The Impact of International Financial Aid on the Economic Growth of Ethiopia: Evidence from Time Series Analysis

Abstract

This study was carried out in order to analyze the impact of international financial aid on the economic growth of Ethiopia. In order to do the analysis, a time series data was collected from the World Bank for the period of 34 years (1981 to 2015). Six sets of models were developed and estimated in order to determine the aid-growth model for Ethiopian economy. To do the empirical analysis ex-anti diagnostic checks were carried out, this involved the determination of the stochastic properties of the selected variables using ADF and PP and the co-integrating relationship using Johansen (1991) procedure. The impact models were estimated using ordinary least square method. The evidence shows the following: i) All the variables expect ODA contain unit root at level. ii) The Co-integrating relation shows the presence of one cointegrating vector between economic growth and ODA and finally iii) the ODA was found to be the most important variable in explaining the economic growth for Ethiopia with an average contribution of 8% over the sample horizon. The study, therefore, recommends that the international donors should sustain the level of aid extended to Ethiopian economy.

1.0: General Background

Ethiopia is a small open economy located in the east African region. It is the second most populated country with an estimated population of 99.39 million people after Nigeria and before Egypt. Agriculture is the mainstay of the Ethiopian economy contributing more than 50% of the country's GDP, 83.9% of the export revenue and 80% of the total employment, the manufacturing sector's contribution to the overall economic activity is insignificant (see World Bank, 2015 country report). The country is experiencing rapid economic growth which stood at 9.60% as of 2015. However, the country is facing a lot of economic problems, due to fluctuation in rainfall which leads to food shortage and inadequate supply of potable water. The fluctuation in rainfall also leads decline in the country's foreign exchange earnings thereby affecting the entire economic activities. These problems make the economy to experience higher inflation which was 64.2% in 2015 and huge domestic and external debts which accounted for 54.55% of its GDP.

In order to help this country, various official development assistance (ODA) flows into the country in different forms, this includes, projects grants, sector grants, grants for human resources development in form of scholarship, grant through budget support program and grants in association with an international organization. Some of these grants come directly to the government while others indirectly which are through projects that will be undertaken directly by the donor organizations/agency. The total donation in form of official development assistance to Ethiopia as of 2013 stood at USD 3.9 billion, the aid comes from bilateral and multilateral partners. In the former group most of the aid is coming from the United States of America (USA), United Kingdom (UK), European Union (EU), Japan and Canada which accounted for USD 1.522 billion while the main donors in the latter group are: World Bank, African Development Bank (AfDB), The global fund, Gavi aid, and United Nations funds and programs which accounted for USD 2.3 billion.

Various empirical works have been conducted trying to assess the impact of different types of aid on the economic growth of Ethiopia. Setargie (2015), Girma (2015), Tadesse (2011), Bitew (2014), Ahmed (2014), Fissha (2007), and Liew et al(2012) among others. However, our work is different from theirs' in the following ways: Firstly, a complete stochastic assessment on the

macroeconomic variables will be made, which none of the existing works did, this involve the process of determining the order to integration and co-integration (co-movement) of the variables. Secondly, a model searching procedure is used in order to determine the actual Ethiopian aid model, this is achieved by developing a baseline model and some sets of alternative scenario models. The rest of the work is organized as follows: Section two contains a detailed theoretical and empirical literature review, in section three, the methodological procedure is discussed while in section four the results are presented and discussed and the final chapter concludes the work.

Aims and Objectives of the Research

The main objective of this research is to examine the impact of financial aid on the economic growth of Ethiopia. The specific objectives include:

- To examine the stochastic as well as co-integrating properties of the variables.
- To find out the most comprehensive aid-growth model for the Ethiopian economy through the use of model searching procedure
- To examine the impact of foreign aid on the economic growth of Ethiopia.

2.0: Theoretical Literature

In this section, the study reviewed both theoretical and empirical literature that has to do with the foreign aid in general and those that relate to Ethiopian economy in particular. The theoretical literature includes Dead aid theory, Walt Rostow, Structuralism, Dependency Theory, Basic needs theory, the basic needs theory, Neo-classical/Liberalist theory, post developing theory. Others are sustainable development, human development theory, the savings-investment gap approach, the foreign exchange gap approach, and the Absorptive capacity approach among others.

Foreign Aid Concepts

Foreign aid can be seen as money; either in cash or kind, willingly transferred to a country, religious groups, nongovernmental organization, and other foundations either free or in form of loans. The term has different meanings and usage in different countries. For example, in US, it is

referred to as military and economic assistance extended by the US government to a foreign nation(s). The foreign aid can be extended in different forms; this includes; a budget support, project aid, program aid, technical assistance, international assistance and food assistance among others.

There are various types of foreign aids, which includes, foreign direct investment, official development assistance, trade openness which allows free movements of goods and services among nations, bi-lateral aid- which happens between two countries or organizations, multi-lateral aid-which is an aid extend by group of countries to a country, for example, the aid coming from United Nations (UN), European Union (EU), OECD and others. Other forms of aid include military aid, humanitarian aid, and relief aid among others. The main aim of foreign aid is to help the poor nations to attain the basic needs of its people.

Aid Development Theory

Dead Aid Theory: this theory was developed by Moyo(2009), she argued that the foreign aid has done more harm than good to African countries and hence should be stopped. Her main argument was that the foreign aid transfer to African Countries has caused too much dependency which further makes the countries underdeveloped, it has also encourage corruption among the countries- this is evident as the world most powerful corruption cases are attributed to Africa leaders, the aid has also lead to poor governance which result in the increase in the level of poverty in the continent. Therefore, to her, the main causes that hinders economic growth in Africa was humanitarian aid.

Basic Needs Theory: This theory was developed in 1976 by the international labor organization (ILO) in order to search for a convincing theory that will reduce the income disparity between rich and poor nations. They developed a minimum level of resources that are necessary for long term physical well being. This gives birth to what is known today as the poverty line. The countries that are below the poverty line need assistance in order to improve the well-being of the people. The believers of the theory argued that the removal of absolute poverty is an important way to make people active and hence a way of improving labor supply.

Walt Rostow: Who developed a growth mode, in the model, he developed five steps five steps through which developing nations need to pass-through before it becomes developed. The stages are traditional society, pre-condition for take-off, take-off, drive to maturity and age of large consumption. According to the model, for a country to reach the take-off stage it needs three fundamental drivers; that is, the country's rate of investment must be at least ten percent (10%) of its GDP. Secondly, a manufacturing sector that is growth oriented need to be established and finally, there must be strong institutions, political will and social cohesion that will engender the development of the manufacturing sector.

Structuralism: This has to do with the structural transformation of developing economies. It involves moving from Agricultural to manufacturing and then to services sectors. The local, as well as the foreign agencies, are the main players that are expected to fuel the activities in the sector. According to this theory, to achieve development, there is the need for the country to move from import dependent to an export oriented economy. This can be achieved through the use of import substitution industry.

Dependency Theory: This theory is advancement from the structuralism, according to it, development can only be achieved if de-linking and import substitution were followed with the help of the developed countries in the world. The believers of this theory are of the view that resources are moved from poor nations to wealthy ones which lead to accumulation of more resources by the wealthy countries at the expense of poor countries. In return, the wealthy countries send in return assistance in form of foreign aid.

Empirical Literature Review

Various empirical works have been conducted trying to assess the impact of different types of aid on the economic growth of Ethiopia. Setargie (2015), Girma (2015), Tadesse (2011), Bitew (2014), Ahmed (2014), Fissha (2007), and Liew et al(2012) among others. For example, Setargie (2015) examined the impact of foreign aid on economic growth for the Ethiopian economy using time series analysis of cointegration. He found that aid has a positive and significant impact on growth both in the short and long run. The work of Girma(2015) who was carried out using ARDL cointegration approach shows that aid has a negative impact on the economic growth of Ethiopia but the aid policy index shows a positive relationship with growth. This find is consistent with what was found by Bitew(2014).

Tadesse(2011) analyze the impact of foreign aid on the economic growth of Ethiopia using multivariate cointegration approach. The empirical evidence shows that aid has a positive and significant long run impact on investment. However, volatility in aid (aid inflow uncertainty) has a negative impact on Ethiopian capital formation. The aid policy term index appeared to be negatively related with growth. This finding is what was reported by Bitew(2014) and Girma(2015). The work of Bitew(2014) who investigated the long run relationship between aid and economic growth using co-integration analysis. The empirical evidence reveals the presence of a long-run relationship between the variables and the Granger causality result shows the presence of uni-directional causality running from aid to economic growth.

From the above-limited literature search, we can see that the evidence in terms of the impact of foreign aid is inconclusive as some studies found the presence of positive and significant relationship while others report the presence of negative relationship between the variables for the Ethiopian economy, this inconclusive evidence give the need to further carry out research in the area for two reasons: either for search of more convincing evidences or to provide a synthesis between the existing works.

: Methodology

: Introduction

This section presents the methodological procedure used in achieving the objectives of the study. This includes the empirical and econometrics models, the data and its sources and the definition of the variables.

: Empirical model

As pointed in the introductory section that one of the difficult tasks is the identification of the true aid model. In order to do that, we applied a trial and error method, where the foreign aid is used as the main explanatory variable with some sets of explanatory variables in order to determine how a small group of variables affect economic growth in Ethiopia. In order to determine this, we follow the works of Griffin and Enos (1970b), Campbell (1999), Bowen (1995) ad Teboul and Moustair (2001) but these models were modified to suit the economic characteristic of Ethiopia. The Following models were developed:

$$EG = F(A) \quad \text{.....(3.1)}$$

$$EG = F(A, IMP, EXP) \quad \text{..... (3.2)}$$

$$EG = F(A, FDI) \quad \text{..... (3.3)}$$

$$EG = F(A, S) \quad \text{..... (3.4)}$$

$$EG = F(A, IMP, EXP, FDI, S) \quad \text{.....(3.5)}$$

Where EG represents economic growth, A and S stand for foreign aid and total savings respectively. IMP and EXP represent import and export and F is the functional relationship. The model in equation 3.1 assumed that it is only aid that affects economic growth. Given that the Ethiopian economy is a small open economy, in model 3.2, we assumed that economic growth of the country can best be explained by foreign aid, import and export. In the model of equation 3.3, we assumed only foreign direct investment and foreign aid are responsible for Ethiopian economic growth. In model 3.2, savings and foreign aid are used as the main explanatory variables, where savings served as a control variable. And finally, in equation 3.5, all the variables are assumed to affect the economic growth of Ethiopia. By observing through equation 3,1 to 3.5, we can see that the model in 3.5 is a nested model which contains all the explanatory variables while the ones in 3.1 to 3.4 are a non-nested model which only contained some set of the explanatory variables. This procedure of modeling from general to a specific approach to

modeling was first developed by Hendry(1976) which we adopt here in order to find out the most robust specifications.

: Data and Sources

In order to estimate the models, a time series data was collected for a period of 34 years; that is, from 1981 to 2015. The data was collected mainly from World Bank database. We opt to use low-frequency data as the data for most of the variables are available only on annual basis. The variables include GDP, index of import and export, per capita savings and gross fixed capital formation and official development assistance. The GDP and ODA were log transformed in order to ensure that all the variables used in the model are of the same scale.

: Econometrics Techniques

In order to estimate the models in equations 3.1 to 3.5, an econometric procedure is applied. But before selecting the estimation techniques, and ex-anti diagnostic checks were first carried out. This is done in order to avoid estimation a spurious regression. This involves testing the stochastic properties of the series and if the variables at individual level contained a unit root, a further co-integration test will be used in order to determine whether a combination of two or more variables will lead to a long run relationship.

To test the unit root, two tests statistics are used, these are Augmented Dickey Fuller (ADF) and Phillips and Perron (PP) test. to understand the ADF test, consider the following equation:

$$y_t = \varpi_1 + \varpi_2 t + \varpi_3 y_{t-1} + \sum_{i=1}^{p} \Delta y_{t-i} + e_t \quad \text{.....(3.6)}$$

From the model in equation 3.6, the null hypothesis of unit root is tested against the alternative of stationary. This is done by comparing the critical value at a given level of significance with the estimated t-statistic of the autoregressive component of the model. the decision rule is that the null hypothesis of unit root is accepted if the critical value at a given level of significant exceed the calculated test statistics otherwise the alternative hypothesis is accepted. For detailed discussion on this test see the works of Dickey (1976) and Fuller (1979).

The above test used the parametric procedure in correcting the serial correlation problem as identified in Dickey and Fuller model autoregressive procedure. That is why the lagged difference of the autoregressive component was introduced. However, Phillip and Perron developed a nonparametric procedure of correcting the series correlation issue associated with the random walk model. Therefore, for the sake of this study, the two procedure is used in order to determine the robustness of the evidence. See for example Phillips and Perron (1989)

After determining the integration properties of the series, there are three possible outcomes: these are: firstly, rejection of the null hypothesis of unit roots in favor of stationarity. If this happens, the variables can be used in estimating the impact model. secondly, all the variables may turn level non-stationary, implying that they need to be differenced before they became stationary. Under this circumstance, a linear relationship between the variables can be determined and this is done through co-integration. Finally, if there is no co-integration, the variables can be made stationary through differencing and the impact model is estimated. The only implication for difference of variables is that the long run information will be lost.

In order to estimate the co-integrating relationship, we applied Johansen (1991) multivariate VECM framework. This model was developed in order to address most of the problems identified with the Engle and Granger (1987) model. The model is given as:

$$\Delta y_t = \alpha + \varpi_1 t + \pi y_{t-1} + \sum_{j=1}^{k-1} \varpi_2 \Delta y_{t-j} + \delta + \beta t + e_t \quad (3.7)$$

The above model gives the Johansen (1991) model which is based on the VECM framework. For the sake of this study, we are going to utilize it to determine the co-integrating relation between the variables.

The final task is to estimate the impact model and this is done through a simple regression model which is estimated using ordinary least square (OLS) estimator. To understand the impact model, consider the following relationship:

$$EG = \alpha_1 + \alpha_2 A + \alpha_3 IMP + \alpha_4 EXP + \alpha_5 S + \alpha_6 FDI + e_t \quad (3.8)$$

The model in equation 3.8 is the econometric specification of the nested model of equation 3.8. And all the other non-nested model are estimated in the same passion.

4.0: Result Presentation and Analysis

In this section, the estimated result was presented and analyzed. The section contained ex-anti diagnostic checks as explained in the methodology section and the estimates to which represent alternative aid models for the Ethiopian economy.

Table 4.1: Summary Statistics

	LGDP	ODA	SAVINGS	IM	GFCF	FDI	EX
Mean	10.69	2005428.	0.59	0.52	24.72	1.90	30.69
Maximum	11.86	5151850.	0.97	0.70	33.05	5.39	51.87
Minimum	10.13	550010.0	0.32	0.27	13.02	0.00	11.74
Std. Dev.	0.51	1085778.	0.19	0.11	6.60	1.67	11.38
Observations	35	35	35	35	13	23	31

Table 4.1 presents the summary of the descriptive statistics for the variables. The estimate shows a mean value of $10.69 million with a standard deviation of 0.51. The minimum and maximum values of Ethiopian productivity are $10.13 million and $11.86 million respectively. For the main explanatory of the study which is official development assistance shows that the Ethiopian economy experiences an average inflow of foreign aid amounting to $2,005,428 million over the sample horizon with a standard deviation of $1,085,778. The maximum and minimum values of foreign aid amounted to $5,151,850 million and $550,010 million respectively over the sample horizon.

Ethiopia has been an export dependent economy has an average value of $30.69 million export, this represents the proceed of export for agricultural commodities to a different part of the world particularly Europe. The export has a total fluctuation of $11.38 million over the period and the maximum and minimum export for the period was found to be $51.87 million and $11.74 million respectively. This represents the evidence for thirty-one years. However, the import value of the economy was low, the average value over the period was $0.59 million with a standard deviation

of $0.11. The minimum and maximum values were found to be $0.32 million and $0.70 respectively. The evidence of high export and low import can be attributed to the nature of the economy as they depend on locally produced goods while importing level from other countries.

The foreign direct investment which represents a number of money foreigners invested directly into the Ethiopian economy shows that the average investment inflow into the economy was found to be $1.90 million with a standard deviation of $1.67 million. The maximum value of FDI was found to be $5.39 while over the sample horizon, there are some years without direct investment inflow into the country. The gross fixed capital formation which represents an average of 24.74 with a standard deviation of 6.60. The minimum and maximum values were 13.02 and 33.05 respectively. Finally, the descriptive statistics show that the Ethiopian economy was saving on average $0.59 million, the estimated savings fluctuation over the period was 0.19 and the maximum and minimum values were found to be $0.97 million and $0.32 million respectively.

Having seen the nature of the descriptive statistics for the selected variables, the study next presents the ex-anti diagnostic checks for the variable. This will aid in determining the appropriate model to use.

Table 4.2: Test of Unit Root

Variables	ADF		PP	
	Level	First Difference	Level	First Difference
Export	-0.32(0.90)	-3.59(0.01)	-0.43(0.81)	-3.34(0.00)
FDI	-2.52(0.12)	-5.70(0.00)	-2.44(0.14)	-6.08(0.00)
GDP	-2.16(0.91)	-5.98(0.00)	0.04(0.99)	-11.22(0.00)
GFCF	-0.77(0.78)	-1.55(0.47)	-1.51(0.48)	-4.80(0.00)
Import	-1.55(0.44)	-6.14(0.00)	-1.53(0.50)	-6.14(0.00)
Savings	-1.87(0.34)	-6.19(0.00)	-1.87(0.33)	-6.20(0.00)
ODA	-3.44(0.01)	-13.0(0.00)	-3.94(0.00)	-14.18(0.00)

The probability values are in parenthesis

Table 4.2 above presents the Unit root evidence for the variables. In order to determine the stochastic properties, we used Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP)

test. The procedure for these tests was explained in detail in the methodology chapter. The evidence for level and the first difference was estimated. The ADF evidence shows that all the variables expect official development assistance is non-level stationary. This is because the calculated test statistic is less than the tabulated critical value all conventional level of significance. However, the official development assistance reveals that the variable is level stationary at one percent. After taking the first difference, all the variables except gross fixed capital formation appeared to be stationary.

For the Phillips and Perron evidence, the result shows that all the series contained unit root at level expect ODA that appeared to be level stationary and after taking the first difference they all became stationary. This includes the GFCF that is not stationary even at first difference using ADF testing procedure. Therefore, the conclusion is that export, foreign direct investment, GDP, gross fixed capital formation, import, and savings are level non-stationary, whereas, official development assistance is stationary. This finding is consistent with both the ADF and PP testing procedures.

Now, since we determined the stochastic properties of the series and we found that all the variables except one contained unit root which implies that the individual series are not mean reverting. The next task is to assess whether the combination of two or more variables will lead to a long run relationship between the variables. In another word, we want to see whether the error process emanating from two or more variables will be mean reverting. If this happens, we assumed the existence of a long run relationship between the variables hence they can be used for the impact analysis. This is done through a procedure called co-integration.

The literature in terms of the assessing the co-integrating relationship between two or more variables starts with the work of Engle and Granger (1987) where the developed a residual based test to co-integration. In Engle and Granger (1987) procedure, a regression model is estimated and the resultant residual is subjected to unit root test and once the null hypothesis is rejected the evidence is in favor of co-integration implying the presence of a long run relationship between the variables. There are four problems identified with the test and this includes: i) The test required that all the series to be integrated of order one {I(1)} ii) since it involves estimating regression, the endogeneity and exogenity of the variables is an issue, iii) if there are more than two variables, there is the possibility of more than one co-integrating relation, but because the test is a residual based test, you can only check the presence of one co-integrating vector and

finally, iv) Since the test is two steps procedure, where there is a mistake in the first step, it will Transnet to the second step which will affect the entire findings. In order to address the identified problems, especially ii-iv, Johansen (1991) came with a multivariate co-integration test which is through vector autoregressive framework. This procedure is widely applied in empirical researchers and it is what we used in to estimate the co-integrating relation in this study. For a detailed specification for the Johansen (1991) test, see the methodology section.

In terms of the strategy of the work, we estimate the co-integration for each of the models in equation 3.1 to 3.5 and the evidence is presented using both trace statistic and maximum Eigen values.

Table 4.3.A: Co-integration test for Model

Hypothesized		Trace	0.05	
Null Hypothesis	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.374218	17.60611	12.32090	0.0060
At most 1	0.062713	2.137265	4.129906	0.1695

Table 4.3.B: Co-integration test for Model 1 Maximum Eigen value evidence

Null Hypothesis		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.374218	15.46884	11.22480	0.0085
At most 1	0.062713	2.137265	4.129906	0.1695

Table 4.3.A and 4.3.B presents the co-integrating evidence based on trace statistics and maximum Eigen values respectively. The two pieces of evidence show the presence of one cointegrating vector. This implies the presence of a long run relation between official development assistant and economic growth of Ethiopia.

Table 4.4.A: Co-integration test for Model 2 trace statistics evidence

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.707578	66.53097	47.85613	0.0004
At most 1 *	0.390492	30.87379	29.79707	0.0374
At most 2 *	0.358877	16.51581	15.49471	0.0350
At most 3	0.117483	3.624335	3.841466	0.0569

Table 4.4.B: Co-integration test for Model 2 Maximum Eigen value evidence

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.707578	35.65718	27.58434	0.0037
At most 1	0.390492	14.35799	21.13162	0.3364
At most 2	0.358877	12.89147	14.26460	0.0814
At most 3	0.117483	3.624335	3.841466	0.0569

The co-integrating evidence for model two is presented in table 4.4A and 4.4.B for both the trace statistics and maximum Eigen values. In this model, two sets of variables were added to the variables in model one; the variables are export and import. This makes the total variables of model 2 to be four. Under the Johansen (1991) procedure, we expect to have at most 3 co-integrating relations. From the evidence, we found the presence of one long run relationship just like in model one. Given this, we assumed that the co-integrating relationship is between ODA and economic growth as we saw in model 1, therefore, there is no co-integration between import, export and economic growth. This represents evidence using maximum Eigen values. However, the trace statistics shows the presence of three co-integrating vectors as the test statistics exceeded the critical values up to at most 2, hypothesis.

Table 4.5.A: Co-integration test for Model 3 trace statistics evidence

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.445487	12.38296	21.13162	0.5103
At most 1	0.247810	5.980093	14.26460	0.6158
At most 2 *	0.197268	4.614433	3.841466	0.0317

Table 4.5.B: Co-integration test for Model 3 Maximum Eigen value evidence

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.445487	12.38296	21.13162	0.5103
At most 1	0.247810	5.980093	14.26460	0.6158
At most 2 *	0.197268	4.614433	3.841466	0.0317

For model 3, we added foreign direct investment to model one; that is, the model contains economic growth, official development assistance, and foreign direct investment. Since we have three variables, we expect the presence of two cointegrating relations. The evidence from both the trace and maximum Eigen values shows the presence of two cointegrating vectors. This implies the existence of a long run relationship between economic growth-ODA and economic growth-FDI respectively.

Table 4.6.A: Co-integration test for Model 4 trace statistics evidence

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.566800	41.87628	29.79707	0.0013
At most 1	0.297128	14.26990	15.49471	0.0758
At most 2	0.076737	2.634747	3.841466	0.1045

Table 4.6.B: Co-integration test for Model 4 Maximum Eigen value evidence

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.566800	27.60638	21.13162	0.0053
At most 1	0.297128	11.63515	14.26460	0.1251
At most 2	0.076737	2.634747	3.841466	0.1045

For model 4, the gross fixed capital formation was added to model 1 and this makes the total variables to be three. Hence we expect the presence of two cointegrating relationships. Given the evidence, we found that for both trace statistic and maximum Eigen values, the calculated value is greater than the tabulated value for the none null hypothesis. However, the remaining evidence show opposite that is the critical value is greater than the calculated value. Therefore, this shows the presence one co-integrating vector. Which implies that there is no long run relationship between foreign direct investment and economic growth in Ethiopia

Table 4.7.A: Co-integration test for Model 5 trace statistics evidence

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.993003	67.18976	29.79707	0.0000
At most 1	0.585107	12.60469	15.49471	0.1301
At most 2	0.233672	2.927597	3.841466	0.0871

Table 4.7.B: Co-integration test for Model 5 Maximum Eigen value evidence

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.993003	54.58507	21.13162	0.0000
At most 1	0.585107	9.677092	14.26460	0.2340
At most 2	0.233672	2.927597	3.841466	0.0871

For model 5, we added the total savings variable in model 1 and this makes model 5 to have three variables, therefore, we expect a maximum of two cointegrating vectors. The evidence from both trace statistic and maximum signal value show the presence of only one co-integrating

vector which implies the absence of a long run relationship between total savings and economic growth in Ethiopian. The evidence in terms of co-integrating procedure shows the existence of a long run relationship between economic growth and official development assistance in Ethiopia, implying that ODA will lead to economic growth in Ethiopia in the long run. However, there is the absence of a long run relationship between economic growth and import, export, gross fixed capital formation, foreign direct investment and total savings for the Ethiopian economy.

Now having determined the integration and cointegration properties of the series as an ex-anti diagnostic check, next we present the estimates of the models. This represents the estimates of equations 3.1 to 3.6 as presented in the methodology chapter.

Table 4.8: Estimates of the Regression Models

Coefficients	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
C	10.06(0.00)	9.10(0.00)	9.88(0.00)	10.7(0.00)	9.85(0.00)	8.48(0.00)
LODA	3.00(0.00)	6.00(0.01)	4.00(0.00)	2.36(0.00)	4.00(0.00)	1.00(0.06)
Export		0.02(0.00)				-0.03(0.14)
Import		1.58(0.00)				2.28(0.08)
FDI			0.02(0.48)			0.24(0.6)
Savings				-0.88(0.02)		0.025(0.05)
GFCF					0.04(0.75)	-0.001(0.6)

The probability values are in parenthesis

Table 4.8 presents the estimates of the six (6) models. For model 1, the official development assistance was found to be positive and significantly related to economic growth. The magnitude of the relationship is 3.0, implying that, when there is an increase in ODA inflow, the economic growth of Ethiopia will increase by 3% and vice versa. The mean value of the relationship is also positive and statistically significant with a magnitude of 10.06, meaning that even if ODA inflow is zero, the level of economic growth for the country will be 10.06%.

For the second equation; that is, model 2, where we added import and export to model one. The estimates show that, just like in model 1, ODA is positive and significantly related to economic

growth with a magnitude of 6.0. The evidence in model 1 presents a situation of the closed economy where no import or export is assumed. However, when an open economy assumed, that is, import and export are introduced, the impact of ODA on economic growth doubled. The import and export variables were found to be positive and statistically significant at 1% level.
For model 3, foreign direct investment was added to model one. The mean value of the relationship is 9.88 which implies that even if all variables are assumed to be zero, economic growth of Ethiopia will be 9.88%. The relationship between ODA and economic growth is positive and statistically significant with a magnitude of 4%. The FDI which is the control variable shows the existence of positive although statistically insignificant relationship. This means that FDI impact on Ethiopian economy is insignificant. However, it is important to note that after adding FDI variable in the model, the magnitude of the relationship between ODA and economic growth increased from 3% to 4%.

For model 4, saving was added to model 1 and the evidence shows a negative relationship between savings and economic growth. Which implies that an increase in savings will lead to a decline in economic growth of Ethiopia. The magnitude of the relationship is 0.88 and it appeared statistically significant. The ODA appeared to be positive and statistically significant in the relationship. The magnitude of the relationship between ODA and economic growth was 2.36% for the estimated period.

For model 5, the gross fixed capital formation was added to model 1 in order to see how ODA and GFCF affect the economic growth of Ethiopia. The result shows that GFCF is positive but insignificantly related to economic growth. The magnitude of the relationship is 0.04, implying that an increase in GFCF will lead to increase in economic growth by 0.04 and vice versa. The ODA shows as in all the previous model, a positive and statistically significant relationship with a magnitude of 4.0, meaning that an increase in ODA inflow will lead to increase in economic growth by 4%. This finding is consistent with what we found in model 3.

Finally, model 6 shows the estimate of the nested model, where all the variables used in the model are jointly estimated in order to see their total impact on the economic growth. In terms of sign, official development assistance, import, foreign direct investment, and savings are

positively related to economic growth, implying that an increase in these variables will lead to an increase in economic growth and vice versa. However, export and gross fixed capital formation show the evidence of a negative relationship with economic growth. This means that an increase in export and GFCF will lead to a decline in economic growth of Ethiopia.

In terms of significance, ODA, import, and savings appeared to be statistically significant while Export, FDI, and GFCF are statistically insignificant. Therefore, our main target will be the significant variables, because they are the main variables that show an impact on economic growth of the country. In terms of the magnitude of the relationship, the coefficient for ODA is 1%, -0.03 for export, 2.28 for import, 0.24 for FDI. The magnitude of the savings and GFCF were 0.025 and 0.001 respectively.

5.0: Summary, Conclusion, and Recommendation

5.1: Summary of the work

This study was carried out to assess the impact of foreign aid on the economic growth of Ethiopia using a time series data sampled from 1981 to 2015. In the first section, the general background of the study and the objectives the study achieved were discussed. In section two, relevant theoretical and empirical literature were discussed and the methodology is presented in section three. The estimated result was interpreted in section four while the work was concluded in this section.

: Summary of Findings

In terms of the stochastic properties of the series, the result shows that export, foreign direct investment, GDP, gross fixed capital formation, import, and savings are level non-stationary, whereas, official development assistance is stationary. This finding is consistent with both the ADF and PP testing procedures.

The evidence in terms of co-integrating procedure shows the existence of a long run relationship between economic growth and official development assistance in Ethiopia, implying that ODA will lead to economic growth in Ethiopia in the long run. However, there is the absence of a long run relationship between economic growth and import, export, gross fixed capital formation, foreign direct investment and total savings for the Ethiopian economy.

Official development assistant was found to be positive and statistically significant in all the six (6) estimated models. This means that when there is an increase in the inflow of official development assistance the economic growth of the Ethiopian economy will increase. The increase in the magnitude depending on the control variable(s) used in estimating the impact model, but on the average, ODA contributes 8% of the Ethiopian economy over the sample horizon.

For the other control variables used in the study, the evidence shows that most of the variables are positive and statistically related to economic growth. This is evident from model 1 to 5 as only savings appeared negative in model 4 and FDI was found to be statistically insignificant in model 3. However, the evidence for the nested model is somewhat different but is qualitatively the same with the non-nested models.

: Conclusions

Given the above evidence, the following conclusions were reached.

- The stochastic properties evidence for the selected variables is consistent using both Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP) tests.
- The Johansen (1991) cointegration procedure, we found the presence of a long run relationship between ODA and economic growth. The evidence is consistent using both trace statistic and maximum Eigen value.
- Official development assistance was found to be an important variable for the Ethiopian economy which accounted for on average 8% of its economic growth over the sample horizon.

: Recommendations

Based on the above findings, the following recommendations were made.

- The foreign aid donors should continue to assist the Ethiopian economy as we found it to be the main source of economic growth for the country.
- However, there is the need for some level of untie grants so that the government can pursue other developmental projects in the country.
- The Ethiopian government should try and diversify their economy. This can be done by boosting the activities of the manufacturing and service sectors of the economy. This is because, as its stands now, the too much dependent on agriculture which is exogenous to the economy is unproductive to the economy.

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