Foreign Direct Investment Inflows and Economic Growth in Ghana

by
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Abstract. There exists mixed empirical evidence on the size of gains from Foreign Direct Investment (FDI) inflows for the economies of different countries. The paper thus investigated the relationship between economic growth and FDI inflows in a dynamic framework. A study of this sort would inform policy on the role of lagged, coincident and leading effects of FDI on economic growth. An Engle-Granger two-step methodology for error correction was employed. The major empirical and methodological contribution of this study is the use of Dynamic Ordinary Least Squares (DOLS) technique. Dynamic OLS becomes better than OLS by coping with small sample sources of bias. The elasticity of economic growth with respect to FDI had a positive sign and also significant at the 1% level. However, the effect of a three (3) year lag of FDI on economic growth had a negative sign and significant at the 5% level. Policy makers should thus not concentrate on current macroeconomic inflows of FDI but consider effects of past FDI inflows on current levels of economic growth.

Keywords: Dynamic ordinary least squares, error correction, leads and lags, inflation.
JEL Classification: F20, F21, O11.

1 Introduction

A major component of capital flow for emerging developing economies is Foreign Direct Investment (FDI). There is however an argument on its contribution towards economic growth. As noted by Musila and Sigüé (2006) most researchers agree that the benefits of FDI outweigh its cost to the particular economies. Carkovic and Levine (2002) find that FDI does not induce economic growth independently. The contribution of FDI to growth is affected by microeconomic conditions of the country as well as the host country’s specific competitive advantage and its business environment. There exists scores of studies on the relationship between FDI inflows and economic growth. A plethora of studies also exist on the direction of causality between FDI and economic growth. Others have investigated it as nexus because of criticisms of a uni-directional causal relationship. As noted by Asafu-Adjaye (2005), the distrust of foreign direct investment (FDI) in the 1960s and early 1970s waned very fast and developing country governments have now come to embrace it recently. He noted that the growing interest in FDI is not only a result of globalization but also a consequence of the steady decline in official development assistance. A major source of capital for developing countries is FDI. Economic theory postulates that, international capital inflows, inter alia, promote efficient allocation of resources, which in turn enhances economic growth. It may therefore be regarded as a catalyst for technology transfer from the developed to developing countries.

The vast literature on FDI, and the empirical evidence on the size of the gains from FDI provides mixed outcomes for different countries. Some of these studies have found that FDI, or FDI in combination with other factors, has a positive effect on economic growth. On the other hand, some studies have found no significant effects of FDI and economic growth while a few studies have found that FDI could even have an adverse effect on economic growth. According to the World Investment Report (2012), there has been huge inflows of FDI into Ghana in recent times following the discovery of oil. Among the top five in Africa, Ghana, Nigeria and South Africa pooled above USD 3 billion. Out of the five countries Ghana ranked third followed by Congo and Algeria. The report further has it that major recipients of FDI are the new and emerging oil- and gas-
producing countries. The two principal recipients of FDI in sub-Saharan Africa are the dominant oil producer countries, Angola and Nigeria. Nigeria was Africa’s largest recipient of FDI flows ($8.92 billion) in 2011, accounting for over one fifth of all flows to the continent. In gross terms, Angola attracted FDI inflows worth $10.5 billion, although in net terms, divestments and repatriated income left its inflows at negative $5.59 billion. Aside from these major oil-producing countries, investors are looking farther afield in search of oil and gas reserves. Ghana, in particular, benefited from FDI in the newly developed Jubilee oil field, where commercial production started in December 2010.

The major empirical and methodological contribution of this study is the use of Dynamic Ordinary Least Squares (DOLS) proposed by Stock and Watson (1993). Dynamic OLS becomes better than OLS by coping with small sample and energetic sources of bias. Up to now, few or no evidence of works on the effects of FDI on growth have used the dynamic ordinary least squares (DOLS). The rest of the paper is organized as follows: Next is a review of relevant literature in section 2. This is followed by section 3 as the methodology and the econometric model used for the estimation. Section 4 is the presentation of findings of the study. The conclusion and policy relevance is presented in section 5.

2 Literature review

Most of the empirical works on the FDI-economic growth relationship have the Neoclassical models as their basis. Chowdhury and Mavrotas (2005) identified four main channels through which this relationship has been studied. These channels are the determinants of growth, determinants of FDI, the role of multinational firms in host countries, and finally the direction of causality between the two variables. Foreign investment can facilitate the transfer of technological know-how to recipient countries. Spillover effects from these transfers may have substantial benefits for the entire economy (Romer, 1993). Rappaport (2000) notes that foreign investment may boost the productivity of all firms -- not just those receiving foreign capital. On the contrary some theories predict that distortions due to FDI pre-existing trade, price, financial, and others will lead to inefficient resource allocation and slow growth (Brecher and Díaz-Alejandro, 1977; Brecher, 1983; Boyd and Smith, 1992). These ambiguous predictions about the growth effects of FDI suggest that FDI will only promote growth under certain policy conditions. However, cross-section macroeconomic studies using aggregate FDI flows generally suggest a positive role for FDI in generating economic growth especially in particular environments (De Gregorio, 1992). Following Borensztein et al. (1998), FDI has a positive growth-effect when the country has a highly educated workforce. They believe that the educated workforce fosters the exploitation of FDI spillovers. Meanwhile, Blomstrom et al. (1992) in their study found no evidence that education is critical. They argued further that FDI has a positive growth-effect when the country is sufficiently rich. Investigating the effects of financial markets, Alfaro et al. (2004) found that sufficiently developed financial markets facilitate the role of FDI spillovers. To add, Balasubramanyam et al., (1999) were of the opinion that trade openness is important for the growth-effects of FDI to manifest. Cross-sectional analyses aid to identify the factors that can act as catalysts for the effects of technological as well as productive spillovers at a disaggregated sector level. They show that the FDI effects on growth of GDP and global productivity of factors depends on higher absorption capacities in the host country. Crespo and Fontoura (2006) have noted that the preconditions for incorporating the benefits of FDI externalities rest on the absorptive capacities of domestic firms and receiving economies. With this, they asserted that FDI impact can be non-significant, negative or positive according to the economic, institutional and technological circumstances of the host country. They argued further that the degree of diversification of the host economy is a crucial dimension of the absorptive capacities. As mentioned earlier, a number of studies have
reported a positive and statistically significant relationship between FDI and economic growth (Schneider and Frey, 1985). On the other hand, national level studies also found that FDI effects on growth are not necessarily positive, (Balasubramanyam, et al. 1999, Borensztein, et al. 1998 and Carkovic and Levine, 2002). Appraising this relationship, Durham (2004) notes that the influence of FDI on growth is contingent on additional factors within the FDI-receiving economy. Among the host country factors are the initial level of development, existing stock of human capital and trade policy regime (Blomstrom et al. 1992, Borensztein et al. 1998, Balasubramanyam et al. 1999).

Aitken and Harris on’s (1999) carried out Firm-level studies of particular countries and found that FDI does not boost economic growth. They asserted that these studies frequently do not find positive technology spillovers running from foreign-owned to domestic-owned firms. Similarly, there are studies that do not lend much support to the view that FDI accelerates overall economic growth (Mansfield and Romeo, 1980).

Adeniyi et al. (2012) examined the causal linkage between foreign direct investment (FDI) and economic growth in selected West African countries with financial development. They employed a trivariate framework which applies Granger causality tests in a vector error correction (VEC) setting. They found that the extent of financial sophistication matters for the benefits of foreign direct investment to register on economic growth.

In a recent study Sackey et al. (2012) investigated the effect of FDI on economic growth in Ghana and tested for the presence of the long-run linear relationship between FDI inflows and Economic Growth for Ghana. The study employed Vector Auto Regression (VAR) and Johansen Co-integration test. Their findings reveal a long run relationship between the variables. They further concluded that there existed a positive relationship between FDI and economic growth. Examining causality between FDI and economic growth for the Ghanaian economy, Frimpong and Oteng-Abayie (2006) employed a bivariate framework for their study. Their study provided different results for different sample periods. It was revealed that there is no causality between FDI and growth for the total sample period and the pre-SAP period. However a unidirectional relationship runs from FDI to GDP growth during the post-SAP period.

3 Methodology and theoretical framework

The model proposed for this study is based on the assumption that Foreign Direct Investment (FDI) inflows and factor accumulation will impact on economic growth. The generic model is thus formulated as:

\[ GDP_t = f(FDI_t) \]  

Using a log-log specification to analyze the elasticity, the model is specified as:

\[ \ln GDP_t = \alpha_0 + \alpha_1 \ln FDI_t + u_t \]  

The functional form of the DOLS model is presented in equation (2). As noted earlier, the DOLS estimates have better small sample properties and provide superior approximation to normal distribution. The Stock-Watson’s DOLS model specified as follows

\[ Y_t = \beta_0 + \tilde{\beta} X_t + \sum_{j=-q}^{q} \tilde{\alpha} \Delta X_{t-j} + u_t \]  

where \( Y_t \) dependent variable, \( X_t \) matrix of explanatory variables, \( \tilde{\beta} \) is a cointegrating vector; i.e., representing the long-run cumulative multipliers or, alternatively, the long-run effect of a change in \( X \) on \( Y \). \( p \) is lag length \( q \) is lead length. The Lag and lead terms included in DOLS regression have the purpose of making its stochastic error term independent of all past innovations in stochastic regressors. Finally, unit root tests are performed on the residuals of the estimated DOLS regression, in order to test whether it is a spurious regression.
is specified as follows:

\[ \ln GDP_t = \alpha_0 + \alpha_1 \Delta \ln FDI_t + \sum_{i=1}^l \delta_i \Delta \ln FDI_{t-i} + u_t \]  \hspace{1cm} (4)

In the models above, variables are in natural logarithm where \( \ln GDP_t \) is gross domestic product and \( \ln FDI_t \) is foreign direct investment. The optimal lag structure was determined using information criteria based on Akaike and Schwarz criterion through an unrestricted VAR estimation. The data used for the study covers the period 1980 to 2010. FDI is measured as Net FDI Inflows in Constant U.S. dollars. GDP is also measured in constant U.S. dollars. Both series are obtained from World Development Indicators (WDI), 2011.

4 Empirical findings

4.1 Characteristics of the variables used in the model

Tests for stationary of the variables are performed using the ADF, Philips-Perron and the KPSS. The order of integration of the series are I(1). These are summarized in table 1.

Table 1. Results of Stationarity Tests with and without Trend

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Variable</td>
<td>Constant +Trend</td>
</tr>
<tr>
<td>ADF test</td>
<td>lnGDP</td>
<td>1.028863</td>
</tr>
<tr>
<td></td>
<td>lnFDI</td>
<td>-0.203538</td>
</tr>
<tr>
<td>Phillips-Perron test</td>
<td>lnGDP</td>
<td>0.828759</td>
</tr>
<tr>
<td></td>
<td>lnFDI</td>
<td>0.571288*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.638315*</td>
</tr>
</tbody>
</table>

Source: Author’s construct.

ADF and PP: Null hypothesis is that the variable being examined is non-stationary.
KPSS: Null hypothesis is that the variable being examined is stationary.
** and * denotes statistical significance at 1% and 5% levels, respectively.

4.2 Cointegration and Error Correction estimation

The trace test statistic from the Johansen approach indicated one cointegrating equation at 5% level. An error correction model that possessed both long-run and short-run equilibrium characteristics was formulated. A model that contains both long-run and short-run characteristics is a good time series model. The speed of adjustment for the error correction term was as low as 3% but had the required sign for dynamic stability.

4.3 Dynamic ordinary least squares estimation

The maximum lag length for DOLS model is based on the unrestricted VAR estimation using the Akaike Information Criteria (AIC) and the Schwarz Bayesian Criteria (SBC). It is observed that the minimum lag length is 5. This is presented in table 2.
Table 3. DOLS Estimation Results based on Equation

<table>
<thead>
<tr>
<th>Dependent Variable: lnGDP</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>20.239***</td>
<td>52.897</td>
</tr>
<tr>
<td>(0.383)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnFDI</td>
<td>0.128***</td>
<td>6.03</td>
</tr>
<tr>
<td>(0.021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnFDIt+1</td>
<td>0.194***</td>
<td>4.54</td>
</tr>
<tr>
<td>(0.043)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnFDIt+2</td>
<td>0.099</td>
<td>2.197</td>
</tr>
<tr>
<td>(0.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnFDIt+3</td>
<td>-0.074</td>
<td>-1.938</td>
</tr>
<tr>
<td>(0.038)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adjusted $R^2 = 0.69$,  
$DW = 1.96$  
$AIC = -1.167$  
$SIC = -0.719$  
Cusum test (see appendix)  
Cusum of Squares (see appendix)  
Source: Author’s construct

The results indicate that lagging, leading and coincident effects of FDI on economic growth are present. In the discussion, the coincident elasticity of economic growth with respect to FDI had a value of 13%. Supporting some existing studies, the coefficient had a positive sign and also significant at the 1% level. This presupposes that increases in FDI inflows will lead to increases in economic growth and vice versa. Of significant interest is the effect of a three (3) year lag of FDI on economic growth. This elasticity had a negative sign of 7% and significant at the 5% level. Therefore, past increases in FDI would lead to declines in current rate of economic growth. These results are shown in table 3.

1 Only statistically significant coefficients are reported.
in the short run. The results are consistent with most of the earlier empirical findings. There exists a positive relationship between economic growth and FDI. However, lagged values of FDI have inverse relationship with economic growth. Policy makers should thus not concentrate on current macroeconomic inflows of FDI but consider effects of past FDI inflows on current levels of economic growth.

References


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Appendices

Appendix 1: Cusum cumulative histogram

The straight lines represent critical bounds at 5% significance level.

Author description

Baba Insah obtained both first degree and master degree in economics from the Kwame Nkrumah University of Science and Technology, Ghana, West Africa. At the Bachelors, he obtained a First Class Honours. As part of a collaborative Ph. D. programme between the African Economic Research Consortium (AERC) and the University of Ibadan, he specialized in development economics and environmental economics at the Joint Facility for Electives. He also presented his proposal and post-field reports at separate occasions at international conferences organized by AERC. In 2012 he was awarded a Ph. D in Economics by the university of Ibadan. His field of specialization is public sector macroeconomics. His research field is fiscal sustainability and economic modeling. His publications have covered fiscal policy, money demand, seigniorage and climate change. Currently, he is the Dean of the School of Business, Wa Polytecnic, Ghana, West Africa.