

Determinants of Economic Growth in Ethiopia: Evidence from ARDL Approach Analysis

¹Minyahil Alemu (MSc) ²Leta Sera (PhD) ³Wondimu Shenkoru (MSc)

Abstracts

Ensuring sustained real growth in national income is a primary concern to both developed and developing countries. It is that sustained growth in real national income to potentially explain an economy's development path and people's wellbeing. Though Ethiopia records double digit growth rate for last few years, it has been found to be unstable due to various internal and emerging global influences. Besides, recent home side political condition is also another challenge to the economic sector of the country at large. The present study examines factors potentially explaining the economic growth of Ethiopia using annual time series observations for the period running from 1981 to 2016. Individual variables were all subjected to both the ADF and PP unit root tests; and that, the existence of mixed order of integration has been confirmed with both approaches. For Cointegration issues, the ARDL approach was employed and the existence of long run relationship among variables entered the growth model has been confirmed too. Besides, none of the diagnostic tests was revealed invalid thereby ensuring the relevance of inferences made based on the ARDL estimates. The current and lagged impact of foreign aids is found to be important in explaining the economic growth of Ethiopia. Its current period impact was estimated to be positive and significant too as expected. Besides, the last year economic status of the country has also been suggested significant determinant of the current economic growth rate. Therefore, economic benefit of aids should be recognized and policy focus must be directed towards its efficient utilization.

Keywords: ARDL, Cointegration, Determinant Economic Growth, Ethiopia, Stationarity

DOI: 10.7176/DCS/9-1-05

1. Introduction

Other things constant, real growth in national income improves per capita income of the people. Real change in the national output of the country is a good measure of country's economic performance. According to [3] and [9] real and sustainable rise in gross national output is a desirable policy concern that could favorably affect people's life. The magnitude of this change in gross national income is a good measure of economic growth. The ambition for economic growth and hence economic development is an outcome of persistent rise in the general people towards improved life standard. The ultimate function of every economic activity is to satisfy people's material needs and wants as can be possible which guarantees worthiness and esteem. Besides, real growth in national income enhances the assortment of human choice and freedom in deciding on important economic options [10]. A number of indicators are used to measure the economic growth and appraise developments in people's living standard. A conventional approach is to use real gross domestic product (RGDP) or GDP per capita. Yet there are shortcomings in employing real GDP per capita as an indicator of the quality of life, it is plausibly associated with other indicators of quality; like, health, education... Economic growth advances living conditions via many ways. It generates more jobs, enhances investment, develops business confidence, and generates more revenue to the government in the form of tax incomes (see [3], [8], [10]).

A question of what potentially explains the country's economic growth has been an important concern among economic policy makers both in developed and developing countries. Though some economic theories suggest differences in natural resource endowments, see [8], a vast majority of literatures confirm differences in economic performance among countries within the same resource endowment and potential. This indicates the existence of country specific factors that are potential to explain the differences in economic performances of countries. Therefore, resource endowment alone is not enough; refer [3] and [9].

In Ethiopia, the trends in economic growth have shown improvements with time for the last few years following considerable reforms in economic policy of the country. It has been experiencing various changes in political and economic structures following changes in political ideologies with each regime. The changes in government structure have created inconsistency in economic policies by successive regimes as well as natural catastrophe such as; famine, drought and prolonged civil war and Ethio-Eritrean war [2] and [1]. These events imposed a depressing cost on the history of Ethiopian economic performance. According to most internal and external sources, these events account for the today's economic condition of Ethiopia. Ethiopia has continued recording a considerably significant economic growth rate since 2004. In the year 2012, Ethiopia's economy grew by about 9.7% and the tenth year in a line of vigorous economic growth. Nevertheless, African average growth rate was 4.9% and for Sub-Saharan countries was 5.3% in that year [1]. Based on the African Economic

¹ Lecturer, Economics Department, Jimma University, Ethiopia

² Assistant Professor of Economics, Jimma University, Ethiopia

³ Senior Expert, Department of Urban Development, Jimma, Ethiopia

Outlook details of 2012, Ethiopia ranks 12th fastest growing economy over the globe and the average growth rate for the last decade was estimated 10.9 percent. Besides, Ethiopia's collective economy reached the sub-Saharan African leading economy. Even though many previous studies exist on the determinants of economic growth in the country, majority of them didn't control for potential internal as well as external variables; like export trade, foreign aid, external debt, capital formation and Government expenditures. These important variables were well considered in the present study. This study investigates the determinants of economic growth in Ethiopia employing the time series variables for the periods running from 1981 to 2016.

2. Methodology

The data were mainly sourced from Ethiopian Ministry of Finance and Economic Cooperation (MoFEC), National Bank of Ethiopia (NBE), Central Statistics Agency (CSA), World Bank and World economic Outlook data bases.

The Classical, Neo-classical and New growth theories have identified various factors that could potentially affect the economic growth and performance of a given country. Some of these include; natural resources, investments, human capital, innovation, technology, economic policies, foreign aid, trade openness, institutional framework, FDI, political factors, socio-cultural factors, geography, demography and many more others; see [3], [8], and [10]. In order to examine the empirical evidence from Ethiopia, we tried considering most of these elements in our model.

The guideline to the present study is the Neoclassical Growth Model. The model proposed by the neoclassical growth model; refer [8] is given by;

$$Y = f(K) \dots \dots \dots (1)$$

Where; K is physical capital.

We extend equation (1) by just accounting for the independent variables as:

$$Y = f(\text{GCF, EXT, GEXP, EXDT, FAID}) \dots \dots \dots (2)$$

The relationship between the dependent and independent variables entered the growth model of the present study can be modeled as:

$$\ln Y_t = \beta_0 + \beta_1 \ln \text{GCF} + \beta_2 \ln \text{EXT} + \beta_3 \ln \text{GEXP} + \beta_4 \ln \text{EXDT} + \beta_5 \ln \text{AID} + \varepsilon_t \dots \dots \dots (3)$$

Where Y_t represents real GDP at a time t ; GCF represent for physical capital (formally gross investment) at a time t ; EXT stands for total export; GEXP, Government expenditure, AID represents for foreign Aid; EXDT is for external debt; and ε is a white noise error.

Individual variables were all subjected to ADF and PP unit root test approaches. Following [4], [5] and [6], a conventional procedure for the ADF unit root test is specified as follows:

$$\Delta Y_t = \alpha + \delta_t + \gamma_{Y_{t-1}} + \sum_{i=1}^p \Delta Y_{t-i} + \varepsilon_t \dots \dots \dots (4)$$

Hence, ADF tests the following hypothesis

$$H_0: \gamma = 0 \text{ against } H_1: \gamma < 0$$

If the t value in absolute terms exceeds the critical, the null cannot be rejected and conclude that there series does not contain unit root; hence, it is stationary.

We adapted the ARDL approach to examine the long run issues with the present study. Among the advantages of bound testing approach would be that, the long run and short run coefficients can be determined simultaneously [4] and [6]. Furthermore, the ARDL approach yields unbiased and efficient estimators [7].

Following [6], the ARDL modeling of unrestricted error correction model can be specified as:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \sum_{i=1}^p \alpha_i \Delta X_{t-i} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + U_t \dots \dots \dots (5)$$

Where Δ is the first difference operator, Y_t is a vector of dependent variables, X_t is a vector of p regressor, U_t is white noise residual term. In essence, the ARDL approach for Cointegration involves regression of the error correction model (ECM) version of the ARDL model.

We model the ARDL using the variables entered the growth model of the present study which accounts for the random effects as follows:

$$\begin{aligned} \Delta_{RGDP} = & \alpha + \sum_{i=0}^p \beta_0 \Delta \ln RGDP_{t-i} + \sum_{i=0}^p \beta_1 \Delta \ln GCF_{t-i} + \sum_{i=0}^p \beta_2 \Delta \ln EXP_{t-i} + \sum_{i=0}^p \beta_3 \Delta \ln GEXP_{t-i} + \\ & \sum_{i=0}^p \beta_4 \Delta \ln EXDT_{t-i} + \sum_{i=0}^p \beta_5 \Delta \ln AID_{t-i} + \theta_0 \Delta \ln RGDP_{t-1} + \theta_1 \Delta \ln GCF_{t-1} + \theta_2 \Delta \ln EXP_{t-1} + \\ & \theta_3 \Delta \ln GEXP_{t-1} + \beta_4 \Delta \ln EXDT_{t-1} + \theta_5 \Delta \ln AID_{t-1} + U_t \dots \dots \dots (6) \end{aligned}$$

Where the variables are all as defined earlier and other notations correspond to their respective expressions from the preceding sections.

3. Results and Discussion

i) Unit Root Test Results

Table 1: Stationarity Test Results for Individual Series

Variables	ADF		Phillips Perron (PP)	
	Estimates	Status	Estimates	Status
DRGDP	0.058	<i>I (1)</i>	0.018	<i>I (1)</i>
DLEXPRT	0.142	<i>I (1)</i>	0.058	<i>I (1)</i>
LEXPEND	0.539	<i>I (0)</i>	0.539	<i>I (0)</i>
LGCF	0.287	<i>I (0)</i>	0.287	<i>I (0)</i>
LAID	0.641	<i>I (1)</i>	0.169	<i>I (1)</i>
D.LDEBT	0.018	<i>I (0)</i>	0.551	<i>I (0)</i>

Source: Own Computation using Stata ver. 14

Evident from table (1) is the mixed order of integration among the individual time series in both approaches. None of them are *I (2)*, which is not among the undesired properties in applying ARDL. Therefore, both the Augmented Dickey Fuller (ADF) and PP unit root tests suggest that ARDL is appropriate for the examination of long run issues.

ii) Diagnostic and Validity Issues

The parameter stability and other validity tests were properly confirmed before starting formal regression analysis. We checked for the following suggested relevance tests. The Serial correlation test (Brush & Godfray LM test), Functional form (Ramsey's RESET) test, Normality (Jaque-Bera test), and Heteroscedasticity test. Besides, the stability of long run estimates has been examined using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. None of them has failed fulfilling the minimum required statistical threshold thereby allowing the estimation of ARDL regression model.

iii) ARDL Model Estimation Results

Table 2: ARDL (1, 1, 1, 1, 1, 1, 1) Regression Outputs

Regresses	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
DRGDP (1)	-0.5249	0.1839	-2.85	0.010	-0.9099 -0.1399
DLEXPRT	-0.1168	0.0624	-1.87	0.077	-0.2475 0.0138
DLEXPRT (1)	-0.0580	0.0521	-1.11	0.280	-0.1671 0.0511
LEXPEND	0.0024	0.0480	0.05	0.961	-0.0981 0.1029
LEXPEND (1)	-0.0806	0.0506	-1.59	0.127	-0.186 0.0252
LGCF	0.5772	0.0987	5.85	0.100	0.3707 0.7838
LGCF (1)	-0.0976	0.1110	5.85	0.126	0.3707 0.7838
DLAID	0.0555	0.0258	2.15	0.044	0.0015 0.1094
DLAID (1)	-0.0683	0.0305	-2.24	0.037	-0.1321 -0.0045
LDEBT	0.2302	0.2200	1.05	0.309	-0.2303 0.6908
LDEBT (1)	-0.2716	0.2289	-1.19	0.250	-0.7507 0.2076
CONS	-2.369	0.6739	-3.52	0.002	-3.780 -0.9591

Regression Output from Stata ver. 14

Evident from table (2) is a positive and significant impact of foreign aid on the economic growth of Ethiopia. Other things constant, a million birr additional aid increases the country's real gross national income by about 0.055 million birr in the same year the aid is received. This is suggested to be statistically meaningful contribution towards the economic growth of the country. This particular finding is as expected and in line with most economic theories as well as empirical evidences over the global economy. Besides, the impact of foreign aid was found to persist for the next year though its growth effect is negative. A year lagged growth effect of external aid is however in contrast to theoretical justifications and most empirical experiences. It may be due to the inflationary role of previous monetary distributions with no parallel positive response from the real sector, particularly real production.

Moreover, the last year's level of real income is found to be important to explain the current period income. However, the estimated coefficient is negative and highly significant as opposed to theoretical expectations. It might be associated with inconsistent agricultural yield which is largely explained by exogenous factors. Alternatively, price falls associated with better agricultural supplies might be deterrent to the supply side and reduced the production motivation in the latter periods. Poor economic institutions in the country lacking well defined strategies on how to manage these surplus productions are responsible for its subsequent costs to the general economy.

4. Conclusion and Recommendations

The present study examines factors potentially explaining the economic growth of Ethiopia using annual time series observations for the period running from 1981 to 2016. Individual variables were all subjected to both the

ADF and PP unit root tests; and that, the existence of mixed order of integration has been confirmed with both approaches. For Cointegration issues, the ARDL approach was employed and the existence of long run relationship among variables entered the growth model has been confirmed too. Besides, none of the diagnostic tests was revealed invalid thereby ensuring the relevance of inferences made based on the ARDL estimates. The current and lagged impact of foreign aids is found to be important in explaining the economic growth of Ethiopia. Its current period impact was estimated to be positive and significant too as expected. Besides, the last year's economic status of the country has also been suggested significant determinant of the current economic growth rate. Therefore, economic benefit of aids should be recognized and policy focus must be directed towards its efficient utilization.

References

- [1] ADB (2012), "*Inflation Dynamics in Some Selected East African Countries*", *Working Paper*, African Development Bank, Tunis, Tunisia
- [2] Alemayehu G. and Befekadu D. (2005), "*Conflict and Economic Performance in Ethiopia*", Research Article, Addis Ababa University, Addis Ababa, Ethiopia
- [3] Ghatak S. (1995), "*Introduction to Development Economics*", 3rd edition, Rutledge, London, UK
- [4] Gujarati D. (2004), "*Basic Econometrics*", 4th edition, New York: The McGraw-Hill
- [5] Peracchi F. (2001), "*Econometrics*", West Sussex, POL9 1UD, England.
- [6] Pesaran M., Y. Shin, and R. Smith (2001), "*Bounds Testing Approaches to the Analysis of Level Relationships*", *Journal of Applied Econometrics*, pp. 289-326
- [7] Peter C.B. Phillips (2004), "*Applied Time Series Econometrics*", Cambridge University Press, New York
- [8] Romer D. (1996), "*Advanced Macroeconomics*", McGraw-Hill Companies, USA
- [9] Todaro M. and Smith S. (2006), "*Development Economics*", 9th edition, Harlow, Pearson and Addison Wesley, London, UK
- [10] Todaro, M., (1994), "*Economic Development*", 5th edition, Longman, New York and London