

A Co-Integration Analysis of the Effect of Foreign Direct Investment on Economic Growth

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ABSTRACT

It has been a major drive for successive governments in Ghana to attract more foreign direct investments as a means of generating growth in the economy. The growth of emerging markets has been attributed, in large part, to incoming foreign direct investments. Companies investing abroad can realise higher growth rates and diversify their income, which creates opportunities for investors. Using our augmented Co-Integration model, we note that foreign direct investment on GDP as the major indicator of economic growth in Ghana is significant. The subsequent analysis also shows that it FDI also has significant effect on other major indicators of economic growth such as Current Account Balance, Unemployment Rate, Technology and Innovation Index, Gini Co-Efficient (Inequality), Gender Inequality Index (GII), Urbanisation, Human Development Index, Per Capita Income, Openness to Trade, Carbon Footprint. FDI is thus constituted as equity capital, reinvested earnings and other capital. By establishing the effect impact of country risk on FDI inflows to Ghana, the study provides insight to policy makers in the country to formulate policies that are aimed at making Ghana a good investment destination for foreign investors.

Keywords : GDP, FDI, GII, FDI, FDI, IMF, VAR, VECM, GDPGR, LFDI, LGDP, ICRG

I. INTRODUCTION

One major feature of the present-day world has been the circulation of private capital flow in the form of Foreign Direct Investment (FDI) in developing countries, especially since the 1980s. Most of these foreign investments include the establishment of an acquisition of overseas raw material and component operations, production plants and sales subsidiaries (Shok, et al, 2015). The International Monetary Fund (IMF) defines Foreign Direct Investment (FDI) as a category of international investment where a resident in one economy (the direct investor) obtains a lasting interest in an enterprise resident in another economy (IMF, 2016).

The implementation of market-oriented economic and financial reforms has resulted in an enormous amount of external capital flowing into the emerging markets across the world. These reforms have opened up such economies to significant improvements in Gross Domestic Product (GDP) and other economic

fundamentals. FDI is seen as a source of economic development and modernization, income growth and employment. It allows technology transfer mainly in the form of new varieties of capital inputs which may not be achieved through trade in goods and services (Asafu-Adjaye, 2005). It also contributes to human capital development which ultimately leads to growth in the host country. Multinational companies invest in foreign lands because of potentially greater cost effectiveness and profitability in sourcing inputs and servicing markets through a direct presence in a number of locations rather than relying on imports and exports to support their operations (Sakyi, et al, 2015).

According to Okafor (2015) immediately after independence in the 1960s, most African countries in a bid to protect local industries imposed trade restrictions and controls on capital. In recent years however, attention has been given to attraction of foreign direct investment (FDI) with policies that will whet the appetite of foreign firms. The liberal FDI policy by successive governments of Ghana as well as the

deregulation and privatization of the telecommunication sector, for example, has triggered a wave of international investments in the sector. The UNCTAD (2015) report indicates that the BRICS countries (Brazil, the Russian Federation, India, China and South Africa) continued to be the leading sources of FDI among emerging investor countries. Flows from these five economies rose from \$7 billion in 2010 to \$145 billion in 2015, accounting for 10 per cent of the world total. Their Transnational Corporations are becoming increasingly active, including Africa. In the ranks of top investors, China moved up from the sixth to the third largest investor in 2012, after the United States and Japan, the report states. China moved sharply to second world best economy in 2015, lead by United States, while United Kingdom taking third position (Anyanwu & Yameogo, 2015).

The growth of emerging markets has been attributed, in large part, to incoming foreign direct investments. Companies investing abroad can realise higher growth rates and diversify their income, which creates opportunities for investors. FDI is thus constituted as equity capital, reinvested earnings and other capital (UNCTAD, 2015). The most distinctive features of FDI are transfer of resources, capital formation abroad and acquisition of control (Kindleberger, 2015; Krugman and Obstfeld, 2015). FDI flows are made up of capital provided by foreign investors to enterprises in another economy with an expectation of obtaining profits derived from the capital participation in the management of the enterprise in which they invest. In this research, FDI refers to the monetary resources foreigners invest in companies or their subsidiaries in Ghana and China.

There is however a certain level of awareness among international investors to the fact that the capital inflows to developing countries have an element of economic growth as well as risk that may have rippling effects on the international financial sector (Kariuki, 2015). This risk reflects the potentially adverse effects of a country's environment on the future cash inflows of the investment. Multinationals often look at the current and potential state of the economy of the host country since a recession can drastically reduce demand (Dah & Sulemana, 2010).

Among the critical factors that affect FDI inflows especially in many developing countries is country risk.

Country risk has become an issue of major concern in international trade and investment over the last three decades. Bryan (2015) defines country risk as the economic, political and business risks that are unique to a specific country, and that might result in unexpected investment losses. In other words, it refers to the type of risk that an investor faces arising from adverse political, economic or financial developments in a country. Although this risk affects all investors assessing investment opportunities in a foreign country, the most affected are the ones that invest in the transition economies.(Petrovic and Stankovic, 2015).This has led to the development of country specific assessment techniques that are aimed at monitoring the risks to international business.

Given the surge in international trade and investments across many parts of the world, the need for the analyses of country risk on foreign direct investments is crucial. It is for this reason that the importance of country rating agencies cannot be downplayed. Almost every investable country receives ratings from these agencies. Risk rating agencies provide qualitative and quantitative country risk ratings, combining information about alternative measures of economic, financial and political risk ratings, to obtain a composite country risk rating (Hoti, 2014). In the view of Cosset and Roy, 2015, following the rapid growth in the international debt of less developed countries in the 1970s and the increasing incidence of debt rescheduling in the 1980s, country risk which reflects the ability and willingness of a country to service its financial obligation has become a topic of major concern for the international financial community.

Perceptions of the determinants of country risk are important because they affect both the supply and the cost of international capital flows (Brewer and Rovoli, 2014). Thus, supply and the cost of capital increase as the country risk increases. It is for this reason that the Price Waterhouse Opacity index tracks elements of risk in a country in order to assess the adverse impact of the opacity of capital (cost of borrowing funds). The index is based on corruption in government bureaucracy, laws governing contracts or property rights and accounting standards. The other indicators are issues related to the economy such as the fiscal and monetary factors and lastly the business regulations in a country. In essence, a high degree of opacity in any of these elements will

raise the cost of doing business and curtail the availability of investment capital (Iddrisu, et al, 2015).

Financial risk as a component of country risk has been defined by Ali et al (2013) as the risk that a country may not be able to repay its foreign liabilities. Financial risk in a country that is burdened with a high debt overhang is likely to lead to a financial crisis. As the amount of foreign debt increases relative to the borrowing country's GDP, the country's ability to repay its debt will decline and the financial risk of the country will increase. Usually, investors find those countries with too much foreign debt relative to GDP to be less attractive for investment (Iddrisu, et al, 2015). The burden is even more if a country experiences persistent current account deficits for many years. The flow of FDI is consequently affected in the long run. Lower corporate profitability, falling stock market valuations, slow economic growth or recovery have been noted as factors that impede FDI inflows (Asongu, Set al, 2015).

Political risk also refers to the risk that the returns on an investment could suffer as a result of political changes or instability in a country. Instability affecting returns on investment could stem from a change in government, legislative bodies, other foreign policy makers, or military control (Görg & Seric, 2015). This type of country risk is hard to quantify because there are limited sample sizes or case studies when discussing an individual nation. Ali et al (2013) find that institutions are a robust predictor of FDI and that property rights security is the most important aspect of institutions in determining FDI flows. On the other hand, there are some papers finding an insignificant effect of country risk on inward FDI. For instance, Asiedu (2014) conclude that political risk does not have any significant impact on FDI.

Economic risk refers to the risks associated with a fall in a country's economic strengths. Where the economic weaknesses outweigh the strengths, the economic risk will be high. Economic risk components are based on accepted ratios between measured data within the national economic structure. Risk points are assessed for each of the component factors of GDP per head of population, real annual GDP growth, annual inflation rate, budget balance as a percentage of GDP, and current account balance as a percentage of GDP. (ICRG, 2013). As weak economic conditions persist, FDI flows and notably cross border mergers and acquisitions to

developed countries decline. A high inflation rate in a host country has been blamed for dwindling FDI inflows. Cash inflows are adversely affected due to reduction in the real value of capital invested and future returns (Adams, et al, 2015).

It has been a major drive for successive governments in Ghana to attract more foreign direct investments as a means of generating growth in the economy. Foreign investments in the country have been in the areas of mining, petroleum, telecommunications and other infrastructural developments. It has been the recognition of the various governments that attracting FDI requires an enabling legal environment (Salim, et al, 2015). There are also sector-specific laws that further regulate banking, non-banking financial institutions, insurance, fishing, securities, telecommunications, energy, and real estate. Foreigners who are interested in investing in Ghana are required to satisfy the provisions of the investment bill as well as the provisions of sector-specific laws. In general, the GIPC has streamlined procedures and reduced delays.

The new Ghana Investment Promotion Council (GIPC) Bill 2013 which replaces the GIPC Act, 1994 (Act 478), governs investment in all sectors of the economy and it ropes in all enterprises, including mining and petroleum, areas that were not previously covered by the GIPC Act 478. The repealed Act 1994(Act 478), excluded minerals and mining, oil and gas, and the free zones. The new Bill is a revision of the country's investment laws to reflect changing economic dynamics to guarantee optimum business opportunities for both foreign and domestic businesses (Essel, 2015). The Bill seeks to establish the Ghana Investment Promotion Centre as a government agency responsible for the encouragement and promotion of investments. The drive for the new Bill has been to ensure increased efficiency in the coordination of investments, improved investment promotion strategies and a comprehensive dissemination of information on investment in Ghana.

According to the GIPC, the bill seeks to provide specialised incentives to attract and retain strategic investors to make Ghana a competitive investment destination, and to provide Ghanaians with opportunities to take advantage of the improved economic situation prevailing in the country. It however addresses the gross abuse of huge foreign exchange

resources being repatriated without tangible transfer of technology (Shen, 2015).

Many benefits for investors under Act 478, such as guarantees against expropriation, dispute incentives for special investments and transferability of earnings, have been retained in the new bill. Constitution however sets out some exceptions and a clear procedure for the payment of compensation in allowable cases of expropriation or nationalization (Alagoa, 2015). The government may compulsorily take possession or acquire property only where the acquisition is in the interest of national defense, public safety, public order, public morality, public health, town and country planning, or the development or utilization of property in a manner to promote public benefit. It must, however, make provision for the prompt payment of fair and adequate compensation. The Government of Ghana also allows access to the high court by any person who has an interest or right over the property (US Embassy, 2015).

The laws of Ghana recognize the right of foreign and domestic private entities to own and operate business enterprises. The laws however restrict investors in certain areas of the economy. For instance under the new GIPC bill 2013, only citizens of the country can operate the following enterprises: the printing of recharge scratch-cards for the use of subscribers of mobile communication services; retailing of Internet bandwidth and mobile telephony value-added services; production of exercise books and other basic stationery; and importation and internal distribution of finished pharmaceutical products (Johnston & Ramirez, 2015). Other areas also require at least 30% participation by a citizen, or an enterprise which is wholly owned by citizens (Alagoa, 2015). These areas are: (a) the production of packaging materials; (b) manufacture of furniture and wood products; (c) manufacture of sanitary paper products; (d) provision of all services; including mining, oil and gas; and (e) manufacture of generic pharmaceutical products. As a way of protecting foreign investments, Ghana has signed up as a member of the Multilateral Investment Guarantee Agency (MIGA) of the World Bank, which provides investment guarantees against non-commercial risk for investments in developing countries. Moreover, the Government has entered into bilateral Investment Promotion and Protection Agreements (IPPAs), as well as double taxation treaties with a number of countries to further

enhance the protection and security of the investment climate (Adams et al, 2014).

According to the United Nations World Investment report for June 2015, the country's recent performance in attracting FDI was mainly due to the developments in the upstream petroleum sector, following the discovery of oil in commercial quantities in the country (Work Bank, 2015). According to the 2015 World Investment Report, Ghana was the fifth largest recipient of FDI inflows into Africa for the year 2015 after Nigeria, Mozambique, South Africa and DR Congo. Ghana's record in attracting FDI inflows has been impressive over the years. The country received 3.3 billion dollars in 2015 while in 2014 it raked in 3.2 billion dollars up from the \$2.5 billion and \$2 billion it received in 2013 and 2015 respectively (Work Bank, 2015).

The Ghana Investment Promotion Center 2015 report states that, the total number of projects registered for 2015 was 399, with a total estimated value of US\$5.63 billion against 514 project registered for the corresponding period of 2014 with a total estimated value of US\$7.68 billion. Out of the 399 registered projects, 239 were wholly-owned foreign enterprises and 160 were joint ventures between Ghanaians and foreign partners (Baccini & Dür, 2015). The joint venture projects were valued at US\$1.97billion, and the wholly-owned foreign enterprises were valued at US\$3.66 billion. FDI inflows have been increasing over the years in line with improvements in political risk and macroeconomic stability. It is likely that the discoveries of crude oil off the western coastline of the country will significantly enhance FDI flows into the country in the years ahead (Otiso & Owusu, 2008).

Underpinning trends in investment flows has been a strong tendency towards liberalization in trade, investment and finance related policies. Currently, FDI has been used more as a market entry strategy for investors, rather than an investment strategy. FDI is expected to spur growth in GDP and provide the benefits of reduced cost through the realization of scale economies, and coordination advantages, especially for integrated supply chains. This study intends to focus on the impact of country risk on foreign direct investment (FDI) inflows into Ghana.

II. METHODS AND MATERIAL

Data and Methodology

The data used in this study are the aggregate annual time series at constant prices for real gross domestic product (GDP) and total net inflows of foreign direct investment (FDI) covering the period of 1983-2015 in 33 pairs of observations. GDP is commonly used to represent economic growth. The data are drawn from the World Bank's "World Development Indicators" and in U.S. billion-dollars. Aggregates are based on 2000 U.S. dollars, and converted from domestic currencies using single year official exchange rates by the World Bank. The relationship between foreign direct investment inflow and economic growth in Ghana is stated as:

$$FDI_t = \pi_0 + \pi_1 GDPGR_t + \zeta_t$$

and,

$$GDPGR_t = \tau_0 + \tau_1 FDI_t + \eta_t$$

where the parameters ζ and η are normally distributed error terms.

Co-integration Test

Co-integration explains that one or more linear combinations of time-series variables are stationary even though they are individually non-stationary according to Dickey et al. (1991). In other words, if two or more series are individually integrated in the same order but some linear combination of them have lower order of integration, then the series are said to be co-integrated. Granger & Newbold (1974) report that a possible presence of co-integration has to be taken into account when one select a method to make a hypothesis on the relationship between two non-stationary variables. Before moving to co-integration test, there was the need to determine the optimal lag-length using the criteria such as AIC, BIC, and SIC. The following output in table 1 was used to pin down the optimal lag-length. Indeed, the stars show that the lag-length is one. Please note that information criteria have to be minimized, and that's the reason why the stars are shown at certain values.

After selecting the right length, the Johansen ML co-integration test by Johansen (1988, 1991) is used to determine whether LFDI and LGDP are co-

integrated. The Johansen multivariate co-integration test involves the proof of relationship between the time-series, takes the following vector auto-regression (VAR) model equation (2):

$$\Delta \ln Y_t = \sum_{i=1}^k \Gamma_i \Delta \ln Y_{t-i} - 1 + \Pi \ln Y_{t-i} + \varepsilon_t \quad (2)$$

where Y_t represents $n \times 1$ vector of $I(1)$ variables, namely foreign direct investment (FDI) and gross domestic product (GDP). Parameter Γ and Π represent for $n \times n$ matrix of coefficients to be tested. All I need to know is that if the rank is zero, there will be no co-integrating relationship. If the rank (r) is one there will be one co-integrating relation, if it is two there will be two co-integrating relations and so on. When there is a co-integration between two time-series, these series have a long-run relation and cannot move too far away from each other.

This test is based on maximum likelihood estimation and two statistics: maximum eigenvalue (K_{max}) and a trace-statistics (λ_{trace}), where the λ_{trace} statistic tests the null hypothesis that r is equal to zero (no co-integration) against a general alternative hypothesis of $r > 0$ (co-integration). The K_{max} statistic tests the null hypothesis that the number of co-integrating vectors is r co-integrating vectors versus the alternative of $r+1$ co-integrating vectors. The result in the table 2 indicates that the null hypothesis of no co-integration is rejected for rank of zero at 5% level of significance since trace statistic is bigger than 5% critical value. In the next step, the null hypothesis of "1 co-integrating equation" versus "2 co-integrating equations" cannot be rejected at 5% level of significance as trace statistic is smaller than 5% critical value. I finally conclude that there is one co-integrating equation that allows us to identify vector error correction mechanism, is covered in the next part.

Vector Error Correction Mechanism

If two time series are co-integrated by a common factor (co-integrating vector) it is not possible to use a standard Vector Autoregression (VAR) Model. I have to account for this relationship and use a Vector Error Correction Mechanism (VECM) which adjusts both short run changes in variables and deviations from equilibrium. I also have to make sure that the estimated parameter of 'equation one' in VECM will be negative and statistically significant if VECM is a correct technique to go with. The negative sign guarantees that

deviations in the short-run make the long-run equilibrium exist over time.

The table 3 shows that the coefficient of 'equation one' is -0.46 and statistically significant at 5% level. Besides, error correction mechanism works and any short-term fluctuations between the time series of GDPGR and FDI lead to a stable positive long run relationship since the value of coefficient lies down between zero and minus one. Referring to the definition by Ghatak (1998), nearly 46% of disequilibrium is "corrected" each year.

Granger (1988) argues that if two series are co-integrated, there must be a Granger-causality in at least one direction. I accordingly examine the Granger causality test in the next section to investigate the direction of linkage between LFDI and LGDP.

Granger Causality

Granger (1988) reports that the Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. It can be relevant only when the variables are either stationary or non-stationary but co-integrated, can be written as:

$$\ln \text{GDP}_t = \alpha_1 + \beta_1 \ln \text{GDP}_{t-1} + \beta_2 \ln \text{GDP}_{t-2} + \dots + \delta_1 \ln \text{FDI}_{t-1} + \delta_2 \ln \text{FDI}_{t-2} + \dots + \varepsilon_{1t} \quad (3)$$

$$\ln \text{FDI}_t = \alpha_2 + \gamma_1 \ln \text{FDI}_{t-1} + \gamma_2 \ln \text{FDI}_{t-2} + \dots + \lambda_1 \ln \text{GDP}_{t-1} + \lambda_2 \ln \text{GDP}_{t-2} + \dots + \varepsilon_{2t} \quad (4)$$

where ε_{1t} and ε_{2t} are white noise error terms, and β , δ , γ , λ are the parameters which tell how much the past values of the variables can explain the current value of either series. The null hypothesis in general is variable X does not Granger cause variable Y. In our example there are two null hypotheses: Foreign direct investment does not Granger cause economic growth (GDPGR), and economic growth does not Granger cause FDI. The null hypothesis of no Granger causality cannot be rejected if and only if no lagged value of an explanatory variable is retained in the regression (3) and or in the regression (4).

The result in the table 4 indicates that I reject the null hypotheses. Hence, GDPGR Granger Causes FDI just as FDI Granger Causes GDPGR at 5% significance level, meaning that there is a two-way (mutual) causality

effect between foreign direct investment and economic growth.

As indicated in the literature review, the major measure of the economic growth is growth on the unemployment rate as a measure of economic growth. Thus the information in table 5 provides the statistical test (using regression analysis) of the relationship between heterogeneous FDI have on unemployment rate as a measure of economic growth using a linear regression method. The data shows a negative relationship between the FDI contributed by manufacturing, extractive, construction and the service sector as represented by the negative beta values albeit some differences in the degree of impact. FDI from the manufacturing sector influences economic growth (unemployment rate) in Ghana by -0.81 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05. This makes the manufacturing FDI the fifth largest contributor to employment among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and other industries combined together. On the other hand the regression analysis shows that FDI from the other sectors influences economic growth (unemployment) in Ghana by -350 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05.

This makes other FDI sectors the second largest contributor to employment among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together. Thirdly the regression tables also shows that FDI from the extractive sector influences unemployment in Ghana by -.609 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05. This means that the FDI from the extractive sector is the largest contributor to employment among all the sources of FDI inflow in Ghana relative to the construction, service, manufacturing and other industries combined together. The next industry that was investigated was the construction industry which is a major source of FDI in Ghana.

The analysis as shown in the regression output indicates that FDI from the construction sectors influences unemployment in Ghana by -.313 per a unit change and this is also statistically significant. This is because the p value is 0.00 and is greater than 0.05. This means that

the FDI from the construction industry is the second largest contributor to employment among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together.

As indicated in the literature review, the major measure of the economic growth is growth on the current account balance. Thus the information in table 6 provides the statistical test (using regression analysis) of the relationship between heterogeneous FDI have on the current account balance as a measure of economic growth using a linear regression method. The data shows a positive association between the FDI contributed by manufacturing, extractive, construction and the service sector as represented by the positive beta values albeit some differences in the degree of impact. FDI from the manufacturing sector influences current account balance in Ghana by $-.303$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This makes the manufacturing FDI the third largest contributor to current account balance among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and other industries combined together. On the other hand the regression analysis shows that FDI from the other sectors influences current account balance in Ghana by $-.040$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This makes other FDI sectors the least contributor to current account balance among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together. Thirdly the regression tables also shows that FDI from the extractive sector influences current account balance in Ghana by $-.825$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This means that the FDI from the extractive sector is the largest contributor to current account balance among all the sources of FDI inflow in Ghana relative to the construction, service, manufacturing and other industries combined together. The next industry that was investigated was the construction industry which is a major source of FDI in Ghana. The analysis as shown in the regression output indicates that FDI from the construction sectors influences current account balance in Ghana by $-.005$ per a unit change and this is also statistically significant. This is because the p value is 0.00 and is greater than 0.05 . This means that the FDI from the construction

industry is the least contributor to current account balance among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together.

As indicated in the literature review, the major measure of the economic growth is growth on the technology and innovation. Thus the information in table 7 provides the statistical test (using regression analysis) of the relationship between heterogeneous FDI and technology and innovation as a measure of economic growth using a linear regression method. The data shows a positive association between the FDI contributed by manufacturing, extractive, construction and the service sector as represented by the positive beta values albeit some differences in the degree of impact. FDI from the manufacturing sector influences technology and innovation in Ghana by $.424$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This makes the manufacturing FDI the third largest contributor to technology and innovation among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and other industries combined together.

On the other hand the regression analysis shows that FDI from the other sectors influences technology and innovation in Ghana by $.732$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This makes other FDI sectors the second largest contributor to technology and innovation among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together. Thirdly the regression tables also show that FDI from the extractive sector influences technology and innovation in Ghana by $.917$ per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05 . This means that the FDI from the extractive sector is the largest contributor to technology and innovation among all the sources of FDI inflow in Ghana relative to the construction, service, manufacturing and other industries combined together. The next industry that was investigated was the construction industry which is a major source of FDI in Ghana. The analysis as shown in the regression output indicates that FDI from the construction sectors influences technology and innovation in Ghana by $.209$ per a unit change and this is also statistically significant. This is because the p value is 0.00 and is greater than 0.05 . This means that the FDI from the construction industry is the fifth

largest contributor to technology and innovation among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together.

As indicated in the literature review, the major measure of the economic growth is growth on the gender income equality. Thus the information in table 8 provides the statistical test (using regression analysis) of the relationship between heterogeneous FDI have on GDP as a measure of economic growth using a linear regression method. The data shows a positive association between the FDI contributed by manufacturing, extractive, construction and the service sector as represented by the positive beta values albeit some differences in the degree of impact. FDI from the manufacturing sector influences gender income equality in Ghana by .065 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05. This makes the manufacturing FDI the largest contributor to gender income equality among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and other industries combined together. On the other hand the regression analysis shows that FDI from the other sectors influences gender income equality in Ghana by .085 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05. This makes other FDI sectors the second largest contributor to gender income equality among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together. Thirdly the regression tables also shows that FDI from the extractive sector influences gender income equality in Ghana by .919 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05.

This means that the FDI from the extractive sector is the third largest contributor to gender income equality among all the sources of FDI inflow in Ghana relative to the construction, service, manufacturing and other industries combined together. The next industry that was investigated was the construction industry which is a major source of FDI in Ghana. The analysis as shown in the regression output indicates that FDI from the construction sectors influences gender income equality in Ghana by .087 per a unit change and this is also statistically significant. This is because the p value is 0.00 and is greater than 0.05. This means that the FDI

from the construction industry is the fourth largest contributor to gender income equality among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together.

As indicated in the literature review, the major measure of the economic growth is growth on the rate of urbanization. . Thus the information in table 9 provides the statistical test (using regression analysis) of the relationship between heterogeneous FDI have on rate of urbanization as a measure of economic growth using a linear regression method. The data shows a positive association between the FDI contributed by manufacturing, extractive, construction and the service sector as represented by the positive beta values albeit some differences in the degree of impact. FDI from the manufacturing sector influences rate of urbanization in Ghana by .030per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05. This makes the manufacturing FDI the largest contributor to rate of urbanization among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and other industries combined together. On the other hand the regression analysis shows that FDI from the other sectors influences rate of urbanization in Ghana by .039 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05.

This makes other FDI sectors the second largest contributor to rate of urbanization among all the sources of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together. Thirdly the regression tables also shows that FDI from the extractive sector influences rate of urbanization in Ghana by .469 per a unit change and this is statistically significant since p value is 0.00 and is greater than 0.05.

This means that the FDI from the extractive sector is the third largest contributor to rate of urbanization among all the sources of FDI inflow in Ghana relative to the construction, service, manufacturing and other industries combined together. The next industry that was investigated was the construction industry which is a major source of FDI in Ghana. The analysis as shown in the regression output indicates that FDI from the construction sectors influences rate of urbanization in Ghana by .013 per a unit change and this is also

statistically significant. This is because the p value is 0.00 and is greater than 0.05. This means that the FDI from the construction industry is the fourth largest contributor to rate of urbanization among all the sources

of FDI inflow in Ghana relative to the extractive, construction, the service and manufacturing industries combined together.

Table 1 : Lag Length Selection Criteria

Lag	LL	LR	df	p	FPE	AIC	HQC	SBIC
0	-55.287	-	-	-	0.178191	3.9508	3.98033	4.0451
1	-3.5992	103.37*	4	0.000	0.006656*	0.662017*	0.750614*	0.944905*
2	-1.2339	4.7307	4	0.316	0.007475	0.774751	0.922413	1.24623
3	-1.0746	0.31867	4	0.989	0.009885	1.03962	1.24635	1.6997
4	3.00617	8.1614	4	0.086	0.010058	1.03406	1.29985	1.88272

Table 2 : The result of the Johansen ML Co-integration test

Maximum Rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	2	-19.2055	-	16.7899	15.41
1	5	-10.8426	0.40707	0.0642*	3.76
2	6	-10.8105	0.00201	-	-

Table 3 : The Result of Vector Error Correction Model

Co-integrating equations							
Equation		Parms	chi2	P>chi2			
_ce1		1	197.661	0			
Identification : beta is exactly identified							
Johansen normalization restriction imposed							
_ce1	beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
	lgdp	1	.	.	.	.	.
	lfdi	-0.4607	0.03277	-14.06	0	-0.5249	-0.3965
	_cons	-5.1721	.	.	.	.	.

Table 4 : The Result of the Granger Causality Test

Equation	Excluded	chi2	df	Prob>chi2
LGDP	LFDI	6.7041	1	0.01
LGDP	ALL	6.7041	1	0.01
LFDI	LGDP	5.3985	1	0.02
LFDI	ALL	5.3985	1	0.02

Table 5: Regression of the Effect of FDI Heterogeneity on Employment Rate (Economic) Growth Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.387	.835		6.451	.000
1 Manufacturing	-.081	.078	-.101	1.038	.304
1 Extractive	-.609	.217	-.302	-2.803	.007
1 Construction	-.313	.080	-.356	-3.926	.000
1 Service	-.350	.092	-.366	-3.800	.000
1 Others	-.392	.095	-.343	4.108	.000

a. Dependent Variable: Unemployment Rate

Table 1: Regression of the Effect of FDI Heterogeneity on Current Account Balance (Economic Growth) Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.371	.848		7.516	.000
1 Manufacturing	-.303	.080	-.442	-3.808	.000
1 Extractive	-.825	.220	-.483	-3.744	.000
1 Construction	-.005	.081	-.394	-3.639	.001
1 Service	-.238	.093	-.294	2.548	.014
1 Others	-.040	.097	-.041	-.409	.685

a. Dependent Variable: Current Account Balance

Table 7: Regression of the Effect of FDI Heterogeneity on Technology and Innovation Index (Economic) Growth Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.050	1.255		4.820	.000
1 Manufacturing	.424	.118	.477	3.599	.001
1 Extractive	.917	.326	.414	-2.812	.007
1 Construction	.209	.120	.216	-1.747	.087
1 Service	.279	.138	.265	2.016	.049
1 Others	.732	.143	.582	-5.104	.000

a. Dependent Variable: Technology and Innovation Index

Table 8: Regression of the Effect of FDI Heterogeneity on Gender Equality Index Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

(Constant)	6.006	.899		6.677	.000
Manufacturing	.065	.084	-.112	-.769	.000
1 Extractive	.919	.234	-.634	-3.931	.000
Construction	.087	.086	.137	1.012	.000
Service	.534	.099	.776	5.388	.000
Others	.085	.103	-.104	-.830	.000

a. Dependent Variable: Gender Inequality Index (GII)

Table 9: Regression of the Effect of FDI Heterogeneity on Rate of Urbanization Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.016	1.372		2.198	.033
Manufacturing	.030	.129	-.043	-.235	.815
1 Extractive	.469	.357	.268	1.315	.194
Construction	.013	.131	-.017	-.098	.922
Service	.215	.151	-.258	-1.418	.162
Others	.039	.157	-.039	-.249	.804

a. Dependent Variable: Urbanisation

III. CONCLUSIONS AND POLICY IMPLICATION

This study attempts to investigate the relationship between foreign direct investment (FDI) and economic growth (GDPGR) using the annual data over the period of 1979-2011. The processes of this paper show that a positive long-run relationship exists between the variables. The ADF unit root test suggests that the variables are non-stationary at levels, but become stationary in the first differences. The Johansen cointegration test indicates that there is long-run relationship between FDI and GDPGR, and the effect is significant. Also, finding of Granger causality states that there is a bi-directional causality between FDI and GDPGR. As Kahramanoglu (2009) suggests, the results of this study imply that a positive change in the level of production of goods and services is likely to increase the FDI in Ghana. In the extant literature, it was explained by Alfaro, et al (2013) that FDI should increase economic growth in the host economy and even more effective in boosting economic growth than domestic investment (Borensztein, De Gregorio, & Lee 2014). The literature further revealed that the ways foreign direct investment should have positive effects on economic growth in the host economy are five, given

the “appropriate host-country policies and a basic level of development” (OECD 2014, 5), FDI facilitates the transfer of technological advances and know-how; it increases competition; human capital improves; it integrates the economy towards the world economy; and it pushes for more positive development of firms. However, FDI can also negatively affect economic growth. Moura and Forte (2015) point out that although, as OECD (2014) states, there are five channels through which FDI can have positive effects on economic growth there are five channels through which FDI can have negative effects on economic growth. While the regression analyses show the impact of foreign direct investment on GDP as the major indicator of economic growth in Ghana, the subsequent analysis also shows that it FDI also has significant effect on other major indicators of economic growth such as Current Account Balance, Unemployment Rate, Technology and Innovation Index, Gini Co-Efficient (Inequality), Gender Inequality Index (GII), Urbanisation, Human Development Index, Per Capita Income, Openness to Trade, Carbon Footprint. For example the analysis shows that a unit change of FDI no matter the source has negative effect on Current Account Balance. This is because it reduces the potential imports that the country

would have made for those products and services while boosting some level of exports. In the same regard, Unemployment Rate is also significantly reduced by a change in FDI and similar trends are also observed for the remaining indicators. A major issue that evokes critical analysis is the knowledge that FDI influences gender income equality which was previously not mentioned in most research. Besides, politics and economists in Ghana should give more attention on attracting higher levels of foreign direct investment into Ghana in order to promote economic growth.

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