of significance. The null hypothesis of zero cointegrating vector is not rejected against the alternative of one cointegrating vector. Therefore, it is concluded that there is no cointegration vectors specified in the model. This shows that there is no long run relationship among the variables, therefore, the paper estimate VAR which shows the short run relationship among the variables, with the lag of 2.

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.609801	28.23297	33.87687	0.2030
At most 1	0.565968	25.03914	27.58434	0.1023
At most 2	0.413692	16.01730	21.13162	0.2238
At most 3	0.262622	9.139643	14.26460	0.2747
At most 4	0.010766	0.324722	3.841466	0.5688

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

The VAR model for examining the determinants of foreign direct investment is re-estimated using the OLS. In this OLS the problem of Heteroskedasticity was taken care of by the White approach as shown in the

table 4 below. Considering the whole model, it was significant with F-statistics, 17.3 and p-value of zero. The Durbin-Watson statistics of 2.1659 showed that there is no problem of autocorrelation in the model estimated. From the table, the explanatory variables accounted for about 89 percent of the total variation in the foreign direct investment. The constant of the regression is 1.96 and it is significant at the 5% . This means that if all the variables are equal to zero, the foreign direct investment will be 1.96.

Considering the previous records of foreign direct investment, the first year's record had positive effects on the current foreign direct investment. That is to say that if last year's foreign direct investment increased, current foreign direct investment also increased while the second year's record of foreign direct investment had negative effects on the current foreign direct investment and if last two year's foreign direct investment increased current foreign direct investment decreased. However, it is the immediate first year's effect which is statistically significant at the 5% level. From the result, if foreign direct investment in the last year increased by one unit the current foreign direct investment will increase by 1.02 units.

Considering the previous first and the second year's records of gross domestic product, both values had negative effects on the current foreign direct investment. This means that if gross domestic product growth for last year or gross domestic product growth for last two years increased current foreign direct investment will decrease. However, both effects did not have any significant impact on the current foreign direct investment.

The previous year’s record of exchange rate had negative effects on the current foreign direct investment. That is to say that if last year's foreign direct investment increased current foreign direct investment will decrease but this impact on current foreign direct investment is not significant. However, the last two year's record of exchange rate had positive effects on the current foreign direct investment. This implies that if last two year's exchange rate increased, current foreign direct investment will also increase and this effect is significant at the 5% level. From the result, an increase of one unit in the last two years exchange rate will cause current foreign direct investment to increase by 6.368 units.

Considering the previous first and the second year's records of inflation, both values had negative effects on the current foreign direct investment which means that if inflation in last year or last two years increased, current foreign direct investment will decrease. However, both impacts did not have any significant impact on the current foreign direct investment.

The previous first and the second year's records of trade openness have negative and positive effects on the current foreign direct investment, respectively. However, it is the immediate second year's value of trade

openness which is is significant at the 5% level. This shows that if foreign direct investment in the last year increased by one unit the current foreign direct investment will increase by 1.02 units.

Finally, the first year's record of trade openness had negative effects on the current foreign direct investment which means that if last year's trade openness increased, current foreign direct investment will decrease. The second year's record of trade openness had positive effects on the current foreign direct investment. This means that if last two year's trade openness increased current foreign direct investment will also increase. However, it is last two year's trade openness which is significant at the 5% level. This shows that if trade openness in the last two years increased by one unit the current foreign direct investment will increase by 1.1488 units.

Dependent Variable: FDI
Method: Least Squares
Date: 09/03/13 Time: 15:36
Sample (adjusted): 1982 2012
Included observations: 31 after adjustments
White Heteroskedasticity - Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.961042	0.961059	2.040500	0.0547
FDI(-1)	1.009644	0.291364	3.465238	0.0024
FDI(-2)	-0.187987	0.222395	-0.845283	0.4080
GDPG(-1)	-0.028798	0.049110	-0.586405	0.5642
GDPG(-2)	-0.131180	0.079711	-1.645697	0.1155
EXRATE(-1)	-5.147744	3.426442	-1.502358	0.1486
EXRATE(-2)	6.368014	3.104516	2.051210	0.0536
INF(-1)	-0.018155	0.011828	-1.534856	0.1405
INF(-2)	-0.014962	0.009752	-1.534280	0.1406
LTRADEOP(-1)	-1.467661	0.902182	-1.626791	0.1194
LTRADEOP(-2)	1.148850	0.622955	1.844195	0.0800

R-squared	0.896475	Mean dependent var	2.576654
Adjusted R-squared	0.844713	S.D. dependent var	2.944295
S.E. of regression	1.160242	Akaike info criterion	3.406557
Sum squared resid	26.92324	Schwarz criterion	3.915391
Log likelihood	-41.80163	F-statistic	17.31909
Durbin-Watson stat	2.165897	Prob(F-statistic)	0.000000

The result of the Granger Causality Test is shown in table 5 below. From the table, there is unilateral directional causality between foreign direct investment and gross domestic product growth, of exchange rate and gross

domestic product growth. Also, there is bidirectional causality between of exchange rate and foreign direct investment, inflation and gross domestic product growth, trade openness and gross domestic product growth and trade openness and inflation.

Table 7: The Results of Granger Causality Test

Pairwise Granger Causality Tests
Date: 09/06/13 Time: 18:18
Sample: 1980 2012
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
GDPG does not Granger Cause FDI	31	0.25607	0.77602
FDI does not Granger Cause GDPG		5.30503	0.01169
EXRATE does not Granger Cause FDI	31	5.44527	0.01059
FDI does not Granger Cause EXRATE		5.97948	0.00730
INF does not Granger Cause FDI	31	1.09560	0.34928
FDI does not Granger Cause INF		0.20438	0.81645
LTRADEOP does not Granger Cause FDI	31	0.95408	0.39824
FDI does not Granger Cause LTRADEOP		0.50638	0.60850
EXRATE does not Granger Cause GDPG	31	8.56481	0.00139
GDPG does not Granger Cause EXRATE		1.07533	0.35588
INF does not Granger Cause GDPG	31	9.39270	0.00085
GDPG does not Granger Cause INF		21.3132	3.3E-06
LTRADEOP does not Granger Cause GDPG	31	8.75320	0.00124
GDPG does not Granger Cause LTRADEOP		4.31408	0.02410
INF does not Granger Cause EXRATE	31	0.53280	0.59323
EXRATE does not Granger Cause INF		1.38531	0.26811
LTRADEOP does not Granger Cause EXRATE	31	0.50467	0.60950
EXRATE does not Granger Cause LTRADEOP		0.27943	0.75846
LTRADEOP does not Granger Cause INF	31	3.45325	0.04677
INF does not Granger Cause LTRADEOP		3.88375	0.03343

6.0 Conclusion And Policy Recommendation

The paper examined the determinants of foreign direct investment inflows into Ghana. The main objective of this study was to find out the major determinants of foreign direct investment in Ghana between the periods 1980 to 2012. All the variables are integrated with order one that is I(1), . With the optimal lag length of two, the cointegration test showed that the variables were not cointegrated. Therefore, VAR model was estimated. From the result, the first past year of foreign direct investment, the last two year's of exchange rate and trade openness that encouraged the current foreign direct investment inflows in Ghana while previous records of gross domestic product growth and inflation, the last two years of foreign direct investment and exchange rate and the last year's trade openness encouraged the current foreign direct investment inflows. However, the first past year of foreign direct investment , the last two year's of exchange rate and trade openness that encouraged the current foreign direct investment inflows were statistically significant. Therefore, policies that encourage foreign direct investment, moderate exchange rate depreciation, increasing trade openness should be implemented.

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References:

Anyanwu, J.C. (1998). An Econometric Investigation of the Determinants of Foreign Direct Investment in Nigeria. Annual Conference, *Nigeria Economic society*.

Balasubramanyam, V. N., Salisu, M. and Sapsford, S. (1996). Foreign Direct Investment and Growth in EP and IS Countries. *The Economic Journal*, Vol. 106, No.434, Pp. 92 – 105.

Barrell, R.., and Pain, N. (1997). Foreign Direct Investment, Technological Change and Economic Growth within Europe. *The Economic Journal*, 107, Pp. 1770 – 1786.

Barro, R. J., and Sala-i-Martin, X. (1995). Economic Growth. McGraw-Hill.

Barthel, F., Busse, M., and Osei, R. (2008). The Characteristics and Determinants of FDI in Ghana. *HWWI Research Paper*, No. 2 – 15.

Benassy-Quere, A., Fontagne, L., and Lahreche-Revil, A. (2001). Exchange – rate Strategies in the Competition for Attracting Foreign Direct Investment. *Journal of the Japanese and International Economics*, Vol. 15, No. 2, pp. 178 – 198.

Breuss, F., and Egger, P. (1997). Use and Misuse of Gravity Equation in European Integration Research. *WIFO Working Paper* No. 93.

Campa, J. M. (1993). Entry by Foreign Firms in the U.S. under Exchange Rate Uncertainty. *Review of Economics and Statistics*, Vol. 75, No. 4, 614 – 622.
Cheng, L.H. and Kwan, Y. K. (2000). What are the Determinants of the Location of FDI? The Chinese Experience. *Journal of International Economics*, Vol. 51, Pp. 379 – 400.
Cheng, L. K., and Zhao, H. (1995). Geographical Patterns of Foreign Direct Investment in China: Location, Factor Endowments, and Policy Incentives. Department of Economics, Hong-Kong University of Science and Technology, February.
Cushman, D.O. (1985). Real Exchange Rate Risk, Expectations and the Level of Direct Investment. *Review of Economics and Statistics*, Vol. 67, pp. 297 – 307.
Cushman, D. O. (1988). Exchange Rate Uncertainty and Foreign Direct Investment in the United States. *Weltwirtschaftliches Archiv*, Vol. 124, pp. 322 – 336.
De Mello, L. R.., and Sinclair, M. Thea. (1995). Foreign Direct Investment, Joint Ventures, and Endogenous Growth. Department of Economics, University of Kent, UK, mimeo.
Dixit, A. K., and Pindyck, R. S. (1994). Investment under Uncertainty. Princeton: Princeton University Press.
Dunning, J. H. (1970). Studies in International Investment. George Allen and Unwin Ltd.
Dunning, J.H. (1977). Trade, Location of Economic Activity and the MNE: A search for an Eclectic Approach, in the International Symposium Allocation of Economic Activity, O. Bertil et al. eds. Proceeding of Noble held in Stockholm, London: Macmillan.
Enders, W. (2004). Applied Econometrics Time Series. Hoboken, N.J: John Wiley and Sons, Inc.
Feenstra, R. C., and Markusen, J.R. (1994). Accounting for Growth with New Inputs. *International Economic Review*, 35, Pp. 429 – 447.
Goldberg, L.S., and Kolstad, C. D. (1994). Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty. National Bureau of Economic Research, NBER Working Paper No. 4815.
Goldberg, L.S. and Kolstad, C.D. (1995). Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty. *International Economic review*, 36, pp. 855 – 873.
Holland, D., Sass, M., Benacek, V., and Gronicki, M. (2000). The Determinants and Impacts of FDI in Central and Eastern Europe: A Comparism of Survey and Econometric Evidence. *Transnational Corporations*, Vol. 9, No. 3, pp. 163 – 213.

Ibrahim, A.(2005). Sectoral Analysis of Foreign Direct Investment in Ghana. BOG Research Paper, Research Development, Bank of Ghana.
Iyoha, M. A. (2001). An Econometric Study of the main Determinants of Foreign Investment in Nigeria. *The Nigerian Economic and Financial Review*, Vol. 6, No. 2: December.
Itagaki, T. (1981). The Theory of the Multinational Firm under Exchange Rate Uncertainty. *Canadian Journal of Economics*, 14, 276 – 297.
Johansen, S. (1998). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, Vol.12, No. 2 – 3, pp. 231 – 254.
Johansen, S., and Juselius, K. (1990). Maximum Likelihood Estimation and Influence on Cointegration – with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, Vol. 52, No. 2, pp. 169 – 210.
Krugman, P. R. (1979). A Model for Innovation, Technology, Transfer and the World Distribution of Income. *Journal of Political Economy*, 87, pp. 253 – 263.
Loree, D.W. and Guisinger, S.E. (1995). Policy and non-Policy Determinants of U.S. Equity Foreign Direct Investment. *Journal of International Business Studies*, Vol. 26, No. 2, pp. 281 – 299.
Mundell, R. A. (1957). International Trade and Factor Mobility. *American Economic Review*, 47, pp. 321 – 335.
Nair Reichert, U., and Weinhold, D. (2001). Causality Tests for Cross – Country Panels: A New Look at FDI and Economic Growth in Developing Countries. *Oxford Bulletin of Economics and Statistics*, Vol. 63, No. 2, pp. 153 – 171.
Nunnenkamp, P.and Spatz, J. (2002). Determinants of FDI in Developing Countries: Has Globalisation Changed the Rules of the Game? *Transnational Corporations*, Vol. 11, No. 2, Pp. 1 – 34.
Pindyck, R. S. (1988). Irreversible Investment, Capacity Choice, and the Value of the Firm. *The American Economic Review*, Vol. 78, No. 5, pp. 969 – 985.
Rivoli, P., and Salorio, E. (1996). Foreign Direct Investment and Investment under Uncertainty. *Journal of International Business Studies*, Vol. 27, No. 2, pp. 335 – 357.
Romer, P. M. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98, pp S71 – S102.
Satomi, K. (2007). Macro Determinants of FDI Inflows to Japan: An Analysis of Source Country Characteristic. Aston University.
Scarperlanda, A. E. and Mauer, L. J. (1969). The Determinants of US Direct Investment in E.E.C. *The American Economic Review*, Volt LIX, No. 4, Part 1, September.
Solow, R.M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, Vol. 70, No. 1, Pp. 65 – 94.

Tasi, P.(1994). Determinants of of Foreign Direct Investment and its Impact on Economic Growth. *Journal of Economic Development*, Vol.19, No. 1.
Wang, J. Y. (1990). Growth Technology Transfer and the Long – run Theory of International Capital Movements. *Journal of International Economics*, 29, Pp. 255 – 271.