The Contribution of Foreign Direct Investment for Economic Growth of Ethiopia: Time Series Analysis

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Abstract:
Economic growth of countries is one of the fundamental questions in economics. Most African countries are opening their economies for welcoming of foreign investors. As such Ethiopia, like many African countries took measures to attract and improve foreign direct investment. The purpose of this study is to examine the contribution of foreign direct investment (FDI) for economic growth of Ethiopia over the period of 1981-2013. The study shows an overview of Ethiopian economy and investment environment by the help of descriptive and econometric methods of analysis to establish empirical investigation for the contribution of FDI on Ethiopian economy. OLS method of time series analysis is employed to analyse the data. The stationarity of the variables have been checked by using Augmented Dickey Fuller (ADF) Unit Root test and hence they are stationery at first difference. The co-integration test also shows that there is a long run relationship between the dependent and independent variables. Accordingly, the finding of the study shows that FDI, GDP per capita, exchange rate, total investment as percentage of GDP, inflow of FDI stock, trade as percentage of GDP, annual growth rate of GDP and liberalization of the economy have positive impact on Ethiopian GDP. Whereas Gross fixed domestic investment, inflows of FDI and Gross capital formation influence economic growth of Ethiopia negatively. This finding suggests that there should be better policy framework to attract and improve the volume of FDI through creating conducive environment for investment.

Key words: Foreign Direct Investment; Economic Growth; Ethiopia

Introduction:
Ethiopia is one of the fastest-growing economies in the world. It has registered impressive GDP growth for several years, ranging between 6% and 12%, depending on source data. The World Bank and IMF forecast continued average growth of 7% over the next three years. With five year GTP plan the growth rate is improved and recorded as double digit for the last 10 years. With a population of roughly 90 million, Ethiopia is the second most populous country in sub-Saharan Africa, after Nigeria. The government of Ethiopia follows an integrated 5-year development plan, the Growth and Transformation Plan (GTP), which aims to achieve 11.2 – 14.9% GDP growth annually as well as achieve the Millennium Development Goals and attain middle-class income status by 2025. To achieve these goals, the government is investing heavily...
in large-scale social, infrastructural and energy projects. While these developments are positive indicators for future private sector development, it translates into the flow of significant amounts of capital into public sector projects (World Development Indicator, 2014 report and Bureau of Economic and Business Affairs, 2013 report).

Explaning economic growth is one of the fundamental questions in economics and has generated a large body of research. Foreign direct investment is one of the most striking features of the global economy today. The growth of private foreign direct investment (FDI) in the developing world has been extremely rapid in this decade (Todaro Smith, 2013). According to World Investment report (2006), FDI flow rose an annual rate of $2.4 billion in 1962 to $35 billion in 1990 and reached $334 billion in 2005, and $600 billion in 2005 and in 2015 it reached to $1.8 trillion in the world total. Attracting Foreign Direct Investment (FDI) is generally seen as an integral part of the development policy mix of successful emerging economies that leads the way to the required sustained economic transformation.

Jamal and Mujoo (2014), suggests that economic growth and participation of a country in international capital market has strong associative relationship. As a result most African countries are opening their economies for welcoming of foreign investors. As such Ethiopia, like many African countries took measures to attract and improve foreign direct investment. FDI into Ethiopia started to grow since the liberalization of the economy in 1992 (Ethiopian Investment Agency). The new regime sought to eliminate the constraints on FDI and to establish an enabling environment for foreign investors by establishing a new investment guide for potential foreign investors in 1999. As a result, FDI as percentage of GDP is currently increasing from the period 1992. There are reasons which can accounts for increasing FDI. These are positive investment climate, expansion of domestic activity, liberalization of economic policy, simplification of procedure, opportunity of market, availability of resource.

As the data indicated by UNCTAD, 2014 report shows that inflow of FDI is increasing from the period 1994 to recent. In the same source Ethiopian inward flow of stock of FDI from different countries is increasing regularly. The major source countries of Ethiopia FDI are Turkey, China, India, Saud Arabia, Germany, South Africa, Sudan, Britain and others.

**Statement of the problem:**

Foreign Direct Investment (FDI) is a category of investment that reflects the direct or indirect ownership of 10% or more of the voting power of an enterprise resident in one economy by an investor resident in another economy. FDI statistics are on a directional basis (inward or outward) and relate to FDI flows, FDI positions (stocks) and FDI income. Outward investments are cross-border investments by direct investors resident in the reporting country while inward investments are investments by non-resident investors in the reporting country. FDI flows are cross-border financial transactions within a given period (e.g. year, quarter) between affiliated enterprises that are in a direct investment relationship. FDI positions relate to the stock of investments at a given point in time (e.g. end of year, end of quarter). FDI flows and positions include equity (10% or more voting shares), reinvestment of earnings and inter-company debt. FDI income is the return on direct investment positions of equity (dividends and reinvested earnings) and debt (interest).

Apart from definition, the effects of FDI can be wide ranging since FDI typically encompasses packages of capital as well as technical, managerial and organisational know-how. FDI is expected to positively influence the growth of a country in terms of technological up gradation of a firm which results in the vertical specialization in the industry. FDI is particularly important for developing countries since it provides access to resources that would otherwise be unavailable to these countries. Its contribution to economic development and therefore poverty reduction comes through its role of transferring advanced technology and organisational forms to the host country, to fulfil technological gap and other spillover to domestically owned enterprises, assisting human capital formation, contributing to international trade integration, helping to create a more competitive business environment, to have superior market and finance, improvement in balance of payment, net addition to investable resource, sustaining high level of development and development of basic infrastructure.

In line with this Krifa-Schneider (2010), investigate Foreign investors can contribute to growth of a country by providing a package of financial capital, transfer of technology, sharing risks in large projects, providing job opportunity, sharing information, providing goods and services that can make a country more
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competitive in the world market. Again Juma (2012), concludes, FDI has a positive effect on growth in Sub-Saharan Africa, and that African policy makers are justified in seeking FDI as a way to accelerate growth in the future.

However, majority of FDI flows from one developed country to another; and flows to developing countries are heavily concentrated in just a few destinations (Todaro and Smith, 2013). As such in 2005 from the total recorded amount, $118 billion FDI was invested in China and Hong Kong. But Africa has usually received only a small fraction of inflows. Most of the 34 least developed countries in Africa received very little foreign investment.

Similarly in Ethiopia, even though the economy is liberalize and start attracting FDI through crating efficient market access and providing incentives with the sale of small retail outlets and medium-sized hotels and restaurants, the telecommunications and energy sectors for foreigners, the volume of FDI to Ethiopia is very low and these selling of already established industries and small scale company’s causes disinvestment in the side of domestic enterprise.

As known, Ethiopia is endowed with a geological environment hosting a wide variety of promising mineral resources. Initial explorations have confirmed the existence of deposits of gold, platinum, tantalite, soda ash and phosphate, dimension stones, geothermal, petroleum and other metallic, industrial, and chemical minerals have also been found. Despite all these occurrences, mineral development remained limited and FDI as percentage of GDP has been at a relatively low level (World Bank survey, 2012) because of poor infrastructure facility, lack of diplomacy with other countries and lack of technology.

Related with this, Gebremedhin (2012) shows that exchange rate volatility, corruption, lack of clear policies and regulatory impediments are the three main factors that have the potential to deter foreign investment and hence economic growth in Ethiopia. The researcher is motivated to do this work to investigate the role of FDI on economic growth of Ethiopia. Most of the previous researchers have studied the determinants of FDI. However, this study examines the percentage share of FDI on economic growth of Ethiopia by using time series data analysis.

Objective of the study:

The main objective of the study is, an attempt made to examine the contribution of foreign direct investment for economic growth of Ethiopia over the period 1981-2013 with the help of regression analysis.

Review of Literature Theories and Empirics:

Theoretical Literature

The theory of portfolio investment:

As sighted by Getinet and Hirut(2005), the theory of portfolio investment is one of the earliest explanations of FDI. The basis of this theory is interest rate differentials between countries. According to this explanation, capital moves in response to changes in interest rate differentials between countries, regions and multinational companies, where its return is low to countries where it is high. This explanation, however, fails to account for the cross movements of capital across countries.

Vernon’s product life cycle theory:

Vernon’s (1966), product life cycle theory is another explanation of FDI. This theory focuses on the role of innovation and economies of scale in determining trade patterns. It states that FDI is a stage in the life cycle of a new product from its invention to maturity. A new product is first manufactured in the home country for the home market. When the home market is saturated, the product is exported to other countries. At later stages, when the new product reaches maturity and loses its uniqueness, competition from similar rival products becomes more intense. At this stage producers would then look for lower cost foreign locations. This theory shows how market seeking and cost reduction motives of companies lead to FDI. However, this theory does not explain why FDI is more efficient than exporting abroad.

Internationalization theory of FDI:

Internationalization theory of FDI provided another explanation of FDI by putting emphasis on intermediate inputs and technology. They shifted the focus of the international investment theory from country-specific towards industry-level and firm-level determinants of FDI (Henisz, 2003). Buckley and Casson analysed MNCs within a broad-based framework developed by Coase (1937). Their theory came to be known as International Journal of Contemporary Research and Review, Vol. 9, Issue. 02, Page no: ME 20442-20454 doi: http://dx.doi.org/10.15520/ijcrr/2018/9/01/414

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internalization theory as they stressed this fact with regard to the creation of MNCs. They articulated their theory based on three postulates: (a) Firms maximize profits in a market that is imperfect (b) When markets in intermediate products are imperfect; there is an incentive to bypass them by creating internal markets. (c) Internalization of markets across the world leads to MNCs. A firm that is engaged in research and development may develop a new technology or process, or inputs. It may be difficult to transfer technology or sell the inputs to other unrelated firms because those other firms may find the transaction costs to be too high. Faced with this situation, a firm may choose to internalize by using backward and forward integration, i.e., the output of one subsidiary can be used as an input to the production of another, or technology developed by one subsidiary may be utilized in others. When internalization involves operations in different countries then it necessarily means FDI (Buckley and Casson, 1976).

**Empirical literature:**

In this study various previous studies were reviewed. A study by Borensztein et al (1998), examine FDI in the process of technology diffusion and economic growth of developing countries. The study concludes that FDI is having a positive effect on economic growth, but the magnitude of effect depends on the amount of human capital available in the host country. Also the study investigated by Anupama (2008) shows that the sector of electrical equipment in India has invited the largest amount of FDI inflows in the post liberalisation period. As a result the foreign direct investment inflow in the top 10 sectors of the Indian economy account for 70 percent of the total FDI inflows in the country. On the other hand Ito and Krueger (1998) studied empirically, the role of FDI in Korean economy. They have been used estimation of a random effects model instruments, that shows the productivity spillover effects of FDI are positive but statistically insignificant. However, Adegbite and Ayadi (2010) also investigate empirically the role of foreign direct investment in economic development. The main objective of study is to investigate the relationship between foreign direct investment flows and economic growth in Nigeria. The study concluded that indeed, FDI promotes economic growth, and hence the need for more infrastructural development, ensuring sound macroeconomic environment as well as ensuring human capital development is essential to boosting FDI productivity and flow into the country. According to Juma (2012) investigation, FDI is associated with higher growth in Sub-Saharan Africa, particularly after the exclusion of outliers. And test for a difference in the effect of FDI on growth in mineral-rich versus mineral-poor countries; show that there is a statistically significant difference between the two sets of countries. Thus, he conclude that FDI has a positive effect on growth in Sub-Saharan Africa, and that African policy makers are justified in seeking FDI as a way to accelerate growth in the future.

When we come to the study country Ethiopia, Lema (2011) in his survey analysis shows foreign direct investment projects in Ethiopia created a total of 67,128 jobs from 1992 to 2005 representing 14.5 per cent of all jobs created during this period. Capital inflow into Ethiopia have increased continuously from 135 million US$ in 2000 up to 545 million US$ in 2004 since then the total FDI inflows remain quite constant after 2005.Moreover, Getinet and Hirut (2005) study the nature and determinants of foreign direct investment in Ethiopia over the period 1974-2001. Their finding shows that growth rate of real GDP, export orientation, and liberalisation, among others, have positive impact on FDI. On the other hand, macroeconomic instability and poor infrastructure have negative impact on FDI. Their paper concluded that, liberalization of the trade and regulatory regimes, stable Macroeconomic and political environment, and major improvements in infrastructure are essential to attract FDI to Ethiopia.

**Overview of Ethiopia’s Recent Economic Growth and FDI Performance:**

**Economic Growth:**

From figure 1 annual gross of GDP was very low and negative before 1993, but it increase after the year 2004 onwards. With five year GTP plan the growth rate is improved and recorded as double digit for the last 10 years. From the above figure GDP growth rate was mostly negative before 1992; it is because of low level of production, drought condition and Ethiopia- Eritrea war, low level of infrastructure facility, un existed technological development and higher population growth. However, starting from the period 2003, the growth rate is double digit and positive.
Gross Domestic Product of Ethiopia millions US dollar at current price in the period 1981-2013 which is remarkably increasing over the period. This is because of the development of infrastructure facility, development of social overhead, improvement in productivity, increasing export volume, increasing saving and capital formation, using technology, increasing external diplomacy to get financial assistance, liberalization of economy to attract FDI and increasing domestic activity (World Development Indicator, 2014 report and Bureau of Economic and Business Affairs, April 2013 report).

**Investment Climate in Ethiopia:**

The investment climate in general and FDI in particular was not encouraging during this period. The problems of political instability, insecurity, and the nationalisation of major industries severely discouraged foreign private investment. Realising the importance of FDI, the government then attempted to revive FDI through the 1983 Joint Venture Proclamation. The proclamation offered incentives such as a five-year period of income tax relief, import and export duty relief, tariff protection and repatriation of profits and capital. However, the proclamation failed to attract foreign investors. In 1989, the government revised the 1983 proclamation by allowing majority foreign ownership in many sectors. It also attempted to provide more protection to investors. However, the political instability and the prolonged civil war at the time further discouraged FDI. The political instability got worse and it consequently led to the overthrow of the regime in 1991.

However, FDI into Ethiopia started to grow since the liberalization of control of the economy in 1992, just after the institution of democracy. The new regime sought to eliminate the constraints on FDI and to establish an enabling environment for foreign investors. The authorities began to promote Ethiopia more vigorously as a location for FDI in early 1998. In 1999 a new investment guide for potential foreign investors in Ethiopia was published. In 2009, the Ethiopian government broadened its agricultural policy focus from increasing smallholder productivity, adding encouragement of private investment (both domestic and foreign) in larger-scale commercial farms to the existing priorities. The Ministry of Agriculture (MOA) created a new Agricultural Investment Support Directorate that is tasked with negotiating long-term leases (all land is owned by the government) on over 7 million acres of land for these commercial farms. The Directorate's goal is to boost productivity, employment, technology transfer, and foreign exchange reserves by offering incentives to private investors. The program, even in its early stages, has encountered some protests from individuals and groups claiming interests in land to be made available to new investors. In 2010 the government established an Agricultural Transformation Agency (ATA) with a mandate to help streamline agricultural investments and more generally to improve the enabling environment for both smallholder and commercial agricultural development in the country (Bureau of Econ and Business A).
As shown in figure 2, FDI as percentage of GDP before the period 1993 was almost zero because during this time there was absence of liberalized economic policy. Starting from the year 1997 FDI has improved and again decline in the year 2007, 2008 and 2009 but it never become negative after 1993. During the year 2003 and 2004 there was highest percentage share which is 5.49 % and 5.48 % respectively. As the data indicated by UNCTAD, 2014 report shows that inflow of FDI is increasing from the period 1994 to recent. In the same source Ethiopian inward flow of stock of FDI from different countries is increasing regularly (World Bank development indicator report,2014).

In addition, table 1 shows the source country of Ethiopia’s FDI. The huge capital is comes from Turkey with 34 projects. According to the data China has more investment projects in Ethiopia from the period 2012- 2013(Ethiopia investment Agency, cited by U.S. States diplomacy in action, 2014).

<table>
<thead>
<tr>
<th>Country of origin</th>
<th>Number of project</th>
<th>Capital in ‘000’ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>34</td>
<td>1,513,503</td>
</tr>
<tr>
<td>China</td>
<td>155</td>
<td>358,642</td>
</tr>
<tr>
<td>Saudi Arabia/Ethiopia</td>
<td>11</td>
<td>318,189</td>
</tr>
<tr>
<td>India</td>
<td>47</td>
<td>302,993</td>
</tr>
<tr>
<td>Sudan</td>
<td>97</td>
<td>125,008</td>
</tr>
<tr>
<td>Britain</td>
<td>2</td>
<td>114,326</td>
</tr>
<tr>
<td>South Africa/Ethiopia</td>
<td>2</td>
<td>112,494</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>19</td>
<td>107,669</td>
</tr>
<tr>
<td>Germany/Ethiopia</td>
<td>5</td>
<td>100,693</td>
</tr>
<tr>
<td>Netherlands/Ethiopia</td>
<td>4</td>
<td>40,944</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>3,094,461</td>
</tr>
<tr>
<td>Other</td>
<td>345</td>
<td>458,235</td>
</tr>
<tr>
<td>Grand total</td>
<td>712</td>
<td>3,552,697</td>
</tr>
</tbody>
</table>


Econometric Model and Variable:

In this time series empirical investigation, secondary data for the variable were employed. This study covers the period from 1981– 2013. To analysis the data, econometrics techniques of data analysis were applicable.
Data of Gross Domestic Product in millions US dollar at current price, annual growth rate of Ethiopia Gross domestic product, Foreign Direct Investments as percentage of GDP, Gross Capital formation in millions of dollar, gross domestic product per capital in current US $ in millions, Gross Fixed Domestic Investment as percentage of GDP, inward foreign direct inflow and inward foreign direct investment stock are from World Bank development indicator report 2014. Investment data were taken from index mundi.

In this study economic growth or gross domestic product (GDP) is taken as dependent variable while foreign direct investment, gross capital formation, trade, exchange rate and other variables are used as independent variable. The methodology of this study, the modern econometric techniques and tools were used to analysis the contribution of foreign direct investment (FDI) for economic growth of Ethiopia. The ordinary least square (OLS) method of estimation has been applied. The stationary of the data of the variable were checked by using Augmented Dickey Fuller test of Unit Root. Thus the variable are stationary at first difference. The result of and Augmented Dickey Fuller test at level are given in table below.

The ADF test consists of estimating the following equation (Gujarati, 2012 and Rajni, International Research Journal of Social Science, 2013).

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \varepsilon_t \ldots \ldots (1)$$

Where, \(Y\) dependent variable GDP, \(t\) is linear time trend, \(\Delta\) is first difference operator, \(\beta_1\) is constant, \(m\) is optimum number of lags in the different variable, \(\varepsilon_t\) is error term and \(\delta\) is coefficient of lagged \(Y_{t-1}\), where there is assumption of serially uncorrelated in error term. The stationary of residual also checked and it is stationary at level in Augmented Dickey fuller unit root test with Schwarz Info criterasion and its mean and variance is zero and constant respectively also its covariance is time-invariant this is fitted with note given by (Gujarati 2012).

**Table 2 Augmented Dickey Fuller Unit Root Test of Variables:**

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF t statistics</th>
<th>Order of integration</th>
<th>Durbin Watson statistics</th>
<th>Critical value at 5%</th>
<th>Schwarz Info criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>Trend and Intercept</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-4.521944</td>
<td>First difference</td>
<td>1.638875</td>
<td>-3.56838</td>
<td>46.29991</td>
</tr>
<tr>
<td>FDI</td>
<td>-6.992806</td>
<td>First difference</td>
<td>2.121478</td>
<td>-2.960411</td>
<td>3.539424</td>
</tr>
<tr>
<td>GDPPC</td>
<td>-3.21644</td>
<td>First difference</td>
<td>1.901294</td>
<td>-2.960411</td>
<td>3.647347</td>
</tr>
<tr>
<td>IFDI</td>
<td>-8.788427</td>
<td>First difference</td>
<td>1.910960</td>
<td>-2.960411</td>
<td>3.431695</td>
</tr>
<tr>
<td>ER</td>
<td>-3.407424</td>
<td>First difference</td>
<td>1.942</td>
<td>-2.960411</td>
<td>9.98939</td>
</tr>
<tr>
<td>IFDIS</td>
<td>-4.15902</td>
<td>First difference</td>
<td>1.87022</td>
<td>-2.960411</td>
<td>9.975358</td>
</tr>
<tr>
<td>TR</td>
<td>-7.038383</td>
<td>First difference</td>
<td>2.127484</td>
<td>-2.960411</td>
<td>13.15254</td>
</tr>
<tr>
<td>GCF</td>
<td>-10.25049</td>
<td>First difference</td>
<td>2.111864</td>
<td>-2.967767</td>
<td>45.64721</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>IN</th>
<th>GFDI</th>
<th>GDPR</th>
<th>DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.121229</td>
<td>-7.447418</td>
<td>-8.518601</td>
<td>-5.567764</td>
</tr>
<tr>
<td></td>
<td>-9.238417</td>
<td>-7.30932</td>
<td>-8.783923</td>
<td>-5.477226</td>
</tr>
<tr>
<td></td>
<td>-8.962266</td>
<td>1.7547</td>
<td>1.856215</td>
<td>2.002299</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.744557</td>
<td>1.869844</td>
<td>2.0012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.75</td>
<td>1.852965</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Computed by researcher from ADF unit root test

After completing the Unit Root test, the next step should be checking whether there is long run relationship between dependent variable and independent variable or not, so that the researcher conducted the residual ADF unit root test to test co integration. The technique to carry out residual stationary is provided in the appendix.

### Table 3 Residual Augmented Dickey Fuller Unit Root test:

<table>
<thead>
<tr>
<th>First difference order of integration at level</th>
<th>ADF t statistics</th>
<th>Computed value</th>
<th>Critical value(table value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1%</td>
</tr>
<tr>
<td>Intercept</td>
<td>(-4.534214)</td>
<td>(-3.65373)</td>
<td>(-2.95711)</td>
</tr>
<tr>
<td>Trend and intercept</td>
<td>(-4.463151)</td>
<td>(-4.27327)</td>
<td>(-3.55775)</td>
</tr>
<tr>
<td>None</td>
<td>(-4.609273)</td>
<td>(-2.63921)</td>
<td>(-1.95168)</td>
</tr>
</tbody>
</table>

Source Regression result of residual of the study

### Model Development and specification:

In this study based on the previous studies empirical and theoretical evidence, researcher going to develop the model as follows. Ram and Zhang (2002), empirically shows the role of foreign direct investment (FDI) in the economic growth of the host countries. They were employed the function of the form Y= F (L, K, FDI). By expanding this function, they pointed out that, despite the enormous increase in the FDI flows, the nexus between FDI and the host country's economic growth seems generally positive for the period 1990s. Based on the above information, the model specification or equation estimation is done based on dependent variable followed by list of repressors in Method of Least Square ARMA (Autoregressive Moving Average) model. Thus, the model specification of this study has the form.

\[
\text{GDP}_t = \alpha + \beta_1 \text{FDI} + \beta_2 \text{GDPPC} + \beta_3 \text{IFDI} + \beta_4 \text{ER} + \beta_5 \text{IFDIS} + \beta_6 \text{TR} + \beta_7 \text{GCF} + \beta_8 \text{IN} + \beta_9 \text{GFDI} + \beta_{10} \text{GDPR} + \beta_{11} \text{DM} + \varepsilon_t
\]

Where , GDP stands for gross domestic product, FDI is foreign direct investment, GCF is gross capital formation, ER is exchange rate, GDPPC is gross domestic product per capita, GFDI is gross fixed domestic investment, IFDI is inward foreign direct investment flows, IFDIS is inward foreign direct investment stock, TR is trade as percentage of GDP, IN is net investment as percentage of GDP, GDPR is gross domestic product growth rate and, DM is dummy variable which represent structural brake or structural change. The above form of equation 1 estimation has been used by Haile and Assefa in 2005 to specify their model. Hence, let us re write the above equation by applying the parameters to incorporate a constant. Thus,

\[
\text{GDP}_t = \alpha + \beta_1 \text{FDI} + \beta_2 \text{GDPPC} + \beta_3 \text{IFDI} + \beta_4 \text{ER} + \beta_5 \text{IFDIS} + \beta_6 \text{TR} + \beta_7 \text{GCF} + \beta_8 \text{IN} + \beta_9 \text{GFDI} + \beta_{10} \text{GDPR} + \beta_{11} \text{DM} + \varepsilon_t
\]

### Definition of variables:

**Foreign direct investment, net inflows (% of GDP):**

Foreign Direct investment (FDI) is investment made to acquire a lasting interest in or effective control over...
an enterprise operating outside of the economy of the investor. There are three types of FDI: horizontal FDI arise when a firm duplicates its home country based activity at the same value chain stage in a host country through FDI. The studies by Helpman et al. (2004), assuming horizontal FDI, shows that productivity sorts the mode of firms internationalization, export or FDI, under given variable and fixed costs and market size. Platform FDI is a movement from a source country in to a destination country for the purpose of exporting to third country. Vertical FDI on the other hand takes place when a firm through FDI moves upstream or downstream in direct value chains that is when firm perform value adding activity stage by stage in a vertical fashion in a host country. Foreign direct investment is 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 (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. Depending on the given definition, in this study FDI as percentage of GDP have been taken to show whether there is significant role of FDI on Ethiopia economic growth or not. This variable is expected to positively correlate with GDP.

**Gross domestic product per capita:** GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciations of fabricated assets or for depletion and degradation of natural resources. Annual percentage growth rate of GDP is at current market price based on constant local currency. This variable was used by Getinet and Hirut(2005) when they study about FDI and they have got positive effect in the regression. This gross domestic product per capita is expected to have positive effect on GDP of Ethiopia.

**Inflow of foreign direct investment:** FDI net inflows are the value of inward direct investment made by non-resident investors in the reporting economy, including reinvested earnings and intra-company loans, net of repatriation of capital and repayment of loans. The regression result of this variable is expected to positive and significant effect on GDP. **Foreign direct investment stock (position):** FDI positions relate to the stock of investments at a given point in time (e.g. end of year, end of quarter). FDI flows and positions include equity (10% or more voting shares), reinvestment of earnings and inter-company debt. This variable

**Exchange rate:** It is the price of a nation’s currency in terms of on other currency. An exchange rate thus has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly.

**Gross capital formation in millions of dollar of Ethiopia:** Gross capital formation is measured by the total value of the gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector. Infrastructure covers many dimensions ranging from roads, ports, railways and telecommunication systems to the level of institutional development. Taking this into account Gross fixed capital formation has been included to proxy infrastructure development because fixed infrastructure development will have positive effect for sustainable development. Therefore, this variable is expected to have positive on Ethiopian GDP growth.

**Gross fixed domestic investment:** Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress. Gross domestic capital formation includes all expenses made by household, business people and Government, adding new durable goods to the fixed capital stock of a country. These assets are in the form of infrastructure such as buildings, roads canals, bridges, means of transport, machinery and other equipment’s. Gross fixed domestic investment as percentage of GDP of Ethiopia which is a part of investment conducted though public and private sectors enterprise. It has up and down trends over the period because of many factors. Fixed domestic investment can be investment in building dams specifically Nile Dam in Ethiopia, construction of roads, explanation of education, buying of capital machinery, expansion of infrastructure and others.
**Investment share in GDP:** refers to the share of investment in total production. It is obtained by calculating gross capital formation as percentage of gross domestic product.

**Liberalisation:** Ethiopia has been introducing liberalisation measures since 1991 and a dummy variable is represented the effect of the change and structural brake in policy environment on FDI. The dummy variable assumes a value of 0 for the pre-liberalisation period (i.e. up to 1990) and 1 for the post liberalisation period (from 1991 onwards). The dummy variable is expected to have positive sign.

**GDP Growth Rate:** is the annual percentage growth rate of GDP at current market based on current local currency.

**Trade as percentage of GDP:** it is defined as Commercial transaction involving the sale and purchase of a good, service, or information. Trade is also defined as the general marketplace of buying and selling goods, the way you make a living or the act of exchanging or buying and selling something. It is the percentage share of GDP.

The above form of equation 1 estimation has been used by Haile and Assefa in 2005 to specify their model. Hence, let us re write the above equation by applying the parameters to incorporate a constant. Thus,

\[ GDP_t = \alpha + \beta_1 FDI + \beta_2 GDPPC + \beta_3 IFDI + \beta_4 ER + \beta_5 IFDIS + \beta_6 TR + \beta_7 GCF + \beta_8 IN + \beta_9 GFDI + \beta_{10} GDPR + \beta_{11} DM + \epsilon_t \] \[ \Delta GDP_t = \alpha + \beta_1 \Delta FDI + \beta_2 \Delta GDPPC + \beta_3 \Delta IFDI + \beta_4 \Delta ER + \beta_5 \Delta IFDIS + \beta_6 \Delta TR + \beta_7 \Delta GCF + \beta_8 \Delta IN + \beta_9 \Delta GFDI + \beta_{10} \Delta GDPR + \beta_{11} \Delta DM + \epsilon_t \] \[ \Delta GDPPC_t = \alpha + \beta_1 \Delta FDI + \beta_2 \Delta GDPPC + \beta_3 \Delta IFDI + \beta_4 \Delta ER + \beta_5 \Delta IFDIS + \beta_6 \Delta TR + \beta_7 \Delta GCF + \beta_8 \Delta IN + \beta_9 \Delta GFDI + \beta_{10} \Delta GDPR + \beta_{11} \Delta DM + \epsilon_t \]

Based on this model the regression is computed for analysing the contribution of FDI on Ethiopian GDP.

**Analysis and Discussion of the Results:**

In table below the estimated regression result shows the coefficient of the variable which is incorporated in the model. According to the result the estimated coefficient of foreign direct investment (FDI) as percentage of GDP has the expected positive sign and it is significant. This implies that even if FDI inflow in to Ethiopia is recent phenomenon in strong way, it positive effect on economic growth through creating employment opportunity, providing new technology and skill, expanding export amount and quality of products and it can be the source of revenue for the government in the form of tax. However, infrastructural development in Ethiopia is very inadequate as there are very few countries invest their capital in this sector. Therefore, the possible solution should be given emphasis at the same time proper policy of foreign investment should be there since foreign investors are profit sicker. This finding is in line with the hypothesis that FDI has significance contribution for economic growth of Ethiopia. The other variable gross domestic product per capita (GDPPC) measured in millions (at current USD) has a positive coefficient and it is highly significance. From the regression, the variable inflow of foreign direct investment (IFDI) measured in millions of US dollar, has negative coefficient but it is significant. This implies that, the amount of inflow of foreign direct investment was very less for the last two decades because of the absence of liberalization of economic policy and political instability in the country. But at present it shows little improvement this variable has also correlation with FDI. Exchange rate has expected positive estimated coefficient and it is significance. Deprecation of exchange rate and devaluation of currency which is Ethiopian Birr has been implemented. This better for attracting foreign direct investment and increasing export amount hence, it has a positive impact for economic growth of the country.
Inward foreign direct investment stock measured in millions of US dollar has expected positive sign and it is significant. As can see from the estimated result the variable trade as a percentage of GDP (TR) has a positive sign but it is insignificant. Similarly the variable gross capital formation (GCF) as measured in millions of current US dollar has negative sign but it is insignificance. This implies gross capital formation is not improved. The variable net investment as percentage of GDP has estimated positive sign but it is insignificance. The estimated coefficient of the variable gross fixed domestic investment (GFDI) has unexpected negative sign and it is insignificant. It implies there is no improvement in gross fixed domestic investment and it is not improved sufficiently. As it is known fixed investment needs huge capital, so that in Ethiopia, there is limited fixed investment. As a result it has negative sign and it becomes insignificant. The domestic investment capital distributed by region and sector not that much sufficient for running for faster economic growth. The other estimated variable is gross domestic product rate of growth (GDPR) as measured annually has positive coefficient but it is insignificant. In fact annual growth rate of GDP is improved continuously over the period as compared to the last.Dummy variable (DM) has expected positive coefficient and it is significant. Hence, in this study there is incorporation of dummy variable which helps to view whether there is impact of structural brake or not. Hence the period 1981-1991 denoted by value zero that is before liberalization of the economy and the period after liberalization denoted by value 1 for filling the value of dummy variable in regression estimation. Thus, dummy variable has positive expected coefficient and it is significant. That indicates structural brake has impact for economic growth. Since the computed value of F-test is high, that shows the overall significance of the model. Similarly lower computed p value shows rejection of null hypothesis and conclude that the model is better (Jim Frost at Minitab).

In time series analysis there is problem of autocorrelation of residuals. It is checked by Durbin Watson

Table 3 Regression Results computed based on Equation 3 with OLS method, data covered from 1981-2013, Dependent variable is GDP measured in millions of current US dollar.
statistics. In this case the Durbin Watson statistics is 1.59106 at 5% level of significance, it is found between the upper and lower table value. This implies there is inconclusive evidence in the absence or presence of positive first order serial correlation. However, applying the run test it can be seen that there is no evidence of autocorrelation in the residual of the first-difference regression. This inconclusive zone narrows when the sample size increases (Gujarati 2012). Hence in this study the regression is computed after first difference and hence the parameters are still BLUE.

Conclusion:

This study attempts to study the contribution of FDI on Ethiopian GDP. Related theoretical and empirical literatures are reviewed to see the extent of role of FDI. To investigate this role econometric method were applicable. Hence, the regression result show FDI has expected positive significant effect on Ethiopian GDP. But emphasis should be given on the policy of FDI. This finding suggests that there should be better policy framework to attract and improve the volume of FDI through creating conducive environment for investment according to the context Ethiopian.

Appendix 1:

The technique of residual ADF unit root test for co integration after estimating the model with constant and parameter take the value of residual and test its stationary in ADF unit root test. If it becomes stationary this means there is existence of co integration between the variable that is long term relationship between the dependent and independent variable. Hence, in this study the residual is stationary and there is co integration and hence long run relationship in the variable. In this study the variables are not stationary at level instead it becomes stationary at first difference. It requires that the variables of interest have the same order of integration. It is only when the variables are integrated of the same order that a linear relationship among them can be expected. Variables are said to be co-integrated if a long run equilibrium relationship exists among them. Engle and Granger (1987) argue that for such relationships to exist, the error terms of the model should be stationary. The researcher has applied the Engle-Granger procedure to test for co-integration. The first stage of the co-integration test involves estimating model/equation (2) and saving the error terms. Then the ADF tests are applied on the error terms. If the error terms are found to be stationary, the variables are said to be co-integrated (Gujarati, 2012). Hence in this study the residual test given by table 3 is stationary in ADF unit root taste at level.

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