The Impact of Bank Saving and Bank Credit on Economic Growth in Ethiopia: An ARDL Co-integration Approach

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Abstract: *Economic growth is the common goal of all nations in the world. Economic growth is defined as a positive change in the national income or the level of production of goods and services by a country over a given period of time. The general objective of this study is to investigate the impact of bank savings and bank credits on Ethiopia's economic growth over the period 1970/71-2014/15. The ARDL Approach to Co-integration and Error Correction Model are applied in order to investigate the long-run and short run impact. The finding of the Bounds test shows that there is a stable long run relationship between independent variables and dependent variable. The long run economic growth regression result indicates that human capital, labour force, private domestic credit, terms of trade and export have positive and significant impact on economic growth of Ethiopia. However, the result shows that gross domestic saving and gross capital formation have an insignificant positive impact on economic growth in Ethiopia. Finally, the study recommended that to make domestic saving is important to maintain sustainable economic growth in Ethiopia; the government should increase the amount of domestic saving. To do so, the government should focus to increase broad money, real interest rate and life expectancy that are important determinants to increase domestic saving.*

Keywords: Ethiopia, Economic Growth, Domestic Saving, Domestic Credit, ARDL

1. Introduction

Economic growth is the common goal of all nations in the world. Economic growth is defined as a positive change in the national income or the level of production of goods and services by a country over a certain period of time. This is often measured in terms of the level of production within the economy. Other possible measures include total factor productivity, factors of production such as technological change, human capital termed the Schumpeterian approach, other measures of growth ranges from real per capita GDP; the rate of physical capital accumulation etc (Odedokun 1998; King & Levine 1993; Allen & Ndikumama 1998). Government in each country aims to reduce the poverty and increase the level on national income. Therefore, to achieve the main target of economic growth, governments may implement various kinds of policies such as encourage saving, stimulating investment and production in their countries.

Ethiopian economy has experienced strong and broad based growth over the past decade, averaging 10.9% per year in 2004/05 – 2012/13 compared to the regional average of 5.3%. Expansion on the service and agricultural sectors account for most of this growth, while manufacturing sector performance was relatively modest. Private consumption and public investment explain demand side growth with the latter assuming an increasingly important role in recent years. Economic growth brought with it positive trends in reducing poverty, in both urban and rural areas. While 38.7% of Ethiopians lived in extreme poverty in 2004-2005, five years later this was 29.6%, which is a decrease of 9.1 percentage points as measured by the national poverty line, of less than $0.6 per day. Using the Growth and Transformation Plan (GTP), the target was to reduce this

further to 22.2% by 2014-2015. Moreover, 22% of Ethiopians lived in extreme poverty in 2015/16.

Financial intermediation is an important activity in sustaining the economic growth because it allows funds to be channelled from people who might otherwise not put to productive use to people who will. However, the level of financial intermediation in Ethiopia is low, in part due to the public's lack of confidence in the banking sector (Admassu, 2014). The position of this country makes it somehow important to see the contribution of the financial sector to the spate of growth within the economy.

The determinants of economic growth are well-documented in the economic literature. However, those results found were inconsistent. Hence, this study can fill the previous studies gap at least in the following three ways. (I) since studies in the area of economic growth are very insufficient and have showed inconsistent results, the study helps to further identify the determining capacity of the variables tested before (II) the study added recent data not used in previous studies and (III) the study also added other variables which are not incorporated in previous studies.

The general objective of this study is to investigate the long run and short run impact of bank savings and bank credits on Ethiopia's economic growth over the period 1970/71-2014/15. The ARDL Approach to Co-integration and Error Correction Model are applied in order to investigate the long-run and short run impact.

The finding of the Bounds test shows that there is a stable long run relationship between independent variables and dependent variables. The long run economic growth regression result indicates that human capital, labour force, private domestic credit, terms of trade and export have

positive and significant impact on economic growth of Ethiopia. However, the result shows that gross domestic saving and gross capital formation have an insignificant positive impact on economic growth in Ethiopia.

Finally, this study gives important recommendation for policy implications. The government is required to set a sound fertile ground in order to enhance private credit that is adequate enough to finance investment and to realize fast, sustainable and equitable economic growth. To do so, the government should create stable and predictable economic environment that create stable exchange rate. The government should also increase the amount of external debt that solves the shortage of domestic source of private domestic credit because of low amount of domestic saving in Ethiopia.

Since the result reveals that gross domestic saving has positive and insignificance effect on economic growth. This is because of low amount of gross domestic saving in Ethiopia. To make gross domestic saving is important to maintain sustainable economic growth; the government should increase the amount of gross domestic saving.

2. Literature Review

Based on the results from previous empirical and theoretical evidences, this study considers the following variables as the important determinants of long-run per capita income: (1) human resources (initial human capital stock), (2) investment, (3) exogenous shock (terms of trade growth), (4) domestic saving and credit and (5) labour force, (6) external debt (7) foreign direct investment.

2.1 Foreign Direct Investment (FDI) and Economic Growth

Foreign direct investment (FDI) contributes to economic growth in host economies by expanding Capital accumulation, technological changes and human capital augmentation. Theoretical arguments state that FDI contributes to economic growth both directly – through the accumulation of capital and technological know-how – and indirectly – through technology and knowledge transfers to domestic firms in the host economy.

However, others have argued that the postulation of foreign firms being more efficient than domestic firms is not necessarily true (Hausmann and Fernandez-Aria, 2000). Especially when FDI takes the form of Merger and Acquisition the inflow of capital might not always be accompanied with enhanced technologies, managerial capacity and entrepreneurial ability. Foreign investment can take place because foreigners have a higher cash position and can take advantage of liquidity constrained domestic investors' fire sales, rather than because of a technological advantage.

2.2 Bank Savings, Bank Credit and Economic Growth

Bank savings and Bank credits are the most important variables that determine the economic growth. In the give domestic economy domestic savings mobilization by commercial banks and credit allocation functions stem from their role as the financial intermediaries. Solow's neo-classical growth theory (1956) suggested that savings affected the economic growth because higher savings led to capital accumulation, which in turn led to economic growth. Anthony (2012) show that increased domestic savings will lead to greater availability of investment fund which will lead to greater capital formation, increased productivity, and higher growth of the economy. Azege (2007) and Orji (2009) states that increase in bank credits to the private sector and public sector will enhance private sector and public sector transactions level and investments within the economy and subsequently accelerate the growth of the economy.

2.3 Government Expenditure and Economic Growth

The classical economists (Smith, 1776, Ricardo, 1821) viewed that countries with higher government expenditure would practice lower economic growth. The classical economists advocated the policy of laissez-faire in economic affairs and wanted that the state activities should be confined to the bare minimum, because interference with the free economy by the government would hinder economic progress.

According to the Keynesian, Myrdal's, and Endogenous Growth Theory, the government plays an active or key role in the growth process. Keynes (1936) supported that higher government expenditure promote economic growth. According to the Keynesian theory, government expenditure as a fiscal policy instrument is useful for achieving short term stability and higher long run growth rate. Government expenditure can also have a negative effect on economic growth, as they grow more and more, the law of diminishing returns begins operating (Gallaway and Vedder 1998; Barro 1991).

2.4 External Debt and Economic Growth

The World Bank report (2009) describes total external debt as debt owed to non-residents repayable in foreign currency, goods, or services. External debt is an important source of finance mainly used to supplement the domestic sources of funds for supporting development and other needs of a country. Every economy requires an amount of capital to generate production and sustain development: capital, being a factor of production is particularly important but relatively scarce, and the dearth of capital is much more prevalent in developing countries which Ethiopia happen to be among. External debt has increased steadily in developing countries in recent decades. In an effort to accelerate the economic development, developing countries often rely on external resources of capital to supplement the lack of domestic capital (Panizza, 2008).

However, an increase in the external debt might indirectly depress the level of economic growth by creating debt overhang effect, crowding out effect, macroeconomic instability and disequilibrium, discouraging capital formation and encouraging capital flight due to tax increase expectation (Boboye and Ojo, 2011; Umaru, et al., 2013).

2.5 Terms of Trade and Economic Growth

Lowering trade barriers is likely to foster international trade by reducing transaction costs, which in turn can enhance economic growth rates. Likewise, it can be argued that developing countries or emerging market economies that are more open to the rest of the world have a greater ability to absorb technologies developed in more developed nations. It goes back to the classical economic theories by Adam Smith and David Ricardo, who revealed that international trade plays an important role in economic growth, and there are economic gains from specialization. It was also recognized that exports provide the economy by providing foreign exchange needed for imports that cannot be produced domestically (Seraphin and Yinguo, 2015).

However, the "Classical Foreign Trade Theory" has been criticized by many scholars. According to these scholars, the theory is not appropriate for real, dynamic conditions, especially in terms of poor countries that want to develop. These countries are export dealers of primitive. This means that the hypothesis of foreign trade as economic growth's engine is not relevant to developing countries. Trade policies can be seen as responses to market imperfections or as mechanisms of rent seeking. Trade restrictions imposed by such policies have a different impact on trade volumes than other constraints due to transport costs or shifts in consumer preferences.

2.6 Gross Capital Formation and Economic Growth

According to the classical and neo-classical growth model capital is crucial for economic growth. The two models reveal that if there is no capital, there is no investment and no growth. That means capital accumulation helps expand productive capacity of different economic sectors by increasing number of firms. When a number of firms engage into business activities, internal resources of a country are better utilized through increasing competition and effectiveness. As a result, the productivity of factor endowments is increased and a low production cost can be realized through greater economies of scale as well as standardization of products (Adhikary, 2011).

3. Research Methodology

3.1 Sources and Types of Data

The study used annual time series secondary data for the period 1970/71 to 2014/15. The necessary data for the study is collected from various sources such as National Bank of Ethiopia (NBE), Ethiopian Economic association (EEA), Ministry of Finance and economic Development (MoFED), Ethiopian Central Statistical Authority (CSA), International Monetary Fund (IMF) database, World Bank (WB) Data base.

3.2 Model Specification

Here, the researcher is interested in studying the impact of bank savings and bank credits on Ethiopia's economic growth. Thus, the researcher modified and extends the model specifications of Azege (2007). Using the OLS

techniques gross domestic savings, private sector bank credits, and other variables will regressed on GDP
RGDP= f (GDS, HEE, ED, GCF, LF, FDI, TO, EXP, and PDC)

$$.. (1)$$

Where: RGDP = Real Gross Domestic Product per capital, GDS = Gross Domestic Saving. It is the ration of gross domestic saving to GDP, HEE = Human capital. It is the ratio of the sum of education and health expenditure to GDP, ED = External debt. It is the ratio of foreign liability to GDP, GCF = Gross Capital Formation. It is the ratio of gross capital formation to GDP, LF = Labour Force. Labour force measured by share of population aged 15-64, FDI = Foreign Direct Investment. It is the ratio foreign direct investment to GDP, TO = Terms of Trade. The volume of exports and imports as a share of total GDP is used as a measurement of terms of trade, EXP = Export. It is the ratio of export to GDP, PDC = Private Domestic Credit. The Ratio of Commercial Banks' private sector credits to GDP.

To make equation (1) amenable for empirical verification, the researcher transforms it into an econometric equation;

$$\ln RGDP = \alpha_0 + \alpha_1 \ln GDS + \alpha_2 \ln HEE + \alpha_3 \ln ED + \alpha_4 \ln GCF + \alpha_5 \ln LF + \alpha_6 \ln FDI + \alpha_7 \ln TO + \alpha_8 \ln EXP + \alpha_9 \ln PDC + \mu...$$
$$...(2)$$

Where: Ln = Natural logarithmic transformation , α_i = Parameters to be estimated, μ = Error Term.

Assuming that the variables in equation (2) are not well behaved, the researcher rewrites it as:

$$\Delta \ln RGDP = \alpha_0 + \alpha_1 (\Delta \ln GDS_{t-i}) + \alpha_2 (\Delta \ln HHE_{t-i}) + \alpha_3 (\Delta \ln ED_{t-i}) + \alpha_4 (\Delta \ln GCF_{t-i}) + \alpha_5 (\Delta \ln LF_{t-i}) + \alpha_6 (\Delta \ln FDI_{t-i}) + \alpha_7 (\Delta \ln TO_{t-}) + \alpha_8 (\Delta \ln EXP_{t-i}) + \alpha_9 (\Delta \ln PDC_{t-i}) + \mu.. (3)$$

Where: Δ= Difference Operator, α_i =Parameter to be estimated, t-i= Unknown lags to be estimated, μ =Error Term

Equation (3) captures the objective of the study. It assumes that all the variables are well behaved; otherwise equation (3) translates to:

$$\Delta^{ko} \ln RGDP = \alpha_0 + \alpha_1 (\Delta^{k1} \ln GDS_{t-i}) + \alpha_2 (\Delta^{k2} \ln HEE_{t-i}) + \alpha_3 (\Delta^{k3} \ln ED_{t-i}) + \alpha_4 (\Delta^{k3} \ln GCF_{t-i}) + \alpha_5 (\Delta^{k5} \ln LF_{t-i}) + \alpha_6 (\Delta^{k6} \ln FDI_{t-i}) + \alpha_7 (\Delta^{k7} \ln TO_{t-i}) + \alpha_8 (\Delta^{k8} \ln EXP_{t-i}) + \alpha_9 (\Delta^{k9} \ln PDC_{t-i}) + \mu_t.. (4)$$

Where: K = Order of Differencing.

Equation (4) assumes that: $K_0 \neq K_1, K_2, K_3, K_4, K_5, K_6, K_7, K_8,$ and K_9. Else if K_0 is equal to any of $K_1, K_2...K_9$, then the researcher shall investigate the presence of a co-integration amongst the variables. If the residuals are stationary and a long in relationship is established, then the parameters will thus be suitably estimated by introducing an error correction mechanism as developed by Engle and Granger (1987). This will enable separate the long run relationship of RGDP from its explanatory variables.

Note that if there is evidence of co-integration, then equation (4) converges to the Error Correction Model (ECM) as shown below:

$$\Delta^{k_0} \ln RGDP = \alpha_0 + \alpha_1 (\Delta^{k_1} \ln GDS_{t-i}) + \alpha_2 (\Delta^{k_2} \ln HEE_{t-i}) + \alpha_3 (\Delta^{k_3} \ln ED_{t-i}) + \alpha_4 (\Delta^{k_3} \ln GCF_{t-i}) + \alpha_5 (\Delta^{k_5} \ln LF_{t-i}) + \alpha_6 (\Delta^{k_6} \ln FDI_{t-i}) + \alpha_7 (\Delta^{k_7} \ln TO_{t-i}) + \alpha_8 (\Delta^{k_8} \ln EXP_{t-i}) + \alpha_9 (\Delta^{k_9} \ln PDC_{t-i}) + \alpha_{10} (ECM_{t-i}) + \mu_t \dots\dots\dots\dots\dots (5)$$

Where:
α_{10} = The Speed of Adjustment Parameter
ECM_{t-i} = the Residual or Error Correction Mechanism of the Previous Year.

However, to ensure the parsimonious nature of the model, equation (5) translates to an Auto regressive Distributed Lag (ARDL) model as shown below.

$$\Delta^{k_0} \ln RGDP_t = \alpha_0 + \text{ө}_i (\Delta^{K_0} \ln RGDP_{t-i}) + \alpha_i \sum_{\substack{i=1 \\ l=1}}^{n} \Delta^{k_i} Z_{t-q} + \alpha_{10} (ECM_{t-i}) + \mu \dots\dots\dots\dots (6)$$

Where, $Z_t - q$ = vector of macroeconomic controls that includes all other explanatory variables in the model. ARDL will be used to avoid unnecessary loss of degrees of freedom. Also model simulation will be carried out to avoid specification error and to ensure the marginalization of the entire irrelevant variables in the ARDL model. But if the auto-regressive variable ($\Delta^{k_0} RGDP_{t-i}$) becomes marginalized in the process of simulation, then equation (6) translates to only Distributed Lag (DL) model as stated below:

$$\Delta^{k_0} \ln RGDP_t = \alpha_0 + \alpha_i \sum_{i=1}^{n} \Delta^{k_i} Z_{t-q} + \alpha_{10} (ECM_{t-i}) + \mu \dots\dots\dots\dots\dots\dots (7)$$

3.3 Estimation Procedure

3.3.1 Unit Root Tests
Several ways of testing for unit roots are available in the literature. Examples of such techniques are the Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test, The DF, ADF and PP tests are the most popular types of unit root tests applied in empirical work. This is mainly due to their simplicity and general nature (Harris and Sollis, 2003). This study applied the Phillips Perron (PP) test since it has greatest power than others.

3.3.2 ARDL Bounds Co integration Approach Tests
This study applied the ARDL which appears to be applied in recent empirical investigations. ARDL model has a more advantages than the Johnson co-integration approach. First, the ARDL approach can be applied irrespective of whether the repressors' are I (1) and I (0). Second, while the Johansen co-integration techniques require large data samples for validity, the ARDL procedure provides statistically significant result in small samples (Pesaran and Shin, 1997; Pesaran and Shin, 1999; Narayan, 2005; Udoh and Ogbuag, 2012). Third, the ARDL procedure provides unbiased and valid estimates of the long run model even when some of the repressors are endogenous (Shimelis, 2014). Further, in using the ARDL Approach, a dummy variable can be included in the co-integration test process,

which is not permitted in Johansen's method (Rahimi and Shahabadi, 2011).

According to Green (2003), the generalized ARDL (p, q) model can be shown as follows:

$$Y_t = \beta_0 + \sum_{i=0}^{p} \beta_i Y_{t-1-i} + \sum_{i=0}^{p} \beta_t X_{i,t-i} + \varphi_t -----\\ -------------(8)$$

Where β_0 is constant, Y_t is endogenous variable, $X_{i,t}$ the ith at period t^{th} independent variables, P is the maximum lag number to be used, and are coefficients of the independent variables, and φ_t is the white noise error.

Therefore, following the ARDL approach proposed by Pesaran and Shin (1997, 1999) and Pesaran, Shin, and Smith (2001), the following model is specified in order to test the long-run co-integration relationships between variables for the impact of bank saving and bank credit on economic growth.

$$\Delta LnRGDP_t = \beta_0 + \lambda_1 LnRGDP_{t-1} + \lambda_2 LnGDS_{t-1} + \lambda_3 LnHEE_{t-1} + \lambda_4 LnED_{t-1} + \lambda_5 LnGCF_{t-1} + \lambda_6 LnLF_{t-1} + \lambda_7 FDI + \lambda_8 LnTO_{t-1} + \lambda_9 LnEXP_{t-1} + \lambda_{10} LnPDC_{t-1} + \beta_1 \sum_{i=0}^{n} \Delta LnRGDP_{t-i} + \beta_2 \sum_{i=0}^{n} \Delta LnGDS_{t-i} + \beta_3 \sum_{i=0}^{n} \Delta LnHEE_{t-i} + \beta_4 \sum_{i=0}^{n} \Delta LnED_{t-i} + \beta_5 \sum_{i=0}^{n} \Delta LnGCF_{t-i} + \beta_6 \sum_{i=0}^{n} \Delta LnLF_{t-i} + \beta_7 \sum_{i=0}^{n} \Delta LnFDI_{t-i} + \beta_8 \sum_{i=0}^{n} \Delta LnTO_{t-i} + \beta_9 \sum_{i=0}^{n} \Delta LnEXP_{t-i} + \beta_{10} \sum_{i=0}^{n} \Delta LnPDC_{t-i} + e_t -----\\ -------------------\\ ----(9)$$

Where: $LnRGDP_t$=Natural logarithm of RGDP at time t, $LnGDS_t$=Natural logarithm of gross domestic saving at time t, $LnHHE_t$= Natural logarithm of human capital at time t, $LnED_t$= Natural logarithm of external debt at time t, $LnGCF_t$= Natural logarithm of gross capital formation at time t, $LnLF_t$= Natural logarithm of labour force at time t, $LnFDI_t$= Natural logarithm of foreign direct investment at time t, $LnTO_t$= Natural logarithm of terms of trade at time t, $LnEXP_t$= Natural logarithm of export at time t, $LnPDC_t$= Natural logarithm of private domestic credit at time t.

$\lambda_1, \lambda_2, \lambda_3, \lambda_3, \lambda_4, \lambda_5, \lambda_6, \lambda_7, \lambda_8, \lambda_9$ and λ_{10} are coefficients that measure long run relationships.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ β_9 and β_{10} are coefficients that measure short run relationships.

e_t is an error term and denotes lag length of the auto regressive process.

t is the time trend of the model.

3.3.3 Error Correction Model

The error correction model has been used to estimate the short run effects of explanatory variables' on the explained variable. According to Harris and Sollis (2003), the error correction model works effectively at capturing the short run dynamics, which are consistent with the long run dynamics. Asteriou and Hall (2011) also state that when co-integration exists between two or more variables, the residuals obtained from the ordinary least squares regression can be applied to estimate the error correction model and examine the effects of the variables in the long run and short run and therefore understand how the coefficient of the lagged residual terms adjusts periodically.

Equation (10) below shows the standard error correlation model that used in this study. So that, the discrepancy between the short-run and the long-run levels of RGDP can be investigated by the following error correction model:

$$\Delta LnRGDP_t = \beta_0 + \beta_1 \sum_{i=0}^{a} \Delta LnRGDP_{t-i}$$
$$+ \beta_2 \sum_{i=0}^{b} \Delta LnGDS_{t-i}$$
$$+ \beta_3 \sum_{i=0}^{c} \Delta LnHEE_{t-i}$$
$$+ \beta_4 \sum_{i=0}^{d} \Delta LnED_{t-i} + \beta_5 \sum_{i=0}^{e} \Delta GCF$$
$$+ \beta_6 \sum_{i=0}^{f} \Delta LnLF_{t-i} + \beta_7 \sum_{i=0}^{g} \Delta LnFDI_{t-i}$$
$$+ \beta_8 \sum_{i=0}^{h} \Delta LnTO_{t-i}$$
$$+ \beta_9 \sum_{i=0}^{i} \Delta LnEXP_{t-i}$$
$$+ \beta_{10} \sum_{i=0}^{j} \Delta LnPDC_{t-i} + \gamma ECM_{t-1} + V_t$$
$$- - - - - - - - - - - (10)$$

Where:

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ and β_{10} coefficients that represents the short run dynamics of the model .

ECM_{t-1} **is** error correction term lagged by one period.

V_t is vector of white noise error terms and $a, b, c, d, e, f, g, h, i, j$ denotes the optimal lag length of each variable in the auto regressive process.

γ =error correction parameter that measure the speed of adjustment towards the long run equilibrium.

After estimating the long run and short run model, misspecification test, normality test, serial correlation test, heteroscedasticity test and cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test for stability of the model is undertaken to check the robustness of the model.

3.3.4 Granger causality test

The Granger causality test was used to determine whether independent variables which are mention above causes growth of income or vice versa. The need to establish Granger causality arises out of the fact that the existence of co-integration between two variables does not necessarily prove the direction of causality.

3.4 Data analysis

To analyze the impact of bank saving and bank credit on economic growth in Ethiopia during the study period, the researcher used tools of standard econometrical technique which is called OLS was applied to analyze the study.

4. Results and Discussion

4.1 Stationary Test

This study used Phillips perron (PP) unit root tests to identify whether the series are stationary or otherwise. Table 1 presents the result of PP unit root tests. The result of the unit root test indicates that except gross capital formation (GCF) and gross domestic saving (GDS) all time series in level are non-stationary. Which means the result shows that there exist unit root problem in level. However, when the variables have been differenced once, the tests strongly reject the unit root.

In general, the PP test as indicated in Table 1 reveals that all the variables are integrated at order one, I(1). Thus, the determination of co integration relationships using the ARDL technique is not face a problem from the existence of I (2) or beyond variables in the model specified.

Table 1: Result for the PP Unit root tests

Variables	Test statistic	1% CV	5% CV	p-value	Test statistic	1% CV	5% CV	p-value	Decision
LNRGDP	-1.980	-3.588	-2.929	0.2941	-2.882	-4.180	-3.515	0.1778	I(1)
LNGDS	-3.200	-3.588	-2.929	0.0267	-3.060	-4.180	-3.515	0.1284	I(1)
LNHEE	-2.396	-3.588	-2.929	0.1487	-2.314	-4.180	-3.515	0.4175	I(1)
LNED	-2.090	-3.588	-2.929	0.2492	-1.858	-4.180	-3.515	0.6588	I(1)
LNGCF	-7.015	-3.588	-2.929	0.0000	-7.060	-4.180	-3.515	0.0000	I(0)
LNLF	-0.112	-3.588	-2.929	0.9416	6.368	-4.180	-3.515	1.0000	I(0)
LNFDI	-2.114	-3.588	-2.929	0.2403	-2.995	-4.180	-3.515	0.1449	I(1)
LNTO	-1.630	-3.588	-2.929	0.4589	-2.162	-4.180	-3.515	0.4976	I(1)
LNPDC	-2.437	-3.588	-2.929	0.1377	-2.805	-4.180	-3.515	0.2030	I(1)
LNEXP	-2.845	-3.588	-2.929	0.0602	-2.802	-4.180	-3.515	0.2040	I(1)
Variables at 1st difference									
LNRGDP	11.136	-3.392	-2.931	0.0000	-12.000	-4.186	-3.518	0.0000	
LNGDS	-8.810	-3.392	-2.931	0.0000	-9.386	-4.186	-3.518	0.0000	
LNHEE	-7.282	-3.392	-2.931	0.0000	-7.410	-4.186	-3.518	0.0000	
LNED	-6.158	-3.392	-2.931	0.0000	-6.250	-4.186	-3.518	0.0000	
LNGCF	-43.382	-3.392	-2.931	0.0001	-42.600	-4.186	-3.518	0.0000	
LNLF	-0.131	-3.392	-2.931	0.0392	-2.177	-4.186	-3.518	0.0096	
LNFDI	-8.495	-3.392	-2.931	0.0000	-8.357	-4.186	-3.518	0.0000	
LNTO	-6.485	-3.392	-2.931	0.0000	-6.425	-4.186	-3.518	0.0000	
LNPDC	-8.843	-3.392	-2.931	0.0000	-9.185	-4.186	-3.518	0.0000	
LNEXP	-6.080	-3.392	-2.931	0.0000	-5.974	-4.186	-3.518	0.0001	

Source: Author's Computations using EVIEWS software (2016)

4.2 Co-integration Test and Long run estimation

As can be seen from Table 2 the bound co-integration tests indicated that LNRGDP, LNGDS, LNHEE, LNED, LNGCF, LNLF, LNFDI, LNTO, LNEXP and LNPDC are co-integrated when LNRGDP is considered as dependent variable since the value of F-statistic = 8.45 (with lag order of (1,1,1,1,0,0,1,1,1,1) which is selected by AIC) is greater that both the 95% upper bound critical value of Narayan (2004) and Pesaran et al. (2001) which is 4.70 and 3.56 respectively. The value of F-statistics is also greater that both the 99% upper bound critical value of Narayan (2004) and Pesaran et al. (2001) which is 6.26 and 3.24 respectively. Whereas taking each of the remain nine variables as dependent variable never gives co-integration since the value of F–statistic is less that 95% and 99% lower bound critical value in all cases.

Table 2: Result of Bounds (Wald) test for co-integration analysis

Dependent Variable	F- value	Decision
D(LNRGDP)	8.45	Co-integration
D(LNGDS)	2.87	No Co-integration
D(LNHEE)	3.28	No Co-integration
D(LNED)	1.62	No Co-integration
D(LNGCF)	2.93	No Co-integration
D(LNLF)	1.81	No Co-integration
D(LNFDI)	2.56	No Co-integration
D(LNTO)	2.92	No Co-integration
D(LNPDC)	2.26	No Co-integration
D(LNEXP)	2.18	No Co-integration

Note: Computed F-statistic: 8.45 (Significant at 5% level of significance). Critical Values are cited from Pesaran et al. (2001) and Narayan's (2005) Table:

Table 3 contains the estimated coefficients of the long run relationship of the model. From the regression result, the adjusted R-squared value of 0.733543 shows that at 73.3543% the explanatory variables explain changes in the dependent variable

As can be seen from Table 3 and the growth equation model the estimated coefficients indicated that human capital, labour force, private domestic credit, terms of trade and export have positive and significant impact on economic growth of Ethiopia. The result is consistent with previous empirical evidences and theoretical arguments.

More specifically, the coefficient of human capital indicated that a 1% change in human capital leads to 60.7165% change in economic growth. This implies that increase in workers' quality through improved education and health improves output. This confirms the human capital theory which suggests that education and healthcare of workers ensure greater productivity (Adawo, 2011). The result is also in line with the empirical findings of Ndambiri et al., (2012), Shimelis (2014), Haile (2014) and Zhuang and Juliana (2010). However, the result is not consistent with the findings of Jarra (2013) which is negative relationship between human capital and economic growth.

Similarly, the result shows that the coefficient of labour force is 20.94714 (p=0.0011). The result confirms the growth theory of Solow (1956) and the empirical findings of Zhuang and Juliana (2010). Mehrara and Rezaei (2015) also argue that increasing in labour force is means high capacity to produce and yield. Therefore, increase in aggregate demand and subsequently underground economic be coming little and consequently increase in economic growth.

Moreover, the result indicates that terms of trade has a negative and significant impact on economic growth. Even though, many empirical result of previous study found a positive relationship between terms of trade and economic growth, nevertheless, this study does not confirm it. The new

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growth theories developed by Romer (1986) and Lucas (1988) have provided persuasive intellectual support for the proposition that openness affects growth positively. However, Shahbaz et al., (2009) confirm that Economic growth is negatively caused by increased trade-openness significantly. Furthermore, the long run model indicated that private domestic credit (LNPDC) has a positive and significant impact on economic growth in Ethiopia. The result is consistent with previous empirical evidences and theoretical argument. This implies that the increase in bank credits to the private sector will enhance private sector transactions level and investments within the economy and subsequently accelerate the growth of the economy. The result of Anthony (2012) also shows that private credit has positive and significant impact of economic growth.

Similarly, the long run model result also shows that export has a positive and significant impact on economic growth.

This is one of the most widely accepted beliefs in the economics growth literature and theory. Thirlwall and Hussain (1982) and Parida and Sahoo (2007) also argue that the higher the income elasticity of export in a country, the faster the economy grows as a whole. According to classical foreign trade theory, trade presents each country with a comparative advantage by providing specialization in production.

Moreover, the long run model shows that external debt has statistically significant and positive impact on economic growth. The result is in line with the findings of Karakoy et al., (2012). An external source of finance is essential for developing countries economic. More specifically external debt is very important for countries which have low domestic saving like Ethiopia.

Table 3: Estimated long-run model coefficient using ARDL approach

Dependent Variable: LNRGDP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26.46543	4.501378	5.879407	0.0000
LNGDS	0.154246	0.161133	0.957258	0.3450
LNHEE	1.011042	0.607165	1.965185	0.0748*
LNED	0.076729	0.191318	1.701054	0.0908
LNGCF	0.055638	0.054568	1.019618	0.3149
LNLF	20.94714	5.867847	3.569816	0.0011***
LNFDI	−0.029302	0.034807	−0.841843	0.4056
LNTO	−1.008961	0.903323	−1.716944	0.08716*
LNPDC	0.668262	0.227735	2.934391	0.0059***
LNEXP	0.831083	0.679041	2.123906	0.0292**
R-squared	0.768500	Adjusted R-squared		0.733543
S.E. of regression	0.430749	Akaike info criterion		1.346548
F-statistic	9.452061	Prob(F-statistic)		0.000000
Diagnostic Tests				
Test Statistics	LM Version		F Version	
Serial Correlation	CHSQ(2) =2.325033[0.3127]		F(2,33)=0.898959[0.4167]	
Functional Form	CHSQ(1) =3.191775[0.2237]		F(1, 34) =2.499994[0.1504]	
Normality	CHSQ(1) =1.562[0.567]		Not applicable	
Heteroscedasticity	CHSQ(9) =7.580569[0.5769]		F(9,35)=0.787826[0.6291]	

Note: *=significant at 10% level of significance, **=significant at 5 % level of significance and *** =significant at1% level of significance.

However, the result shows that gross domestic saving has an insignificant impact on economic growth. The result is consistent with the findings of Budha (2012) and Shimelis (2014). The reason why gross domestic saving is insignificant in the effect of Ethiopian economic growth is due to low level of savings which resulted from lack of continuous saving over the time which is in turn primarily attributable to the subsistence nature of the economy for consumption Shimelis (2014).

Moreover, the regression result also indicates that gross capital formation has positive and insignificant impact on economic growth. This is also not consistent with the previous empirical evidences.

Finally, the result shows that foreign direct investment has negative and insignificant impact on economic growth. The result is also not in line with most of empirical findings.

The result indicates that foreign direct investment had an adverse effect on the economic growth of Ethiopia.

Table 3 also shows the results of long run diagnostic tests. The diagnostic tests result reported in Table 3 indicate that there is no error autocorrelation or serial correction, and heteroskedasticity and the errors are normally distributed. In addition the Ramsey functional form test confirms that the model is specified well. Hence, the relationship between the variables is verifiable or valid.

4.3 Short run Error Correction Model Estimates

After the acceptance of long-run coefficients of the growth equation, the short-run ECM model is estimated. Table 4 indicates the equilibrium error correction coefficient, estimated -0.904997 is highly significant, has the correct

sign, and imply a very high speed of adjustment to equilibrium after a shock.

The overall model is significant (F – statistic = 7.245803, P<0.01), and consistent with prior studies, the model's explanatory power is high (adjusted R^2 = 0.637486). Most of the results are similar in both long-run and short-run. However, some difference exists; like in the short run terms of trade have no significant relationship. The short run exports, human capital, labour force and private domestic credit have positive and significant relationship with economic growth. This result is in line with other studies in this field.

Results of the remaining variables are the same in the short run as in the case of the long run. The coefficient of ECt−1 (-0.904997) indicates that the above mentioned long run relationship is stable and any disequilibrium formed in the short run will be temporary and get corrected over a period of time with a high speed of 90.4997% per year.

Table 4 also contains the result of short run model diagnostic tests. As can be shown from Table 4 the short run model pass all the diagnostic tests against serial correlation (Breusch-Godfrey test), heteroscedasticity (Breusch-Pagan-Godfrey Test), functional form (Ramsey RESET Test) and normality of errors (Jarque-Bera test).

Table 4: Error correction representation for the selected Autoregressive Distributed Lag model:

Dependent Variable: D(LNRGDP)				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.026658	0.081570	0.326804	0.7461
D(LNGDS)	0.129795	0.171269	0.757842	0.4545
D(LNHEE)	0.348108	0.762023	1.756821	0.0511
D(LNED)	-0.215846	0.291607	-0.74019	0.4649
D(LNGCF)	0.025483	0.041767	0.610121	0.5464
D(LNLF)	14.87525	16.89398	0.980506	0.0856
D(LNFDI)	-0.050784	0.050350	-1.00861	0.3212
D(LNTO)	0.056015	1.241241	0.045128	0.9643
D(LNPDC)	0.305767	0.331766	1.952163	0.0641
D(LNEXP)	1.332546	0.868151	1.834924	0.0353
ECT(-1)	-0.904997	0.284201	-3.184350	0.0034
R-squared	0.658114	Adjusted R-squared		0.6374
F-statistic	7.245803	Prob(F-statistic)		0.0004
S.E. of regression	0.485764	Akaike info criterion		1.6180
Diagnostic Tests				
Test Statistics	LM Version		F Version	
Serial Correlation	CHSQ(2) =2.550736 [0.2793]		F(2,28)= 0.928764[0.4069]	
Functional Form	CHSQ(1) =6.892347[0.4287]		F(1, 17) =1.112055[0.5957]	
Normality	CHSQ(1) =1.83252[0.5453]		Not applicable	
Heteroscedasticity	CHSQ(10) =6.689380[0.7544]		F(10,30)= 0.584896[0.8132]	

Source: Author's Computations using EVIEWS software (2016)

The stability test of long run and short run model output is not presented here to save space. However, it can be accessed upon request. The results show that all the coefficients are stable because the plot of both the CUSUM statistic and the CUSUM of square (CUSUMSQ) lay inside the critical bounds of the 5% confidence interval of parameter stability

4.4 Estimate the long run granger causality

The estimated long run granger causality output is not presented here to save space. However, it can be accessed upon request. The result indicates that the null hypothesis that real gross domestic product does not Granger Cause to gross domestic saving cannot be rejected even at 10% level of significance. However, the null hypothesis that gross domestic saving does not granger cause to real gross domestic saving is rejected. That means domestic saving is found to granger cause economic growth. This result is in line with the findings of Arok (2012). The result is not consistent with Igbatayo and Agbada (2012), and Johnson

(2015) which argue that there is bidirectional cause between saving and economic growth. The result is not also in line with the result of Abu (2004) and Khan and Shahbaz (2010). The result also indicates that real gross domestic product granger cause form human capital and human capital granger cause for real gross domestic saving. However, the result is contradicts with the findings of Shimelis (2014).

Moreover, the result indicates that the granger causality between labour force and real gross domestic product is bidirectional. It also indicates that the granger causality between export and real gross domestic product is bidirectional. Similarly, the result reveals that private domestic credit granger causes for real domestic product. However, the result indicates that there is no granger causality between GCF and remain variable. The result also indicates that there is no granger causality between FDI and remain variable except RGDP and HEE in which granger causality run from FDI to RGDP and from GDI to HEE.

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5. Conclusion and Recommendations

The general objective of the study is to investigate the impact of bank savings and bank credits on Ethiopia's economic growth. To address the main objective, the study has used the ARDL Approach to co-integration and the error correction model (ECM) in order to investigate the long-run and short run impact.

The finding of the Bounds test shows that there is a stable long run relationship between independent variables and dependent variables. The long run economic growth regression result indicates that human capital, labour force, private domestic credit, terms of trade and export have positive and significant impact on economic growth of Ethiopia. However, the result shows that gross domestic saving and gross capital formation have an insignificant impact on economic growth in Ethiopia. The result is not in line with most of empirical findings.

The estimated short-run model reveals that export, human capital, labour force and private domestic credit have a positive and significance impact on economic growth. However, in the short run real terms of trade has no significant impact on economic growth.

Some major recommendations for policy makers can be drawn from the above result are stated below.

The human capital variable has a positive and significant relationship with economic growth. This implies that education and healthcare of workers ensure greater productivity. Therefore, the government should continue to devote more resources to expand education and healthcare. Also, the government needs to devote more resources to enhance non-formal education with strong emphasis on basic literacy and skills training. The study also suggests that the government should devote resources to expand healthcares and healthy society.

The result shows that labour force has positive and significant impact on economic growth in Ethiopia. Therefore, the government is required to set a sound fertile ground in order to enhance productive labour force that is adequate enough to maintain sustainable economic growth.

Moreover, the result shows that domestic private credit has positive and significant impact on economic growth in Ethiopia. Therefore, the government is required to set a sound fertile ground in order to enhance private credit that is adequate enough to finance investment and to realize fast, sustainable and equitable economic growth. To do this, the government should create stable and predictable economic environment that create stable exchange rate. The government should also increase the amount of external debt that solves the shortage of domestic source of private domestic credit because of low amount of domestic saving in Ethiopia.

The result also reveals that gross domestic saving has positive and insignificance effect on economic growth. This is because of low amount of gross domestic saving in Ethiopia. To make gross domestic saving is important to maintain sustainable economic growth; the government should increase the amount of gross domestic saving. To do so, the government should focus to increase broad money, real interest rate and life expectancy that are important determinants to increase domestic saving.

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