The Contribution of Foreign Direct Investment on Economic Growth in Rwanda

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Abstract: This paper examined the contribution of FDIs inflows for the selected sectors on economic growth in Rwanda and to ascertain the long run sustainability of the ones that contribute most on Rwandan Economy. This relationship was assessed using Johnson’s cointegration approach and vector error correction model for the annual data spanning the period of 2000-2015 obtained from National Institute of Statistics of Rwanda. Five alternative FDI inflows were used as independent variables. These are FDI inflows from construction sector as the ratio of real GDP (Cons_gdp), FDI inflows from manufacturing sector as the ratio of real GDP (Man_gdp), FDI inflows from mining sector as the ratio of real GDP (Min_gdp), FDI inflows from financial and insurance sector as the ratio of real GDP (FinIns_gdp), FDI inflows from utilities sector as the ratio of real GDP (Ut_gdp) while the economic growth was measured by real gross domestic product (RGDP). The results show that FDI inflows from construction and mining sectors have positive influence on economic growth in Rwanda economy in the both long run and short-run. This finding is consistent with theoretical literature because Rwanda is a developing country, so increases in foreign capital inflows positively especially in construction and mining sectors affect the level of investment; the consumption level is also increase because of foreign capital inflows. Furthermore, the value of R-square is 0.8 for long run and 0.85 for short run and those means the change in RGDP is explained by the change of selected variables. The study recommends therefore the government of Rwanda to reinforce the existing policies that will encourage FDI inflows in construction and Mining sectors as the major contributors of RGDP unlike other sectors. Also aggressive mechanisms should be adopted to pull more investors (FDI) in others sectors such Manufacturing, Utility, Finance and insurance sectors so that they can also bring positive and significance contribution to RGDP in Rwandan economy and there by accelerating Rwandan economic growth and development.

Keywords: FDI inflows, Economic growth, Johnson’ cointegration

1. Introduction

Most countries strive to attract foreign direct investment (FDI) because of its acknowledged advantages as a tool of economic development. Africa and Rwanda in particular, joined the rest of the world in seeking FDI as evidenced by the formation of the New Partnership for Africa’s Development (NEPAD), which has the attraction of foreign investment to Africa as a major component (AERC Research paper 165).

Also MINICOM (2006) clearly said that there are still many barriers to growth. But this policy aims at identifying those barriers in area of trade and describes how the government intends to overcome them. The agriculture activity occupies more than 60% of the Rwandan households that depend on agriculture.

A study conducted in 2000-2011 showed that 22.1% of inhabitants of Kigali city are involved in commercial activity while at national level; only 2.6% of Rwandans live of commercial activity. Building on the investment law of 2006, the GOR established Rwanda development board (RDB) in 2006 to fast track development projects and to facilitate new investment. RDB consolidates several Agencies previously involved in promoting investment including the Rwanda investment and export promotion Agency, the Rwanda commercial registration service Agency, the human and institutional capacity development Agency, the Rwanda information and technology agency, and the Rwanda office of tourism and national parks (Affairs, bureau of economic and business development report, 2012). Foreign direct investment (FDI) is often seen as a driver for economic and social development as it may bring capital, technology management know how, jobs and access to new markets. Policy –makers have therefore tended to emphasize the benefits that FDI can bring to host economies particularly in developing countries.

Accordingly, many governments have developed policies to encourage inward FDI (IRDP, 2008). Referring to IRDP (2008) Rwanda is one of the most powerful countries in sub-Saharan Africa and a model of past conflict reconstruction. However, the country is also characterized by a poverty rate which is quite high (57% of total population), a high population density and a high demographic growth. These features as well as recent population migrations have contributed to: deforestation, soil erosion, insufficient crop production leading to food insecurity (28% of the total population) and persisting extreme poverty (37% of the total population).

Undoubtedly Africa and indeed Rwanda is facing an economic crisis situation featured by inadequate resources for long-term development, high poverty level, low capacity utilization, high level of unemployment, and other Sustainable Development Goals (SDGs) increasingly becoming difficult to achieve by 2030. Promoting and facilitating technology transfer through foreign direct investment (FDI) has assumed a prominent place in the strategies of economic revival and growth being advocated by policy makers at the national, regional and international levels because it is considered to be the key to bridging the technology and resource gap of underdeveloped countries and avoiding further build-up of debt (UNCTAD, 2005).

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Given this development, Ikiara (2002), UNIDO (2002), UNCTAD (2017) recognize and emphasize the significance of FDI in providing technological know-how, capital, management and marketing skills, facilitating access to foreign markets and generating both technological and efficiency spillovers to local firms provided the right policy and business conditions are available. By facilitating access to the above, FDI is expected to improve the integration of the Rwanda’s economy into the global economy, and further spurring economic growth through technological advancement.

From a global perspective, the relationship between FDI and economic growth, and the stability of this growth, is a central consideration as host countries evaluate the trade-offs associated with foreign entry. This has been considered in the context of longer term performance, stemming from the argument by Romer (1993) that an idea gap has held back growth in emerging markets. If an idea gap has impeded growth, FDI can induce a catch-up process. The most robust evidence on FDI and aggregate growth is found in studies of developing countries. For example, analyses of inward investments to Greece, Taiwan, Indonesia, and Mexico show a significant positive contribution to these countries growth.

Research using detailed industry-level data finds that growth spillovers across industries depend on the industries into which FDI flows. The spillovers and growth ramifications are expected to be strongest when foreign affiliates and local firms compete most directly with each other, as may be the case in previously protected industries. Despite Rwanda’s business-friendly reputation, FDI in Rwanda lags well behind some of its neighbors in the East African Community (EAC) a mere 2.2 percent of GDP in 2012, worth USD 156 million. Potential and current investors cite a number of hurdles and constraints, including high transport costs, a small domestic market, limited access to affordable financing, inadequate infrastructure, ambiguous tax rules, and a lack of skills in the workforce.

In consideration of studies conducted in Rwanda, whether foreign direct investment leads to economic growth is still a debatable one. What is clear is that the relationship may be significant or insignificant depending on the country under study, type of investments, the adjective of the donor country, the implementation policy of the recipient country, the methodology will use, and the period of study (Musau, 2009). A sound industrial policy is necessary for economic growth and development; such a policy should encompass FDI policies (promotion and entrenchment) targeted at sectors where MNC presence would be advantageous to the country’s industrialization effort (Gachino, 2009). This research makes a number of contributions to the relevant literature. In this respect, this study is distinguished from earlier studies. Nonetheless, this study examines the relationship between FDI inflows and Rwanda’s economic growth, hence addressing the country’s specific dimension to the FDI-growth debate.

2. Literature Review

During the last decades, the relation between FDI and economic growth has been extensively discussed in the economic literature. Theories and existing literature provide conflicting results concerning this relationship. On one hand, some scholars argue that foreign direct investment could stimulate technological change through the adoption of foreign technology and know-how and technological spillovers, thus boosting host country economies. On the other hand, other pessimists believe that FDI may bring about crowding out effect on domestic investment, external vulnerability and dependence, destructive competition of foreign affiliates with domestic firms and “market stealing effect” as a result of poor absorptive capacity.

In literature, there exists an agreed framework definition of foreign direct investment (FDI). That is, foreign direct investment is an investment made to acquire a lasting management interest (normally 10% of voting stock) in a business enterprise operating in a country other than that of the investor defined according to residency (World Bank, 2016). FDI can be divided into two forms: “greenfield” investment, which is also called “mortar and brick” investment, as well as merger and acquisition (M&A), which entails the acquisition of existing interest rather than new investment.

There is conflicting evidence in the literature regarding the question as to how, and to what extent, FDI affects economic growth. FDI may affect economic growth directly because it contributes to capital accumulation, and the transfer of new technologies to the recipient country. In addition, FDI enhances economic growth indirectly where the direct transfer of technology augments the stock of knowledge in the recipient country through labour training and skill acquisition, new management practices and organizational arrangements (De Mello, 2009). Theoretically, however, in the context of either neo-classical or endogenous growth models, the effects of FDI on the economic growth of the receiving country differ in the recent growth models from their conventional counterparts. The conventional economic growth theories are being augmented by discussing growth in the context of an open rather than a closed economy, and the emergence of externality-based growth models.

Moreover, Lipsey (2002), after surveying the macro empirical research, claimed that a consistent relation between the size of inward FDI stocks or flows relative to GDP and growth did not exist. He further argued that there was need for more consideration of the different circumstances that obstructed or promoted spillovers. Later, Lipsey and Sjoholm summarized that evidence of positive spillovers of FDI had been found by researchers in some countries and some industries, though, country-specific and industry-specific factors seemed so crucial that these results did not support the overall conclusion that FDI brought about substantial spillover effects for the entire economy.

Theoretically, FDI is concerned to directly impact growth through capital accumulation, and the incorporation of new inputs and foreign technologies in the production function of the host country. Empirically, Neoclassical and endogenous growth models have been widely used to test those theoretical benefits of FDI. However, the results are varying. The reasons include sample selection (e.g. developed versus less developed countries), the selected estimation techniques
(e.g. OLS, Granger Causality, Cointegration, Error correction models), and the selected time period, the estimation methodology (i.e. time series versus cross-section), etc.

2.1. Conceptual Framework

![Image](image)

Figure 1: The model showing theoretical framework for analysis of FDI inflows in selected sectors and economic growth

3. Research Methodology

3.1 Data and Model Estimation Procedure

This research used purely secondary data. It utilized annually time series data for the period of 2005-2015 and the variables considered time series are ratios that were extracted and computed from data provided by the National Institute of Statistics (NISR). The dependent variable is represented by economic growth, which has as main indicator of real gross domestic product growth (RGDP), and can be defined as the total added value of goods and services produced in a country during a given period of time. In this study, the relationship was investigated using five selected foreign direct investment sectors namely, the construction sector as the ratio of real GDP, manufacturing sector as the ratio of real GDP, financial and insurance sector as the ratio of real GDP, the mining sector as the ratio of real GDP and Utilities sector as the ratio of real GDP.

Therefore, all statistical estimations and analysis were carried out using E-Views econometric packages. For the estimate purpose, the following model is specified to examine the functional relationship between selected FDI inflows and economic growth in Rwanda, which is written in econometric linear form thus:

\[ \text{RGDP} = \beta_0 + \beta_1 \text{Cons}_{\text{gdp}} + \beta_2 \text{Man}_{\text{gdp}} + \beta_3 \text{Min}_{\text{gdp}} + \beta_4 \text{FinIn} + \beta_5 \text{Ut}_{\text{gdp}} + \epsilon t \]

Where:

- RGDP: Real GDP or Economic Growth;
- Cons_{gdp}: Construction sector as ratio of real GDP;
- Man_{gdp}: Manufacturing sector as ratio of real GDP;
- Min_{gdp}: Mining sector as ratio of real GDP;
- FinIn: Financial and Insurance sector as the ratio of real GDP;
- Ut_{gdp}: Utilities sector as the ratio of real GDP.

The parameters to be estimated are \( \beta_0 \) (constant) and \( \beta_i \) (i=1, 2, ..., 5), which are the slope parameters. \( \epsilon t \) is an error term that is identically and independently distributed with zero mean and constant variance \( \sigma^2 \). These parameters were obtained using the ordinary least square (OLS).

3.2 Data Analysis

3.2.1 Unit Root Test for Stationarity

The Augmented Dickey-Fuller (ADF) unit root test was applied to the variables listed above in order to avoid the spurious regression problem. The Augmented Dickey-Fuller test was conducted on each of the variables based on the null hypothesis of stationarity and failure to reject the null implies the need for appropriate differencing to bring stationarity. Further, if variables series are non-stationary, this indicates that they have unit root. Therefore, before making any kind of estimation, one has to make a test for unit root for the time series. If the time series has unit root, what follows is the transformation of that non-stationary time series into one that is stationary. One way of inducing stationarity in non-stationary series I(d), is to be differentiated of order d before getting to I(0) or simply to say the series becomes stationary.

3.2.2 Cointegration Test

Once a unit root has been confirmed for a data series, the question is whether a long-run equilibrium relationship exists among variables. Having confirmed in this study that all variables included in the models were integrated of order one, the next step was to test independently for the existence of co-integration relationships between each of the selected FDI inflows in selected sectors and economic growth. For this purpose, the study used the Johansen (1988, 1991) and Johansen and Juselius (1990) co-integration test procedure. Multivariate co-integration analysis was conducted using the method developed by Johansen and Juselius (1990). The Johansen and If co-integration is detected between these variables, then the existence of Granger causality in either direction cannot be ruled out. The testing hypothesis is the null of non-co-integration against the alternative of existence of co-integration using the Johansen maximum likelihood procedure (Johansen (1991)).

3.2.3 Vector Error Correction Model

Having found a suitable Johanson cointegration equation that best describes the data, the next step involves estimating a corresponding error correction model for economic growth. The error correction model takes both the long-run equilibrium to which output converges over time and the rate of adjustment following disequilibrium; and it is of the form:

\[ \Delta Y_t = \alpha_0 + \sum \beta_i \Delta X_{t-i} + \sum \gamma_j \Delta Y_{t-j} + \rho \epsilon t - 1 + \mu t(2) \]

Where \( \Delta \) is the first differentiation, \( \epsilon t \) is the estimated residual from the selected Johnson’s cointegration equation, RGDP is as earlier defined while \( X_t \) is the vector of exogenous variables, including Cons_{gdp}, Man_{gdp}, Min_{gdp}, FinIn_{gdp} and Ut_{gdp}. For a stable model, the coefficient \( \epsilon \), which measures the speed of adjustment of the outcome variable to the value implied by the long run equilibrium relationship, have to be negative and statistically significant.
4. Research Findings and Discussions

4.1 Tests for Stationarity

As in any other time series, the variables must be tested for stationarity before running other econometrics techniques such as co-integration and causality test. The study used the Augmented Dickey–Fuller (ADF) unit root tests to test the non-stationarity in our data series. The variable tested are, RGD, Cons_gdp, Man_gdp, Min_gdp, FinIn_gdp, and Ut_gdp. The results presented in Table 1 shows that, Cons_gdp, Man_gdp, Min_gdp, FinIn_gdp are stationary at first difference with no trend and intercept, which imply that they are I(1), while RDP is stationary at second difference. However, Ut_gdp variable did not become stationary at both first and second differences, which lead to be excluded in the model in order to avoid spurious estimates. Having established that most of the variables are integrated of order on (I (1)), the next step is to check for possible long run relationship among variables.

Table 1: Results of Augmented Dickey-Fuller Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model</th>
<th>Augmented Dickey Fuller test (ADF)</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Level First difference 2nd difference</td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>Constant</td>
<td>2.3 -1.9 -3.27*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-0.5 -3.8* -2.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>14.4 0.8 -3.3**</td>
<td>I(2)</td>
</tr>
<tr>
<td>Cons_gdp</td>
<td>Constant</td>
<td>-1.9 -2.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-1.5 -2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0.7 -2.6**</td>
<td>I(1)</td>
</tr>
<tr>
<td>Man_gdp</td>
<td>Constant</td>
<td>-2.3 -5.5**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-2.9 -5.6**</td>
<td>I(1)</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0.4 -5.8***</td>
<td>I(1)</td>
</tr>
<tr>
<td>Min_gdp</td>
<td>Constant</td>
<td>-2.3 -3.2*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-3.1 -2.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1.3 -3.4**</td>
<td>I(1)</td>
</tr>
<tr>
<td>FinIn_gdp</td>
<td>Constant</td>
<td>-0.7 -3.26*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>4.3** -3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0.8 -5.8***</td>
<td>I(1)</td>
</tr>
<tr>
<td>Ut_gdp</td>
<td>Constant</td>
<td>0.12 -1.2 0.04</td>
<td>Removed</td>
</tr>
<tr>
<td></td>
<td>Trend</td>
<td>-1.8 0.7 -0.9</td>
<td>in the model</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>-1.6 -0.3 -0.4</td>
<td></td>
</tr>
</tbody>
</table>

4.2 Johansen’s cointegration test

Given the unit root properties of the variables, we proceeded to establish whether there is a long run co-integrating relationship among the variables in equation 1 by using the Johansen full information maximum likelihood method. Co-integration analysis is necessary in all times series data to determine whether there is a long run relationship between two variables. Therefore, the co-integration test results show that all the variables (Cons_gdp, Man_gdp, Min_gdp, FinIn_gdp, and RGDP) are co-integrated. Since the variables are stationary, integrated of order one and two, and co-integrated, it shows that there is a long run relationship between the variables. The results of the Johansen Co-integration test is presented in Table 2 below.

Table 2: Johansen Co-integration test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Max-Eigen value</th>
<th>Critical Value</th>
<th>Trace Statistic</th>
<th>Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGDP and Cons_gdp</td>
<td>15.5</td>
<td>12.3</td>
<td>17.5</td>
<td>12.3</td>
</tr>
<tr>
<td>RGDP and Man_gdp</td>
<td>24.3</td>
<td>12.3</td>
<td>15.3</td>
<td>12.3</td>
</tr>
<tr>
<td>RGDP and Min_gdp</td>
<td>21.2</td>
<td>12.3</td>
<td>14.5</td>
<td>12.3</td>
</tr>
<tr>
<td>RGDP and FinIn_gdp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3 Long Run Cointegration Estimates

The results of long run relationship are presented in table 4 below. The result of the OLS shows that, there is positive relationship between each of the Cons_gdp, Min_gdp, and RGDP. The results show that the coefficient of Cons_gdp is (2.44 E+09) which is positive and insignificant at 5%, this means that an increase FDI inflows from construction sector, would lead to a subsequent increase in RGDP in the long run in Rwanda. This results joint the one found by Mohamed (2008) for the case of Sudan. On the other hand, the coefficient of Min_gdp is positive and significant, further implying that an increase in FDI inflows from mining sector would increase RGDP in the long-run.

Table 3: Ordinary Least Square (OLS) Long Run Relationship

<table>
<thead>
<tr>
<th>Variables</th>
<th>Long run relationship</th>
<th>Coefficient</th>
<th>P value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cons_gdp(1)</td>
<td>2.44 E+09</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Man_gdp(1)</td>
<td>1.76 E+08</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>Min_gdp(1)</td>
<td>3.3 E+08</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>FinIn_gdp(1)</td>
<td>-5,410,948</td>
<td>0.979</td>
<td></td>
</tr>
</tbody>
</table>

R-squared 0.8
Adjusted R-squared 0.7

4.4 Short run relationship estimates

Table 4 presents the results of the error correction model (ECM) estimated based on the residuals obtained from Model above model. Therefore, at the 5 and or 10 per cent significance levels among of our four target variables, two of them were found to be the determinants of economic growth in the short run. These were ratio of FDI inflows from construction to RGDP and ratio of DFI inflows from mining sector to RGDP and all variables were entered in the model in their lag form/differential form.

The coefficient of the error correction term was found to be negative and significant at five and or ten per cent levels, further providing evidence of a short-run cointegrating relationship among the variables. At -0.63, the magnitude of the error correction coefficient implied a lower speed of convergence of output to its long run equilibrium as about 63 per cent of disequilibrium in the Real GDP is corrected within a year (Table 4).

Furthermore, the negative and significant coefficient is an indication of cointegrating relationship among real gross domestic product (RGDP), FDI inflows from construction and mining sectors. This justifies the fact that construction and mining sectors are still effective in the short run in the
case of Rwanda.

Table 4: Results of the Error Correction Model for Output (With Break)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cons_gdp(1)</td>
<td>2.79 E+09</td>
<td>0.09</td>
</tr>
<tr>
<td>Man_gdp(1)</td>
<td>3.2 E+08</td>
<td>0.46</td>
</tr>
<tr>
<td>Min_gdp(1)</td>
<td>2.7 E+08</td>
<td>0.02</td>
</tr>
<tr>
<td>FinIn_gdp(1)</td>
<td>-43.040.665</td>
<td>0.66</td>
</tr>
<tr>
<td>e(-1)</td>
<td>-0.63</td>
<td>0.06</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.76</td>
<td></td>
</tr>
</tbody>
</table>

5. Conclusion and Recommendations

5.1 Conclusion

The objective of this study was to examine the contribution of FDI inflows from the selected sectors on economic growth in Rwanda and to ascertain the long run sustainability of the ones that contribute most on Rwandan Economy. The study used the secondary data obtained from National Institute of Statistics of Rwanda spanning the period of 2005-2015. To examine the long and short run cointegration relationship, Johnson’s cointegration was used.

The results show that FDI inflows from construction and mining sectors have positive influence on economic growth in Rwanda economy in the short-run. This finding is consistent with theoretical literature because Rwanda is a developing country, so increases in foreign capital inflows positively especially in construction and mining sectors affect the level of investment; the consumption level is also increase because of foreign capital inflows. The value of R-squared is 0.8 for long run and 0.85 for short run and those means the change in RGDP is explained by the change of selected variables.

In spite of the literature on further theoretical arguments why developing countries may not gain from FDI; Krugman, argues that the transfer of control from domestic to foreign firms may not always be beneficial to the host countries because of the adverse selection problem, from our empirical findings, we can conclude that the results show that FDI inflows from construction and mining sectors have positive influence on economic growth in Rwanda economy in the short-run unlike FDI inflows in other sector of the economy understudy and therefore FDI inflows in developing countries have a significant and positive contribution to real GDP of developing countries and consider Rwanda as a case in point.

5.2 Recommendations

Going from the findings and conclusions drawn from this study, the following recommendations are suggested.

- Based on the findings, the study recommends that the Rwandan policy makers should continue deepening further and actively seek to attract FDI by marketing our economy and eventually set up national investment promotion agencies.
- Policies such as opening up of the economy by engaging in more bilateral and multilateral trade agreements, improving the quality of infrastructure by way of channeling more resources to its development.
- In a nutshell, regarding investment promotion policies, Rwanda should adopt a proactive approach towards FDI promotion, and explicitly look for ways to increase its FDI inflows specifically for Construction and Mining sectors since they have a greater positive and significance share on Real GDP of Rwanda.
- Also Rwandan policy makers should lay much emphasis on strategies to mobilize FDI inflows in other sectors such as utility, manufacturing, finance and insurance sector so that they can create a significant contribution on Rwanda’s Real GDP thereby by stimulating economic growth and development of Rwanda

References


