A Causality Analysis for FDI and Economic Growth in Ghana

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ABSTRACT

For most developing countries an important reason why political leaders spend millions of dollars to travel the world over to woo investors to their countries is the need to create jobs and boost the economy. This paper sought to explore the extent of heterogeneity of FDI in Ghana. Using economic data from selected institutions in Ghana, we noted a polarization of the FDI distribution with regards to regional distribution. It is fair to suggest that currently FDI inflow from all countries or all sources are positively skewed towards the middle belt and coastal regions relative to the three northern region. Several reasons explain this geographic polarization of FDI. First of all, the early economic reform was focused on the coastal areas such as Tema, Accra and Takoradi where Special Economic Zones, Development Zones, Economic and Technology Development Zones were gradually opened to foreign investors.

Keywords: Causality, FDI, Economic Growth, Ghana,

INTRODUCTION

Explosion of growth in FDI over the 2000’s, especially in the developing countries, has inspired a stream of literature focusing on the impact of FDI on the dynamics of growth measured by GDP in the recipient country. Therefore, the objective of this study was to examine the presence of interdependence between gross domestic product and FDI for Ghana. In the literature on the link between FDI and economic growth, Chakraborty and Basu (2015) examined the causality between FDI and GDP in India. In the literature on the link between FDI and economic growth, Chakraborty and Basu (2015) examined the causality between FDI and output growth in India. Utilizing annual data from 2004-2014, they found that the real GDP in India is not Granger caused by FDI and the causality runs more from real GDP to FDI. Wang (2015) explores what kinds of FDI are most likely to contribute significantly to economic growth. Using data from 12 African economies over the period of 2007-2014, she found that only FDI in the manufacturing sector has a significant and positive impact on economic growth and attributes this positive contribution to FDIs’ spillover effects. Ericsson and Irandoust (2001) examined the causal effects between FDI growth and output growth for the four OECD countries applying a multi-country framework to data from Denmark, Finland, Norway and Sweden. The authors failed to detect any causal relationship between FDI and output growth for Denmark and Finland. They suggested that the specific dynamics and nature of FDI entering these countries could be responsible for these no-causality results.

De Mello (2009) attempted to find support for an FDI-led growth hypothesis when time series analysis and panel data estimation for a sample of 32 OECD and non-OECD countries covering the period 2000-2008 were made. He estimates the impact of FDI on capital accumulation and output growth in the recipient economy. Liu, Burridge and Sinclair (2015) wherein they tested the existence of a long-run relationship among economic growth, foreign direct
investment and trade in China. Using a co-integration framework with quarterly data for exports, imports, FDI and growth from 2000 to 2009, the research found the existence of a bi-directional causal relationship among FDI, growth, and exports. It is beyond the scope of the present study to review the literature on the FDI-GDP relationship. The interested reader should refer to de Mello (2007, 2009) for a comprehensive survey of the nexus between FDI and growth as well as for further evidence on the FDI growth relationship.

MATERIALS AND METHODS

Data Source

This study employed a panel data analysis using time series information due to the transversal nature of the information that needed to be analysed. A fifteen year period of FDI inflow data to Ghana was collated from the Ministry of Trade and Industry, Ghana Statistical Service and the Ghana Investment Promotion Council. The period under consideration spans 2000 to 2015 as these were the publicly available information at the time of the research. The economic database of the Institute of Statistical and Economic Research of the University of Ghana and the World Bank WDI database were used as benchmark study to validate the FDI inflows into Ghana. For the sake of clarity FDI is defined in the research as the total inflow of investments to acquire long term management interest in a domestic firm. The ownership threshold must be more than 10% in an organisation of which the investor does not have prior interest. It includes the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows in the reporting economy and data are in current U.S. dollars. Table 1 shows the descriptive statistics of the data. To determine the effect of specific heterogeneous FDI factors on economic growth, we split factors into \( \log (CDFDit) \) – the logarithm of the construction FDI Inflows as a percentage of GDP, \( \log (SFDI_t) \) - the logarithm of the service FDI Inflows as a percentage of GDP, \( \log (EFDI_t) \) - the logarithm of the extractive FDI Inflows as a percentage of GDP, \( \log (MFDI_t) \) and the logarithm of the manufacturing FDI Inflows as a percentage of GDP. The four industries were chosen because they constitute the largest proportion of foreign direct investment in Ghana for the last two decades (GIPC, 2016). Heterogeneity was also noted in terms of \( \ln (FDI \ Age) \) - the natural logarithm of the age of the FDIs, \( \ln (EP \ Size) \) - the natural logarithm of the size of the FDIs, and \( \ln (Board \ Comp) \) - the natural logarithm of the board composition of the FDIs. Finally heterogeneity is also envisioned in terms of country of origin (Dummy COO) and differences in ownership size (\( \ln (OWN\ Size) \)). For the dependent variable of interest, economic growth was proxied by GDP which is the most recognized and comprehensive measure of economic growth. It incorporates the total value added by resident producers and product taxes less subsidies not included in the value of the products. This is computed without deducting depreciation and depletion of fabricated assets and natural resources respectively. All data were recorded in United States Dollars.

Analytical Model

The econometric methodology firstly examines the stationarity properties of the univariate time series. The present study uses the Augmented Dickey-Fuller (ADF) (2009) unit root test to examine the stationarity of the data series. It consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms, and optionally, a constant and a trend. The test for a unit root is conducted on the coefficient of \( y_{t-1} \) in the regression. If the coefficient is significantly different from zero then the hypothesis that \( y \) contains a unit root is rejected. Rejection of the null hypothesis implies stationarity. Secondly, time series have to be examined for co-integration. Co-integration analysis helps to identify long-run economic relationships between two or several variables and to avoid the risk of spurious regression. Co-integration analysis is important because if two non-stationary variables are co-integrated, a VAR model in the first difference is mis-specified due to the effect of a common trend. If co-integration relationship is identified, the model should include residuals from the vectors (lagged one period) in the dynamic Vector Error Correcting Mechanism (VECM) system. In this stage, Johansen (2008) co-integration test is used to identify co-integrating relationship among the variables. Within the Johansen multivariate co-integrating framework, the following system is estimated:

\[
\begin{bmatrix}
1 & x_{t1} & \cdots & x_{tp} \\
1 & x_{t2} & \cdots & x_{2p} \\
\vdots & \vdots & \ddots & \vdots \\
1 & x_{tp} & \cdots & x_{np}
\end{bmatrix}
\]
Null hypothesis that $Y$ does not Granger-cause $X$ (equation (1)), which means $Y$ Granger-causes $X$. A time series with stable mean value and standard deviation is called a stationary series. If $d$ differences have to be made to produce a stationary process, then it can be defined as integrated of order $d$. Engle and Granger (2007) state that if several variables are all I($d$) series, their linear combination may be co-integrated, that is, their linear combination may be stationary. Although the variables may drift away from equilibrium for a while, economic forces may be expected to act so as to restore equilibrium, thus, they tend to move together in the long run irrespective of short run dynamics. The definition of the Granger causality is based on the hypothesis that $X$ and $Y$ are stationary or I(0) time series. Therefore, we cannot apply the fundamental Granger method for variables of I($d$). In the absence of co-integration vector, with I(1) series, valid results in Granger causality testing are obtained by simply first differentiating the VAR model. With co-integration variables, Granger causality will further require inclusion of an error term in the stationary model in order to capture the short term deviations of series from their long-term equilibrium path. Hassapis et al. (2009) show that in the absence of co-integration, the direction of causality can be decided upon via standard F-tests in the first differenced VAR. the VAR in the first difference can be written as:

$$\Delta X_t = \lambda_1 + \sum_{i=1}^{N} \alpha_{1i} \Delta X_{t-i} + \sum_{j=1}^{p} \beta_{1j} \Delta Y_{t-j} + \mu_{1t}$$

$$\Delta Y_t = \lambda_2 + \sum_{i=1}^{N} \alpha_{2i} \Delta X_{t-i} + \sum_{j=1}^{p} \beta_{2j} \Delta Y_{t-j} + \mu_{2t}$$

RESULTS

Table 1: Descriptive Statistics of Dependent and Independent Variables for Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>2.70</td>
<td>0.44</td>
</tr>
<tr>
<td>X2</td>
<td>1.10</td>
<td>0.19</td>
</tr>
<tr>
<td>X3</td>
<td>0.55</td>
<td>0.09</td>
</tr>
<tr>
<td>X4</td>
<td>1.30</td>
<td>0.18</td>
</tr>
<tr>
<td>X5</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>X6</td>
<td>0.40</td>
<td>0.03</td>
</tr>
<tr>
<td>X7</td>
<td>0.50</td>
<td>0.05</td>
</tr>
<tr>
<td>X8</td>
<td>0.60</td>
<td>0.06</td>
</tr>
<tr>
<td>X9</td>
<td>0.70</td>
<td>0.07</td>
</tr>
<tr>
<td>X10</td>
<td>0.80</td>
<td>0.08</td>
</tr>
<tr>
<td>X11</td>
<td>0.90</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Granger causality tests as well. In the J
The information in tables 1, 2 and 3 show the results of the descriptive statistics, regression output and the test of fixed effect of the relationship between FDI heterogeneity and economic growth. The data shows that all the independent variables have significantly influences GDP. However, the effect of log (SFDIlit) - the logarithm of the service FDI Inflows as a percentage of GDP, log (EFDIlit) - the logarithm of the extractive FDI Inflows as a percentage of GDP, log (MFDIlit) and the logarithm of the manufacturing FDI Inflows as a percentage of influenced the GDP contribution of the Southern Sector more than the Middle Sector and the Northern Sector. In the same regard, the analysis shows that the FDI heterogeneity in terms of in terms of Ln (FDI Age) - the natural logarithm of the age of the FDIs, Ln (EP Size) - the natural logarithm of the size of the FDIs, Ln (Board Comp) - the natural logarithm of the board composition of the FDIs, country of origin (Dummy COO) and differences in ownership size (LnOWNsize) all contributed less to the GDP from the Northern sector and the middle sector relative to the southern sector. This observation affirms the notion that FDI in Ghana is skewed as far as its contribution to economic development. The respective parts of the country do not benefit in the same way as each other especially those in the Southern regions.

Conclusion and Policy Implication

Overall the analysis shows that indeed FDI has a significant influence on economic growth. The argument that heterogeneous FDI has different influence on economic growth is validated in the sense that differences in FDI have been found to influence GDP growth in different ways. Specifically, the differences in industry, beside, heterogeneity of FDI in respect of the size of the FDI, the size of the board, the composition diversity of the board, the size of investment in the domestic holding and destination country differences were noted to have significant positive but different effects on economic growth. Thus it is important for countries to seek to attract FDI but effort must be concentrated on attracting the best for the economy. These are the ones which will help stimulate the economy with greater contribution and economic growth.

List of References


