Foreign Direct Investment (FDI) and Economic Growth in East African Countries

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Abstract
This paper investigates the Impact of Foreign Direct Investment (FDI) on Economic Growth of East African Countries. We apply Fully Modified Ordinary Least Square (FMOLS) technique for the data from 4 East African Community Member Countries (Kenya, Rwanda, Uganda and United Republic of Tanzania) covering the period 1990 to 2015 to examine the long term coefficients after confirmation the existence of panel cointegration. We find foreign direct investment (FDI) accelerates positive impact on economic growth in most of east African countries with significant results at 10 percent level of significance. We suggest that the East African countries region should remain their economies open to attract more potential investors to invest in sectors that promote the economy in order to achieve the desired objectives.

Keywords: Foreign Direct Investment, Economic growth, FMOLS, East African countries.

1. Introduction
One of the most important reasons for the East African countries (Tanzania, Kenya, Uganda, Rwanda and Burundi) to emphasize on promoting and attracting FDI inflow is helping the sustainability and increasing the speed of their economic growth. This in turns will improve the living standard of the people, decreasing unemployment rate and speedup the rate of economic integrations with other nations. This is because FDI plays an important role in improving and strengthening the ability of the recipient countries to take an action on the opportunities provided by international economic integration, which is recognized as one of the principal aim of any development strategies (Cho, 2003). FDI gives firm cheaper production facilities, intensive skills, access to new technology, creation of new market and market channels. It also increases innovation and financing new methods of production. It bridges the gap between investment requirements and domestic resource availability (UNCTAD, 2013). Recipients’ countries benefit from FDI through technological transfer, governing investment in enterprises, growing liberalization of the national regulatory framework and changes in financial markets (Sharma, 2012).

FDI has grown at the highest rate from the earliest of 1980s, and the global market for FDI has become more competitive. African countries happen to be the most striking regions to foreign investments because they encourage investors by offering tax incentives, infrastructures, subsidies and import duties with a range of created facilities.

Munda (2013) shows that, the inflow of FDI in East African countries are comparatively lower than the inflows into other African regions. UN (2010) verifies this statement by showing that Southern African countries maintain the highest rate of FDI which constitute 31 billion of USD. South Africa and Angola have much contribution in this share, followed by West Africa countries (USD 26 billion). On the other hand, North African countries have contributed USD 24 billion share of FDI, while East African countries have only 6 billion USD of FDI inflows.

However, in recent years, there have been significant changes in the FDI in East Africa due to discovery of energy resources such as oil fields in Uganda and mineral resources of gas in the United Republic of Tanzania. This situation has led into a high number of foreign investors to operate their investment in different parts of the East African region. As a result, the inflow of FDI into this region increases from USD 4.5 billion to USD 6.3 billion (40 percent increase) in 2012 (UNCTAD, 2013).

In this study, we apply the Fully Modified Ordinary Least Square (FMOLS) technique on the data from 4 East African Countries (Kenya, Rwanda, Uganda and United Republic of Tanzania), covering the period 1990 to 2015, to examine the impact of FDI on economic growth. Our results indicate that FDI contribute positively to growth in the East African counties. The implication of our results is that FDI can be used as an important tool for promoting economic growth in developing countries, especially in East African countries.

The rest of the paper is organized as follows: the second section examines the review of literature on FDI-growth linkage; the third section describes the methodology; and the fourth section discusses the empirical results and discussion. Finally, the paper provides summary and concluding remarks of the study.

2. Literatures Review
The disparity of the FDI inflow and the differences in economic growth among developing countries have led most economists to be more interested in this field of study. There is vast empirical literature on the impact of FDI on economic growth, However, there have been mixed results; some scholars come up with empirical evidence...
suggest that, FDI promotes economic growth. Despite their evidences, recent studies have shown that there are numerous theoretical arguments that analyze the reasons for developing countries not to have benefited from the impact of FDI. Krugman (21) cited in A. Sukar, et al (2007) assert that the shift in enterprise management from local to foreign company is not helpful to the recipient countries; this is due to adverse selection problem which may yield to less productivity.

Borensztein et al (1998) estimate the impact of FDI on economic growth, employing sample data of sixty-nine developing countries; observe that FDI has a positive relationship with a real per capital growth. Moreover, they argue that FDI contributes more shares to economic growth than domestic investments. The higher productivity of FDI is achieved only when the levels of human capital take into consideration. This has led the scholars to conclude that the host countries with the highest level of educated workforces can lead to higher effect of FDI on the economic growth. Additionally, it can be noted that FDI can play significant role in promoting economic growth only when there is sufficient human capital.

Other economists argue that the high productivity of FDI to growth is achieved by not only human capital but also infrastructural developments. Hermes and Lensink (2003) point out that the positive impact of FDI on economic growth is achieved through the development of the financial system of the host country. These scholars argue that the domestic financial market enhances the proper resource allocation which improves the absorptive capacity of a country to attract FDI. They further commend that the interaction of FDI and domestic financial market have positive and statistically significant relationship with economic growth. These results strongly suggest that FDI can boost economic growth in a situation where there is a development of domestic financial markets.

Kojrajjaras (2010) introduces an idea that FDI might contribute economic growth through technological transfer, which depends directly on the economic condition of the recipient countries. He analyses how human capital, trade openness and infrastructural development in FDI zones can contribute to a positive impact on economic growth. Kojrajjaras (2010) reveals that, positive impact of FDI on the economic growth will only be attained if the countries have a conducive political and economic environment. Moreover, other studies provide the support of the argument by maintaining the outcomes of inappropriate environment such as political instability; reduce the willingness of foreign corporations to invest directly in a particular economy.

Adewumi (2003) estimates the impact of FDI on the economic growth in the developing countries. He states that most African countries have inadequate resources to finance long-term investment which is the main hindrance towards the achievement of the Millennium Development Goals (MDGs). Therefore, the financial resource is the major driving force in promoting FDI in a country.

Mangir et al (2012) conclude that, most developing countries do not have adequate resources to establish investment due to lower levels of saving as a consequence of low national income. Hence, FDI bridges the gap between investment requirements and domestic resources available in the host countries (UNCTAD, 2013). Alfaro (2013) examines the relationship between FDI and economic growth, by observing the major role played by FDI inflows in promoting growth across different sectors of the economy, including manufacturing and services sectors. He notes that there is a disparity in the impact of FDI into various sectors of the economy, which shows in the following trend: FDI inflow into primary sectors tends to have a negative effect on growth, meanwhile the flow of FDI towards manufacturing sectors leads positive growth rate. However, the impact of FDI particularly in services sectors is ambiguous. He further argues that not every form of FDI development is beneficial to the recipient countries.

Sukar et al (2007) using panel data over the period of 24 years (1975-1999), in Sub-Sahara Africa, they conclude that FDI has a significant and positive impact on economic growth. In addition, similar conclusions were drawn by Tiwari and Mutascu (2011), based on a nonlinear regression model have found that FDI and exports show the positive effects on the process of economic growth, there study analyses FDI and exports on the economic performance in Asian countries. They further argue that FDI inflow, labor and capital are the main determinants of economic growth. Adofu and Ilemona (2009) indicate that FDI has significant impact on growth rate in the Nigerian economy. They conclude that FDI performs a significant contribution in accelerating the economic growth. However, the findings of their study are statistically insignificant.

3. Methodology
3.1 Theoretical Methodology;
Referring to previous related studies, Akinlo (2004) uses the production function below to examine the relationship between FDI and economic growth. Similarly, Ayanwale (2007) uses the same model to find out the impact of FDI on growth in Nigeria. The modified production function is written as:

\[ Y_t = A_t K_t^a L_t^{1-a} \]  \hspace{1cm} (1)

Where \( Y \) is the flow of output, \( A \) is the total factor productivity which captures growth resulting from other factors not included in the model includes \( FDI \); \( L \) is the labour while \( K \) is the capital. Therefore we substitute total factor productivity from equation (1) above with FDI which is an input in economic growth and is written as;
Convert all variables into logarithmic forms, which give more clearly in interpretation of the coefficients in term of percentage change, the growth equation (2) will be:

$$\log (GDP_t) = \alpha \log (FDI_{it}) + \beta_2 \log (K_{it}) + \beta_3 \log (LAB_t)$$

(3)

Where by GDP which proxy as a real GDP, FDI stands as Foreign Direct Investment which proxy as Foreign direct Investment inflows to GDP ratio, K stands as Gross Fixed Capital Formation to GDP ratio, LAB stands as Labour Force to GDP ratio; t and i are used to index time series and countries respectively, $\alpha$, $\beta_2$, $\beta_3$ represent the elasticity of output of FDI, K and LAB respectively.

3.2 Empirical Methodology

To estimate Fully Modified OLS (FMOLS) estimator, panel Cointegration technique is used, which consists of the following steps:-

3.2.1 Panel Unit Root

The data are collected over a large span of time it is possible that a unit root problem would exist; therefore the stationary of the time series should be tested by using panel unit root test in order to adjust the difference in mean and variance within the variables. If this test shows significant value, “it means that the variable series is stationary and does not has a unit root test, so the null hypothesis will be rejected but alternative hypothesis will be accepted, But if the stationary test is not significant, it means that the variable series is non-stationary and has a unit root problem” (Shaari et al, 2012). In order to detect the unit root problem in panel data, various techniques applied like Hadri’s (2000), Levin, Lin and Chu (LLC) (2002), and I'm, Pesaran and Shin (IPS) (2003). Furthermore, the Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests are frequently used in testing the unit root. LLC and IPS tests are extensions of the ADF within the panel perspective. Therefore, this study employed two tests, namely I'm, Pesaran and Shin (2004) and ADF. Hence, the unit root tests can be formulated as follows:

$$\Delta Y_{it} = \alpha Y_{it-1} + \sum_{j=1}^{p_i} \beta_j \Delta Y_{it-j} + D_{it} \sigma_i + \epsilon_{it} \quad i = 1,\ldots,N; \ t = 1,\ldots,T$$

3.2.2 Panel Co-integration

Panel cointegration will be applied once after checking and confirming the stationarity of all variables that are integrated at the same order. This technique used to determine the long run and the equilibrium relationship between the variables. When two variables move together over time technically meaning that there is a long run relationship. The different empirical studies have been undertaken while applying this test when there is a long run relationship between the non-stationary variables when are cointergrated at order 1.

We employed the Padroni panel co-integration test (1999), this test is an extension of Engle-Granger (1987) in the context of panel data. Padroni introduced seven co-integration tests which are categorized into two dimensions which are: within dimension based statistics, referred to as co-integration statistics containing four test panels: v-statistics, panel p-statistics, panel t-statistics (non-parametric) and panel t-statistics (parametric). The other is between- dimension based statistics, which are referred to as group mean panel co-integration statistics. The tests are divided into three: group p- statistics, group t-statistics (non -parametric) and group t-statistics (parametric). The test is defined as follows:

1. Panel v statistic:

$$Z_F = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1}$$

2. The panel t statistic:

$$Z_P = \left( \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \left( \hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_1 \right)$$

3. The panel t statistic (Non-parametric):

$$Z_i = \frac{1}{\sigma_{N,T}^2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \left( \hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_1 \right)$$

4. The panel t statistic (parametric):

$$Z_i = \left( \frac{1}{\sigma_{N,T}^2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \left( \hat{e}_{i,t-1} \Delta \hat{e}_{i,t}^* \right)$$

$$Z_i^{*2} = \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \left( \hat{e}_{i,t-1} \Delta \hat{e}_{i,t}^* \right)$$
5. The group t statistic (parametric):

\[ \bar{Z}_p \equiv TN^{-1/2} \sum_{i=1}^{N} \left( \sum_{t=1}^{T} \hat{\epsilon}_{it}^2 \right)^{-1/2} \sum_{t=1}^{T} \left( \hat{\epsilon}_{it,1} \Delta \hat{e}_{it} - \hat{\lambda}_i \right) \]

6. The group t statistic (non-parametric):

\[ \bar{Z}_i \equiv N^{-1/2} \sum_{i=1}^{N} \left( \sum_{t=1}^{T} \hat{\sigma}_i \hat{\sigma}_{ij} \right)^{-1/2} \sum_{t=1}^{T} \left( \hat{\epsilon}_{it,1} \Delta \hat{e}_{it} - \hat{\lambda}_i \right) \]

7. The group t statistic (parametric):

\[ \bar{Z}_i^* \equiv N^{-1/2} \sum_{i=1}^{N} \left( \sum_{t=1}^{T} S_i \hat{\epsilon}_{it,1}^2 \right)^{-1/2} \sum_{t=1}^{T} \left( \hat{\epsilon}_{it,1} \Delta \hat{e}_{it}^* \right) \]

Where \( \hat{\lambda}_i \) is a consistent estimator of the long run variance?

\[ L_{11}^2 = \frac{1}{T} \sum_{t=1}^{T} \eta_{i,t}^2 + \frac{2}{T} \sum_{t=1}^{T} \left( 1 - \frac{S_i}{K_i + 1} \right) \sum_{i=1}^{N} \hat{\eta}_{j,t}, \eta_{j,t}^2, \sigma_l = S_i + 2 \hat{\lambda}_i, \sigma_l = 1 \sum_{i=1}^{N} \hat{\eta}_{j,t}, \sigma_l^2 = 1 \sum_{i=1}^{N} L_{11}^2 \sigma_l \]

\[ S_i = \frac{1}{T} \sum_{t=1}^{T} \eta_{i,t}^2 S_{N,T} = \frac{1}{N} \sum_{i=1}^{N} S_i^2 \]

And the residuals \( \eta_{i,t}^*, \eta_{j,t}^* \) and \( \eta_{1,t}^* \) are obtained from the following regression:

\[ e_{i,t} = \gamma_{i,t} e_{i,t-1} + \eta_{i,t}^*, e_{i,t} \gamma_{i,t} e_{i,t-1} + \sum_{k=1}^{b_1} \gamma_{i,k} \Delta e_{i,t-k} + \eta_{i,t}^*, \Delta y_{1,t} = \sum_{M=1}^{b_1} \Delta x_{m,t} + \eta_{1,t}^* \]

Therefore, if residuals are non-stationary, there is no co-integration among the series. While, when the residuals are stationary, there is co-integration.

### 3.2.3 Fully modified OLS (FMOLS) estimator

Given that, there is panel co-integration between the results, the long run relationship can further be estimated using panel co-integration estimation namely Ordinary Least Square, Fully modified OLS (FMOLS) estimator. The fully modified OLS was developed by Phillips and Hansen in 1990. The FMOLS estimator not only generates consistent estimates of the parameters in small samples but also is control for endogeneity of the regressors and serial correlation and provides a check for robustness of the results. Further, The FMOLS method has an advantage over the Engle-Granger (EG) techniques to addresses the problem of simultaneity biases.

### 4. Empirical Results

#### 4.1 Panel Unit Root Test

The results of panel unit root test (ADF and IPS tests) are shown in table 1 and 2 below, which indicate all variables fail to reject the null hypothesis of unit root at level. However, after taking first difference we are able to reject the null hypothesis of unit root. Therefore, the results strongly indicate that all variables are stationary at first difference.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Constant</th>
<th>Constant with linear Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF Test</td>
<td>IPS Test</td>
</tr>
<tr>
<td></td>
<td>t-Statistic</td>
<td>Probability</td>
</tr>
<tr>
<td>LFDI</td>
<td>11.5857</td>
<td>0.1707</td>
</tr>
<tr>
<td>LGDP</td>
<td>0.58072</td>
<td>0.9998</td>
</tr>
<tr>
<td>LK</td>
<td>2.86477</td>
<td>0.9426</td>
</tr>
<tr>
<td>LLAB</td>
<td>0.81988</td>
<td>0.9992</td>
</tr>
</tbody>
</table>

**Source:** Author computation from collected Data (2017)
Table 2. Unit root results (First difference)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ADF Test</th>
<th>IPS Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Constant with linear Trend</td>
</tr>
<tr>
<td>t-Statistic</td>
<td>Probability</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>LFDI</td>
<td>32.5216</td>
<td>0.0001</td>
</tr>
<tr>
<td>LGDP</td>
<td>283.716</td>
<td>0.0000</td>
</tr>
<tr>
<td>LK</td>
<td>54.8001</td>
<td>0.0000</td>
</tr>
<tr>
<td>LLAB</td>
<td>41.1731</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Author computation from collected Data (2017)

4.2 Panel Cointegration Test
After detecting that all series are I(1), this study applied Pedroni co-integration to test the existence of long-run relationship among the integrated variables with both a time series dimension, T, and a cross section dimension, N. Constant and constant with trend employ four panel statistics and three group statistics to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration.

Table 3 shows the panel cointegration test both within and group statistics for cointegration between the variables. The results rejects the null hypothesis of no cointegration in Panel v-statistic, Panel PP-Statistic, Panel ADF statistic, Group PP statistic, Group ADF statistic, at both 5 and 10 percent level of significance. Subsequently there is significance in most of panel and group panel; it is satisfactory evidence to say that variables in growth model are cointegrated with each other.

Table 3: Pedroni Panel cointegration results
Panel cointegration test
Dependent Variable = LGDP
Independent Variables = LFDI LK LLAB

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Constant</th>
<th>Constant with trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel v-Statistic</td>
<td>6.858242</td>
<td>6.381564</td>
</tr>
<tr>
<td>(0.0000)**</td>
<td>(0.0000)**</td>
<td></td>
</tr>
<tr>
<td>Panel rho-Statistic</td>
<td>-0.020175</td>
<td>0.24484</td>
</tr>
<tr>
<td>(0.4920)</td>
<td>(0.59670)</td>
<td></td>
</tr>
<tr>
<td>Panel PP-Statistic</td>
<td>-3.965956</td>
<td>-2.198101</td>
</tr>
<tr>
<td>(0.0000)**</td>
<td>(0.0140)**</td>
<td></td>
</tr>
<tr>
<td>Panel ADF-Statistic</td>
<td>-1.132664</td>
<td>-3.07334</td>
</tr>
<tr>
<td>(0.1287)</td>
<td>(0.0011)**</td>
<td></td>
</tr>
<tr>
<td>Group rho-Statistic</td>
<td>1.058999</td>
<td>2.408355</td>
</tr>
<tr>
<td>(0.8552)</td>
<td>(0.992)</td>
<td></td>
</tr>
<tr>
<td>Group PP-Statistic</td>
<td>-5.506441</td>
<td>1.412863</td>
</tr>
<tr>
<td>(0.0000)**</td>
<td>(0.9212)</td>
<td></td>
</tr>
<tr>
<td>Group ADF-Statistic</td>
<td>-1.529712</td>
<td>-0.019418</td>
</tr>
<tr>
<td>(0.0630)*</td>
<td>(0.4923)</td>
<td></td>
</tr>
</tbody>
</table>

Note:* and** represent statistical significance at 10% and 5% respectively.

4.3 Full Modified OLS Results
Table 4 presents the results of FDI and economic growth model for the EAC countries based on FMOLS estimator. The estimation requires the inclusion of leads and lags in order to avoid the autocorrelation problem and to capture the endogeneity of the independent variables. The results revealed that foreign direct investment (FDI) accelerates positive impact on economic growth in most of East African countries with significant statistical at 10 percent.

This result is consistent with Okizilkaya et al. (2016) who employed the same estimation method and found evidence that FDI is associated positively with economic growth. The significant FDI confirm that FDI can be used as a tool for achieving the middle income economy, which related with international economic growth strategies in developing countries. In contrast, our results oppose Yan and Majagaiya (2010) who failed to find satisfactory evidence association between FDI and economic growth.

In addition, the result also shows that capital formation and economic growth are positively related with each other. This implies that an increase in capital stock will increase the economic performance of the region. This finding is supported by Suleiman and Suleiman (2017) who found that capital formation have significant effect on economic growth. However, labour force has a negative impact on economic growth in East African Countries.
Table 4: FMOLS estimates of the long run effect of FDI on economic growth for EAC Countries

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LK</td>
<td>0.212932</td>
<td>2.871140</td>
<td>0.0051*</td>
</tr>
<tr>
<td>LLAB</td>
<td>-1.542338</td>
<td>-13.07941</td>
<td>0.0000*</td>
</tr>
<tr>
<td>LFDI</td>
<td>0.032664</td>
<td>1.717785</td>
<td>0.0892**</td>
</tr>
</tbody>
</table>

Note: * and ** reject the null of no cointegration at 5% and 10% level respectively.

Source: Author computation

5. Conclusion

In this study, we examine the impact of FDI on economic growth in East African countries. We apply Fully Modified Ordinary Least Square (FMOLS) technique for the data from 4 East African Countries (Kenya, Rwanda, Uganda and United Republic of Tanzania) covering the period 1990 to 2015. We first employ unit root test to check the stationarity of the time series. Then, we employ Padroni panel co-integration test to check the existence of long run relationship between variables. Finally, we estimate the impact of FDI on economic growth. Our results indicate that FDI contribute positively to growth in the East African. The implication of our results is that FDI can be used as an important tool for promoting economic growth in developing countries, especially in East African countries. We suggest that the East African countries region should remain their economies open to attract more potential investors to invest in sectors that promote the economy in order to achieve the desired objectives.

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