

## **EXTERNAL DEBT AND ECONOMIC GROWTH IN ETHIOPIA: A TIME SERIES ECONOMETRICS APPROACH.**

**Dr. Akshaya Kumar Mohanty** \*

---

### **ABSTRACT**

The study Evaluates the impact of external debt on economic growth in Ethiopia for the period 1981-2014. Time series data on Real Gross Domestic Product Growth rate, External Debt Stock GDP ratio, External Debt service export ratio, Gross domestic investment GDP ratio, human capital proxies by educational expenditure GDP ratio, labor force as a share total population and Trade Openness as factors used for the assessment of economic growth of Ethiopia for the period of 1981-2014. Time series econometrics model was used to estimate the long run and short-run relationships among the variables. The empirical result suggests the existence of long run relationship between external debt and Economic Growth in Ethiopia and reveals that external debt contributes positively to the economic growth of Ethiopia.

**Key words: Growth;Time series model;External debt;Impact analysis;Developing nations.**

---

\* ( **Ph.D. ; M.Phil. ; M.A. ; L.L.B. ; Q.I.P. & F.D.P.** )Associate Professor Of Applied Economics, Department Of Economics, Wollega University ,Post Box No: 395, Nekemte, Ethiopia.

## 1. INTRODUCTION

There is a problem of capital in Ethiopia due to low level of saving, low investment and low productivity. Ethiopia is one of the countries of the sub-Saharan Africa, which faces major economic problems and high level of indebtedness. Such developing countries facing with a current account deficit were encouraged to borrow from developed countries as well as an international community to boost their economic growth.

Debt problem is one of the main challenges faced by the developing countries like Ethiopia, the repayment and debt service create problems especially for developing countries because a debt has to be serviced is more than the actual amount it was taken for. Therefore, large debt service payments impose a number of constraints on a country's growth scenario. Either, it drains out limited resources or restricts financial resources for domestic need of development of these countries.

Alemayehu (1998) revealed that, many developing countries have been greatly exposed to external capital inflows in the past for four and half decades. Such external flows are now becoming the source of external debt problems in Africa in general and Ethiopia in particular. External debt magnitudes of larger proportion have been very familiar in sub-Saharan Africa. Many countries in this region have been stressed with debt burdens that outweigh their export earnings, the growth rate and even level of their gross national product.

It is estimated that by the year 2004, sub-Saharan Africa have to spend an amazing 70 percent of its export earnings on external debt servicing. Africa's debt rose sharply in the past decade and is now equivalent to over 100 percent of its gross national product (about USD 200 billion) (World Bank, 2011).

The debt crisis experienced by the Sub-Saharan African's countries is used as a benchmark for studying the impact of the external debt on economic growth in Ethiopia. One should note that even though Ethiopia has not experienced a debt crisis the studies done for the debt stricken countries focus on economic growth. Because it is not necessarily the case that a country be in a debt crisis to necessitate, investigating the impact of external debt on economic growth.

Ethiopia's external debt has changed significantly in magnitude, structure and composition over the last four and half decades. In 1975, it stood at about USD 343.7 million (14% of the GDP) and in 1991 raised to USD 8.86 billion (138.93% of GDP). Moreover, in 2001 this figure had decreased to an equivalent of USD 5.6 billion (57.11% of GDP). Recently, in 2011 following the debt relief granted in accordance with development initiative designed to benefit the heavily indebted poor countries (HIPCs), it had raised to USD 7.9 billion (36.7% of GDP) (world Bank, 2011). In 2014, the total government spending reaches its highest level that is Birr 178 Billion. Between 2010 and 2014, the annual government spending was growing by 15 percent with yearly additional government spending of Birr 24.2 Billion. Ethiopia being a developing country has not been out of danger either the country is incapable of servicing its debt and or attaining a reasonable level of economic growth.

The huge external debt stock and debt service payments of African countries and Ethiopia in particular prevented the countries from embarking on larger volume of domestic investment, which would have enhanced growth and development (Clements, et al. 2003). External debt became a burden to most African countries because contracted loans were not optimally deployed, therefore returns on investments were not adequate to meet maturing obligations and did not leave a favorable balance to support domestic economic growth. So, Ethiopian economy not performed well because the necessary macro-economic adjustment has remained elusive. The main interest of this study then is to empirically investigate the impact of external debt on the economic growth of Ethiopia.

There are some empirical studies that have been conducted regarding the relationship between external debt and economic growth, even if, they end up with different conclusive results. Some of these works are: Jonse (2002), Befekadu (1992) and Hailemariam (2011). The results of these studies, however, are somewhat ambiguous with regard to the effect of external debt on economic growth. For instance, Befekadu (1992) study indicated that past debt accumulation relates positively to economic growth whereas, a study by Hailemariam's (2011) showed that past debt accumulation has a negative relationship with economic growth. Different from the two, Jonse's (2002) result showed that external debt variable has no significant effect directly on

growth of output. These studies applied different methodological approaches which might be one of the reasons for the difference in their findings.

Elbadawi et al. (1996) confirmed a debt overhang effect on economic growth using cross-section regression for 99 developing countries spanning SSA, Latin America, Asia and Middle East. They identified three direct channels in which indebtedness in SSA works against growth: current debt inflows as a ratio of GDP (which should stimulate growth), past debt accumulation (capturing debt overhang) and debt service ratio. The fourth indirect channel works through the impacts of the above channels on public sector expenditures. They found that debt accumulation deters growth while debt stock spurs growth.

Iyoha (1999) Noted, devaluation, which featured in virtually all-Structural Adjustment Programs (SAPs) leads to an increase in total debt and debt service payments denominated in domestic currency. The deflation required by the SAPs leads to a fall in domestic production and a reduction in national income available for consumption, provision of public services and investment. A reduction in investment meant a fall in economic growth, meanwhile, foreign investment, which was expected to increase on the adoption of SAPs failed to materialize, due to a lethal combination of political instability, poor macroeconomic policies, weak economic performance and the debt overhang syndrome. In addition, heavy debt service payments have been shown to "crowd out" foreign investment. Indeed, aid and foreign investment were routinely diverted in to debt service payments mainly to pay the multilateral institutions (WB and IMF) as debt owned by the multilateral institutions cannot be rescheduled or written off Kapijipanga (1996).

As mentioned earlier the external debt for Ethiopia is expected to increase significantly in the immediate future because of the need to secure finance from external sources to undertake big infrastructure projects. This external debt will have to be repaid in the future against depreciating Birr. Since devaluation of domestic currency or appreciation of foreign currency means an increase in the real value of debt-service repayments.

Jonse (2002) used a simultaneous equation approach to investigate the impact of external debt on economic growth in Ethiopia using a macro econometric model estimated for 1970-2000. The empirical findings reveal that external debt does not affect growth directly. The results indicate that external debt affects investment positively and is statistically significantly indicating external debt in Ethiopian case encourage investment rather than depress it. Furthermore, the result also confirms that there is no sign of crowding out effect through which external debt is hypothesized to affect growth.

Benedict et al. (2003) suggested that foreign borrowing has a positive impact on investment and growth of a country up to a threshold level but external debt service can potentially affect the growth as most of the funds will go in the repayment of the debt rather at the investments.

Fosu (2009) found out that debt servicing shifts spending away from the social sector, health and education. This is shown that the aim of taking debt is behind to seek development than being depressed by debt service payments because it cuts up most of the resources rather than development. As a result creates a great hindrance in the economic growth of a country due to high interest payments on the external debt, heavy public expenditures and foreign exchange to repay that debt

Gohar et al. (2012) examined that the repayment or “debt service” creates problems for many countries especially for developing countries because a debt has to be serviced are more than the actual amount it was taken for. Therefore, large debt service payments impose a number of constraints on a country’s growth scenario. Either, it drains out limited resources or restricts financial resources for domestic need of development of these countries.

In contrast to the previous studies the current study uses the Restricted VAR or VECM (Vector error correction Model) approach to know the impact of external debt on economic growth in Ethiopia through co-integration and vector error correction model to fill the previous literature and methodological gaps.

## 2. objectives

- ❖ To find out the effect of debt servicing and stock of external debt on economic growth in Ethiopia.
- ❖ To investigate the long-run and short run relationship between external debt (debt servicing and stock of debt) and economic growth in Ethiopia.
- ❖ To examine a causal relationship between external debt and economic growth in Ethiopia.

## 3. LITERATURE REVIEW

A number of empirical studies have been conducted by many economists and researchers to examine the relationship between external debt and economic growth using different techniques and methodologies in different countries of the world. Empirical studies on the effect of external debt on the debtor's economy revealed diverse views.

Among the pioneering studies, Geiger (1990) used the lag distributional model to assess the impact of external debt on economic growth for 9 South American countries over a period of 12 years (1974-1986), and found a statistically significant inverse relationship between the debt burden and economic growth.

While analyzing 13 developing countries for a period of 1960-1981 and 1982-1989, Warner (1992) could not find any conclusive evidence whether debt has any negative effect on economic growth or it may have depressed investment in those developing countries.

Cohen (1993) used a larger data set of 81 developing countries over a period of 1965- 87 and did not find any evidence of a negative relationship between external debt and economic growth.

Chowdhury (1994) attempted to resolve the controversy of cause and effect relationship between external debt and economic growth, by conducting granger causality tests for Asian and Pacific Countries over a period of 1970-88. He found that both the public and private external debt has a relatively very small impact on GNP, and both have opposite signs. He found that any increase in GNP leads to a higher level of external debt, but over all external debt does not have any negative impact on economic growth.

Gerald (1994) employed simple neo-classical model to evaluate whether capital imports can increase output; and whether there are enough exports to meet the external debt servicing in 31 Sub-Saharan African countries. His model suggested that actual surplus available for debt service may be much smaller and may lead to debt overhang.

Furthermore, lyoha (1999) used simulation approach to investigate the impact of external debt on economic growth in sub-Saharan African countries estimating a small macro-econometric model for the period 1970-1994. He found an inverse relationship between debt overhang, crowding out and investment thereby concluding that external debt depresses investment through both a —disincentive effect and a —crowding out effect, thus affecting economic growth.

Fosu (1999) estimated the impact of external debt on GDP growth in the 1980s, based on a cross country analysis of 35 Sub-Saharan countries. He observed that „net external debt“, measured as total external debt outstanding less total reserves, as a proportion of GDP, is most likely the best measure of the debt burden. In an attempt to evade the potential problem of causation, he uses the external debt measure for the first half of the period as well as that for the entire period. He finds a fractional elasticity of growth with respect to external debt of 0.5 for either measure. From the standing point of this finding, he concludes that Sub-Saharan growth could have average 1.2 percent, nearly 50 percent, higher during the decade of the 1980s in the absence of the external debt burden.

Focusing on one of the Heavily Indebted Poor Countries (HIPC), Were (2001) analyzed the debt overhang problem in Kenya and tried to find evidence for its impact on economic growth. Using time series data from 1970-1995, this study did not find any adverse impact of debt servicing on economic growth; however, it confirmed some crowding-out effects on private investment.

Karagol (2002) also examined the relationship between external debt service and GNP in Turkey. He found a long run relationship between GNP and debt burden and accepted the debt overhang hypothesis in Turkey. However, in the case of Sri Lanka, Wijeweera et al (2005) found

conversely that external debt affected GNP positively in the long run equation and negatively in the short run.

Correspondingly, Melese (2002), by using a structural macroeconomic model, also found that all debt burden indicators have a negative relationship with economic growth during the period 1970 to 2002.

Furthermore, employing data from 59 developing and 24 industrial countries over a period of 1970-2002, Schclarek (2004) could not find any evidence that external debt may affect total factor productivity. However, he found that in case of developing countries higher growth rate is associated with a relatively lower external debt levels and this negative relationship is mainly driven by public external debt rather than private external debt. While, in case of industrial countries, he could not find any evidence for the existence of such relationship between public external debt and economic growth.

Audu (2004) examined the impact of external debt on economic growth and public investment in Nigeria from 1970-2002 using ordinary least square method. The result revealed that the external debt service has a negative impact on economic growth and there is a negative correlation between external debt overhang and public investment.

Similarly to investigate the impact of external indebtedness on economic growth for Sudan, Mohamed (2005) used a time series data from 1978–2002 including the growth rate of real export earnings to capture the impact of export promotion strategy and inflation to capture macroeconomic policy impact. He used real GDP annual growth rate as dependent variable and concluded that external debt and inflation deter economic growth, while, real exports have positive and significant impact on economic growth.

Adenike, Adekunle and Abiodun (2007) reviewed the roles of debt management practices on sustainable economic growth and development with particular emphasis on Nigeria. The analysis of the data collected with descriptive statistics shows that, availability of access to external finance strongly influences the economic development process of any nation. Debt is an

important resources needed to support sustainable economic growth. But a huge external debt without servicing as it is the case for Nigeria before year 2000 constituted a major impediment to the revitalization of her shattered economy as well as the alleviation of debilitating poverty.

Melese (2005) analyzed the relationship between external debt and economic growth in Ethiopia using structural macroeconomic model, which is a single growth equation model, estimated using the Ordinary Least Squares (OLS) method with data covering the period 1970-2002. The Co integration and Error Correction Models were estimated and the result revealed that there is a strong positive relationship between external debt and economic growth in Ethiopia.

However, Haile (2005), using conventional tests, argued that the Ethiopian debt is sustainable.

Abinet (2005) examined the relationship between real GDP growth rate and debt burden indicators during the period 1962/63 to 2003/04. He found that the real GDP growth rate has negatively correlated with debt burden indicators.

Villanueva et al. (2006) used standard neo-classical growth model to explore the dynamics of capital accumulation, external debt and economic growth for Philippines over a period of 2000-2003. They used goal seek technique to estimate the steady state ratio of external debt to GDP associated with doubling the per capita income. Additionally, he also tried to estimate the optimal savings rate that is —consistent with maximum real consumption per unit of effective labor in the long run. He concluded that higher ratio of change in interest rate spread to change in debt-to-GDP lower welfare in long run.

Abbas and Christensen (2007) examined the role of domestic debt markets in economic growth: an empirical investigation for low-income countries and emerging markets using panel econometric techniques to examine the endogeneity of domestic debt and its impact on growth with a view to obtaining a sense of the optimal size and quality of domestic debt.

They found the following, among others: higher private savings increase the scope for domestic debt issuance while a larger supply of domestic debt instruments provides incentives to increase private savings. But, financial depth had a surprisingly weak causal contribution to income and

the growth contribution of domestic debt is higher if it is marketable, bears positive real interest rates and is held outside the banking system.

Both domestic and external loans have desirable advantages if properly managed. It has the capability of achieving desirable impact in the growth and progress of a developing economy if investment of loans in productive activity is strictly made to service and repay loan principal. It is also a way of forced saving when private or public loans are judiciously managed.

Adepoju et al. (2007) analyzed the time series data for Nigeria over a period of 1962 to 2006. Exploring time to time behavior of donor agencies as an outcome of various bilateral and multilateral arrangements, they concluded that accumulation of external debt hampered economic growth in Nigeria.

Furthermore Jayaraman et al. (2008) focused on the flow of foreign aid in 6 Pacific Island countries over the period of 1988-2004. These countries had been among the top recipients of foreign aid till early 80s, but later on could not maintain the level of higher aid inflows due to change in political situation thereby subsequently fell into the trap of twin deficits. While assessing whether the higher flow of foreign aid and external debt had ever contributed to economic growth in these countries, the study concluded a significantly positive relationship between external debt and real GDP; and an inverse relationship between higher fiscal deficit and GDP growth.

Hameed et al. (2008) explored the dynamic effect of external debt servicing, capital stock and labor force on the economic growth for Pakistan for a period of 1970-2003. They found an adverse effect of external debt servicing on labor and capital productivity which ultimately hampers economic growth.

Similarly Ayadi (2008) investigated the impact of indebtedness and debt service obligations on economic growth of Nigerian and South African economies. On this study he attempted to explore a linear as well as non-linear effect of debt on growth and investment using both ordinary least squares (OLS) and generalize least squares (GLS) in his analysis. He finds that external debt and servicing requirements have negative effects on both countries economic

growth. Moreover, from the result conclude that, South Africa performs better than Nigeria in the application of external credits to promote economic growth. In addition, in Nigeria external debt affects economic growth positively up to a certain point after which its contribution becomes negative.

Alemayehu G. and Daniel Z. (1998), clearly confirmed that, the level of Ethiopia debt is beyond the capacity of the country to its servicing requirements (existence of debt overhang problem). Although, the new debt initiative may have a say to lessen the debt problem, it by no means alleviated the crisis.

Butts (2009) investigated the causal relationship between short term external debt and GDP growth rate for 27 Latin American and Caribbean countries over a period of 1970-2003 and found an evidence of granger causality in 13 countries.

Udoka and Anyingang (2010) evaluated the relationship between external debt management policies on the economic growth of Nigeria from 1970-2006 using ordinary least square method. The empirical result shows that, GDP, exchange rate, fiscal deficit, London

Interbank offered rate, and terms of trade are the major determinants of external debt in Nigeria. They further pointed out that the severity of the debt within the period is reflected in the country's inability to meet the debt service obligations particularly scheduled debt services in relation to its foreign currency earnings, it explains why the country had rescheduled its debt from time to time (first in 1986, 1989, 1991, and last in October 2000).

In Ethiopian case, Hailemariam (2010) investigated the existence of long run relationship between external debt and growth in Ethiopia. He explores that the current level of external debt flow has a positive while the past debt accumulation has a negative impact on growth and private investment. This confirms the existence of debt overhang hypothesis in the Ethiopian economy. Furthermore, in the longrun, both external debt stock as well as total debt servicing has a negative and significant impact on economic growth and private sector capital accumulation activity.

Akram (2011) tried to see the consequence of public debt for economic growth and investment in Pakistan for the period 1972-2009. The role of public debt is explicitly incorporated in the growth equation and an autoregressive distributed lag model (ARDLM) technique has been applied to estimate the model. The result indicates that public external debt has negative relationship with per capita GDP and investment confirming the existence of 'debt overhang effect'. The hypothesis of existence of crowding out could not be confirmed due to insignificant relationships of debt servicing with investment and per capita GDP.

Ajayi (2012) investigated the effect of the external debt burden on economic growth and development of Nigeria. He adopted regression analysis of OLS on secondary data sourced from CBN, Economical and Financial review, Business times, Financial Standard and relevant publication from Nigeria on variable like National Income, Debt Service Payment, External Reserves, Interest rate among others. The finding indicated that external debt burden had an adverse effect on the national income and per capital income of the nation. High level of external debt led to devaluation of the nation currency, increase in retrenchment of workers, continuous industrial strike and poor educational system. This led to the economy of Nigeria getting depressed.

Ajayi and Oke (2012) investigated the effect of external debt on economic growth and development of Nigeria employing ordinary least square method of data analysis and found that external debt burden had an adverse effect on the national income and per capita income of the nation, and high level of external debt led to devaluation of the nation currency, increase in retrenchment of workers, continuous industrial strike and poverty.

In the same vein, Sulaiman & Azeez (2012) studied the effect of external debt on the economic growth of Nigeria. They employed the method of ordinary least square and error correction model to ascertain the long run relationship of the endogenous and exogenous variables chosen. Their findings revealed that the external debt has contributed positively to the Nigerian economy. Nawaz et al (2012) attempted to examine the long run and short run dynamics of external debt and economic growth in Pakistan using time series data for the period 1980-2010. The analysis was done using Johanson cointegration and granger causality Test. The evidence showed the

existence of long run relationship between the two variables. Furthermore, in the short run there exists bi-directional causality between them. It is implied that, since Pakistan's external debt is sustainable, external finance could be used to tackle the scarcity of capital.

Ogiemudia and Ajao (2012) studied the effect of foreign debt management on sustainable economic development with specific emphasis on Nigeria over the period 1979-2009 using ordinary least square method of data analysis and error correction model to ascertain the long-run relationship of established model. Their finding showed that access to external finances strongly influence the economic development process of Nigeria and other countries.

The study further revealed that there is a significant relationship between external debt and economic development in Nigeria while debt servicing had a negative but insignificant effect on Nigeria.

Mulugeta (2014) studied the impact of external debt on economic growth of Ethiopia over the period 1983-2013 using johansen maximum likelihood and vector error correction (VECM) model and found the existence of long run relationship between RGDP and Debt.

Wassene (2014) studied the causal relationship between external debt and economic growth of Ethiopia over the period of 1970/71-2010/2011 using Autoregressive Distributed Lag Model (ARDLM) or bound testing approach. The empirical results indicated that the relationship between external debt and economic growth both in the short run and long run is significant with a negative sign.

#### **4. Methodology**

The sample period for this study is from 1981 to 2014 G.C. As the success of any econometric analysis ultimately depends on availability of appropriate data, it is, therefore, essential to discuss about the source and nature of the data. The study is conducted based on secondary data from domestic and foreign sources. For the domestic sources from documents of the former Ministry of Economic Development and Cooperation (MEDaC) the now Ministry of Finance and Economic Development (MoFED) and the National Bank of Ethiopia (NBE) while for external

sources from World Debt Tables, World Development Indicator, different World Bank Reports and IMF publications are utilized.

This study will use the VAR model, time series analysis to estimate the effect of external debt on economic growth in Ethiopia through Vector Error Correction model (VECM) between the time periods 1981-2014. This econometric analysis will be applied by using the statistical program (Eviews-7) on the time series data that will be collected during the period of the study.

The empirical model is preferred based on its relevance and availability of data. Recent literature has provided a significant body of evidence about the most relevant indicators and predictors of external debt crises. The key macro-economic indicators are output growth; terms of trade; monetary indicators; interest rates; external debt ratio to GDP, external debt service ratio to GDP, external debt service ratio to exports, and, ratios of short term debt to total debt, and debt service due to total debt.

The augmented functional model under this study when the selected debt burden indicators enter the production function, the functional form of this Model is represented as follows:

$$RGDPG = F(EDGDP, DSEXP, GDINVGDP, LF, HK, OPEN) \text{ ----- (1)}$$

Where,

RGDPG = RGDP growth rate proxy for Economic growth

LF= Labor Force as a share of total population (+)

HK=Human Capital (proxied by government educational expenditure) (+)

GDINVGDP=Real Gross Domestic Investment as share of GDP (captures the accelerator principle) (+ or -)

EDGDP=Total External Debt as a percentage GDP

DSEXP=Total Debt Service as a percentage of export of goods and services (reflect the 'crowding-out' effect) (-)

OPEN= Trade openness (- or +)

Using equation (1) and expressing the variables in natural logarithmic form, an attempt will be made to look at the relative contribution (elasticity) of each variable to the growth process.

$$\text{LRGDPG}_t = \beta_0 + \beta_1 \text{LLF}_t + \beta_2 \text{LHK}_t + \beta_3 \text{LGDINVGDP}_t + \beta_4 \text{LEDGDP}_t + \beta_5 \text{LDSEXP}_t + \beta_6 \text{LOPEN}_t + \varepsilon_t \text{ ----- 2}$$

Where, LRGDPG<sub>t</sub>=the natural logarithm of RGDPG at time t

LLF= Labor Force as share of Total Population (+)

LHK=Human Capital (proxied by Government educational expenditure) (+)

LEDGDP=the natural logarithm of stock of external debt to GDP (-)

LDSR=the natural logarithm of debt service as a ratio of export of goods and services (-)

LINVGDP=the natural logarithm of current real gross domestic investment as a ratio of GDP (- or +)

LOPEN=Trade openness (+or -)

$\varepsilon$  =Captures all variables that are omitted from the model but that collectively affect the dependent variable, economic growth GDP.

Note: The expected sign of each variable is shown in the bracket.

In equation (2) above,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ , and  $\beta_6$  are coefficients of elasticity's, and  $\varepsilon_t$  is the random disturbance term.

To estimate the model and examine the statistical significance of the explanatory variables on RGDP, econometric analysis will be employed using time-series data.

There are varieties of approaches for investigation of time series data. Unit root test , Tests for Co-integration , Vector error correction modeling , Granger causality tests , Diagnostic test , Stability test are those which to be analysed to get desired result.

## 5. Econimetric Analysis

### 5.1. Results for Unit Root Tests

In this work, there is use of the unit root test, which is Augmented Dickey-Fuller (ADF) test.

**Table 5.1.unit root test results**

Variable	ADF Statistic	Critical values at 5% level of significance	Order of Integration	Unit root
Log RGDPG	-9.222128	-3.562882	I(1)	stationary
Log EDGDP	-4.770423	-3.557759	I(1)	stationary
Log DSEXP	-4.569720	-3.562882	I(1)	stationary

LogGINVGDP	-9.468165	-3.557759	I(1)	stationary
Log HK	-9.946342	-3.568379	I(1)	stationary
Log LF	-5.488644	-3.557759	I(1)	stationary
Log OPEN	-4.736364	-3.557759	I(1)	stationary

Source: Author's Compilation from Eviews

The absolute values of the ADF statistic of all variables are higher than the critical values at 5%. So, considering the nature of stationarity of the variables, it is pertinent to ascertain if there is long run relationship between the dependent variable (RGDPG) and other variables since all of them are integrated of the same order. Hence, we proceed to test for co integration using Johansen co-integration test.

### Table5.2. Johansen Co-integrating Test Results

Unrestricted Co integration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.969004	276.7566	125.6154	0.0000
At most 1 *	0.858470	169.0659	95.75366	0.0000
At most 2 *	0.794453	108.4533	69.81889	0.0000
At most 3 *	0.662332	59.40887	47.85613	0.0029
At most 4	0.351479	25.75244	29.79707	0.1363
At most 5	0.296754	12.32755	15.49471	0.1419
At most 6	0.044590	1.414060	3.841466	0.2344

Trace test indicates 4 co integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

## Unrestricted Co integration Rank Test (Maximum Eigen value)

Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.969004	107.6907	46.23142	0.0000
At most 1 *	0.858470	60.61252	40.07757	0.0001
At most 2 *	0.794453	49.04447	33.87687	0.0004
At most 3 *	0.662332	33.65643	27.58434	0.0073
At most 4	0.351479	13.42489	21.13162	0.4139
At most 5	0.296754	10.91348	14.26460	0.1586
At most 6	0.044590	1.414060	3.841466	0.2344

Max-Eigen value test indicates 4 co integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Since the series are integrated of order one, the author established a long run relationship between the two series using Johansen test for co integration. The results in Table (5.2) indicates that RGDPG and Other variables have long run relation for the four periods as the Eigen values and values of trace statistic are higher than critical values. This implies that there exists a stable long run relation between RGDP and other independent variables. From the above tables both Trace statistic and Max-Eigen value indicates four co-integrating equations at 5 percent level. Based on the above tables we reject the null hypothesis of no co-integrating equations.

**Table 5.3 Long run Normalized Co-integration Estimates**

LRGDPG	LDSEXP	LEDGDP	LGDIVGDP	LHK	LLF	LOPEN
1.000000	-0.306908	-0.049212	-0.240593	-3.891738	0.144008	0.064516
	(0.02541)	(0.00481)	(0.08718)	(0.37033)	(0.14163)	(0.05144)
	[12.07823]	[5.80261]	[2.75972]	[10.50883]	[1.01679]	[1.25419]

Source: Author's Compilation from Eviews 7.

The above table 5.3 shows the normalized co-integration coefficient with the standard error and t-statistic in parentheses ( ) and [ ] respectively.

There is an elastic relationship between LRGDPG and LEDEXP. A unit change in LEDEXP will bring about a more than proportionate change in LRGDPG. The t-statistic shows the significance of the independent variable with respect to the dependent variable in the long run. The rule of thumb for t-statistics states that  $t \geq 2$  is significant. Therefore LEDSEXP ratio is positively and statistically significant at 12.07823.

There is also an elastic relationship between LRGDPG and LEDGDPG. A unit change in LEDGDP ratio will bring about a more than proportionate change in LRGDPG. The rule of thumb states that  $t \geq 2$  is significant. Therefore LEDGDPG ratio is statistically significant at 5.80261.

There is positive relationship between LRGDPG, GDINVGDP and HK. A unit increase in GDINVGDP and HK will bring about 2.75972 and 10.50883 increases in LRGDPG respectively. This meets a priori expectation of a positive relationship between investment and human capital and economic growth. The rule of thumb states that  $t \geq 2$ . Therefore GDINVGDP and HK is statistically significant at 2.75972 and 10.50883 respectively. There is a negative relationship between rgdpg and labor force and openness, even though the result is insignificant.

The existence of linearly combined I (1) variables that co integrated them in a stable long-run relationship, permits writing the relevant growth equation in which LRGDPG as a function of the other six explanatory variables. The vector of Co integration indicates that the long run elasticity of growth with respect to external debt GDP ratio (EDGDP), debt service export ratio (DSEXP), gross domestic investment GDP ratio (GDINVGDP) and human capital (HK) is positive as expected. However, the long run elasticity of growth with respect to Labor forces (LF) and Openness (Open) is negative.

Therefore, the long run growth equation with the corresponding signs and significance is presented as follows, where the t-values are in the bracket.

$$\begin{aligned} \text{LRGDPG} = & 0.3069\text{LEDGDP} + 0.0492\text{LDSEXP} + 0.2405\text{LGDINVGDP} + 3.8917\text{LHK} - 0.1440\text{LLF} \\ & [5.80261]** \quad [12.07823]** \quad [2.75972]** \quad [10.50883]** \quad [1.01679] \\ & -0.0645\text{LOPEN} \\ & [1.25419] \end{aligned}$$

Where, \*\* signifies rejection at 5% level of significance

The result implied that the variable real investment as share of GDP which is used as a proxy variable to measure capital in the economy significantly positively affect growth in the long run. This shows that capital influences output as it is included as an input in production and plays a major role in enhancing growth. This is consistent with the standard growth theory. The long run elasticity of LRGDPG with respect to LGDINVGDP is 0.2405 indicating one percent increase in Gross domestic investment as share of GDP induces 24.05% increment in RGDGP. The result is significant at 5%.

The variable human capital has shown a significant positive effect on economic growth in the long run. The result clearly implies that human capital is an important determinant of output. The long run elasticity of LRGDPG with respect to LHK is indicating one percent increase in annual real education expenditure which is used as a proxy for human capital induces 389.17 percent increment in RGDGP. The result is significant at 1%. Different theoretical models incorporate human capital as a factor of production and regard the accumulation of human capital as part of the growth process.

One of the debt burden indicator, external debt as percentage of GDP has a significant and positive relationship with real GDPG. It is implied that external debt to GDP has had a positive contribution to economic growth of Ethiopia. The coefficient of LEDGDP 0.3069 indicates a one percent increase in the stock of debt will result in 30.69 percent increase in real GDP growth. This indicates the absence of debt overhang problem in the country. The result is significant at 1% level of significance.

The other debt burden indicator i.e. debt service as percentage of export of goods and services has also positive and significant relationship with economic growth. It reveals that there is no evidence of crowding out effect of external debt service; rather it indicates there is the sign of debt crowding in effect in Ethiopia since it is positive and significant. Debt servicing as

percentage of export appear to affect growth positively and significantly. This implies that DSP has a positive relationship with RGDPG. Meaning that, the amount used in servicing external debt improves the economic position of Ethiopia significantly. The result is contrary to the a priori expectation that DSP has a negative influence on the RGDPG. This may be as a result of the fact that, it is good to pay debt. As the country pays its debts, it avoids the accumulation of interests and penalties. Servicing of debts also attracts foreign aids, foreign direct investments and so many international opportunities that can boost the economy in the long run.

The result revealed that trade openness showed negative insignificant effect on economic growth. It may be developing countries may not be benefited by opening their economies towards other external world.

Labour force as share of total population has negative but insignificant effect on economic growth. Priorly, the study hypothesized that labour force can have positive or negative effect on economic growth. We should note that labour force includes both the employed and unemployed labour force. Ethiopia is labour abundant country where most of the labour force is unskilled and with limited opportunity of making it productive. More unskilled labour with low productivity is not likely to raise the level of output in the country. This could justify the negative relationship even if it is insignificant.

## **5.2 .Error Correction Estimates Using Vector Error Correction Model**

In the short-run, there may be deviations from equilibrium and we need to verify whether such disequilibrium converges to the long-run equilibrium or not. Vector Error Correction Model (VECM) can be used to check this short-run dynamics.

The estimation of a vector error correction model requires the selection of an appropriate lag length. The number of lags in the model has been determined according to Akaike Information Criterion (AIC) and the appropriate lag length in the present study is 2. Then an error correction model with the computed-t values, standard error and probabilities of the regression coefficient is estimated and the results are presented in Table 5.4.1 below.

**Table 5.4 Table Showing Vector Error Correction Estimates**

Dependent variable D (RGDPG)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.641577	1.851256	0.346563	0.7349
D(LDSEXP(-1))	0.143713	0.161561	0.889527	0.3912
D(LDSEXP(-2))	0.111501	0.157979	0.705794	0.4938
D(LEDGDP(-1))	0.051202	0.071708	0.714035	0.4889
D(LEDGDP(-1))	0.033050	0.086596	0.381659	0.7094
D(LGDINVGDP(1))	1.279883	0.513687	2.491564	0.0284**
D(LGDINVGDP(2))	0.580907	0.322074	1.803646	0.0964*
D(LHK(-1))	7.022275	5.786163	1.213633	0.2482
D(LHK(-2))	5.097351	3.945933	1.291799	0.2208
D(LLF(-1))	-2.187289	1.098646	-1.990895	0.0698*
D(LLF(-2))	-0.997777	0.962674	-1.036464	0.3204
D(LOPEN(-1))	-1.253799	0.914648	-1.370799	0.1955
D(LOPEN(-2))	0.061671	0.582802	0.105817	0.9175
ECT	-0.997373	0.442836	-2.252240	0.0438**

\*\* , and \* indicate level of significance at 5% and 10% respectively.

Source: Own estimation

$R^2 = 0.865946$      $Adj R^2 = 0.66$      $DW = 2.02$      $F = 4.306$      $Prob(F\text{-statistic}) = 0.0066$

The estimated coefficient of error-correction term (ECT) in the equation is statistically significant at 5% level and has a negative sign, which conforms that there is not any problem in the long-run equilibrium relation between the dependent and independent variables, but its relative value (-0.9973), for Ethiopia shows the rate of convergence to the equilibrium state per year. Precisely, the speed of adjustment of any disequilibrium towards a long-run equilibrium is that about 99% of the disequilibrium or errors in economic growth are corrected each year (annually) in the long run. The ECT has a correct negative sign and it's also significant. It proves the existence of long term relationship among our variables under study and the speed of adjustment is very high towards a shock in any variables.

According to the above table 5.4. there is a casual relationship running from independent variables such as GDINVGDP(-1),GDINVGDP(-2) and (LF-1) to RGDPG in the short run. Meaning that, there is a short run relationship or association ship between the variables such as Gross domestic investment GDP ratio (GDINVGDP) and labor force lag once (LF-1) to Real GDP growth rate and no causal relationship between external debt and economic growth in the short run.

### **5.3. Diagnostic Test Results**

The results obtained from the various diagnostic tests are presented below.

The goodness fit of the above model ( $R^2$ ) shows that 86.59 percent of the total variation in the dependent variable (LRGDPG) is explained by the independent variables in the model. While the remaining 13.41% is accounted for by factors not specified in the model or not related to the included explanatory variables. The Durbin Watson (DW) test also suggests that there is no autocorrelation problem (there is no serial correlation in the residuals). Moreover, the various diagnostic tests do not detect any problem about the regression analysis. That is, the tests do not reject the null of white noise error terms suggesting no problem of error autocorrelation. The Jacque Berra test for normality cannot reject the null hypothesis of normality. It points out that the error term is normally distributed. Finally, the test for autoregressive conditional hetroskedasticity (ARCH) points that no ARCH structure in the error term is detected. Failure to reject the null of no ARCH indicates the existence of constant variance. Also the breush-pagan-Godfrey confirm that there no problem of Heteroskedasticity.

The F statistics rejects the null hypothesis that all the coefficients in the model are jointly insignificant. The F-statistics value of 4.306 shows that the model is fit and significant at 1% level (0.0066) which confirms that the variables in the model sufficiently explain the contribution of external debt to economic growth in Ethiopia. This further reveal that the result is not spurious and provide the basis for rejecting the null hypothesis that external debt does not contribute to Ethiopia's economic growth. This position is also in line with the Dual-gap analysis which argued that development is a function of investment and that such investment which requires domestic savings is not sufficient to ensure that development take place.

#### 5.4. Result of Autocorrelation Test

The table 5.5. shows that at lag order 2, the results are not significant so the null hypothesis of no serial correlation in the model is accepted. This implies that the random variable “u” is not correlated with its previous values; hence there is no serial correlation in the model.

**Table 5.5 Breusch-Godfrey Serial Correlation LM Test**

Ho: no serial correlation

F-statistic	0.034236	Prob. F(2,10)	0.9665
Obs*R-squared	0.210821	Prob. Chi-Square(2)	0.9000

**Table 5.6 Heteroskedasticity Test: Breusch-Pagan-Godfrey**

F-statistic	1.438306	Prob. F(21,9)	0.2941
Obs*R-squared	23.88345	Prob. Chi-Square(21)	0.2987

**Table 5.7 Heteroskedasticity Test: ARCH**

F-statistic	0.365662	Prob. F(2,26)	0.6972
Obs*R-squared	0.793392	Prob. Chi-Square(2)	0.6725

#### 5.5. Results of Normality Test

The result of the normality test is presented in Fig.1 below. The results of the VEC normality tests presented in Fig.1 reveal that the probability of Jarque-Bera is insignificant. Thus, the null hypothesis of normal distribution of the residuals is not rejected.

Fig.1.

Histogramnormalitytest

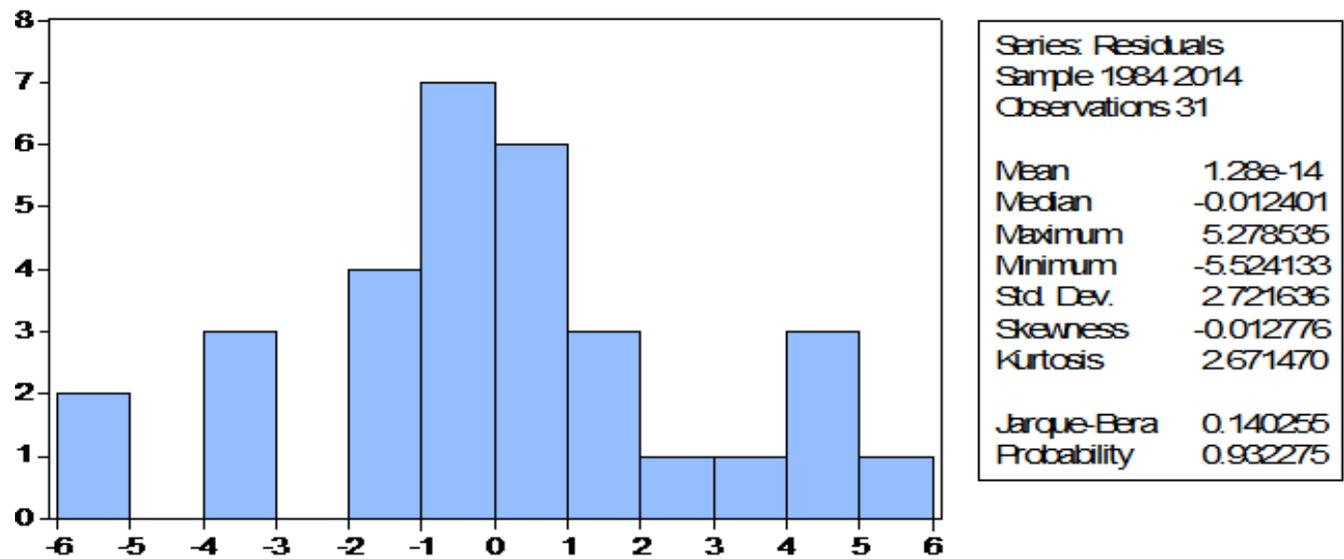


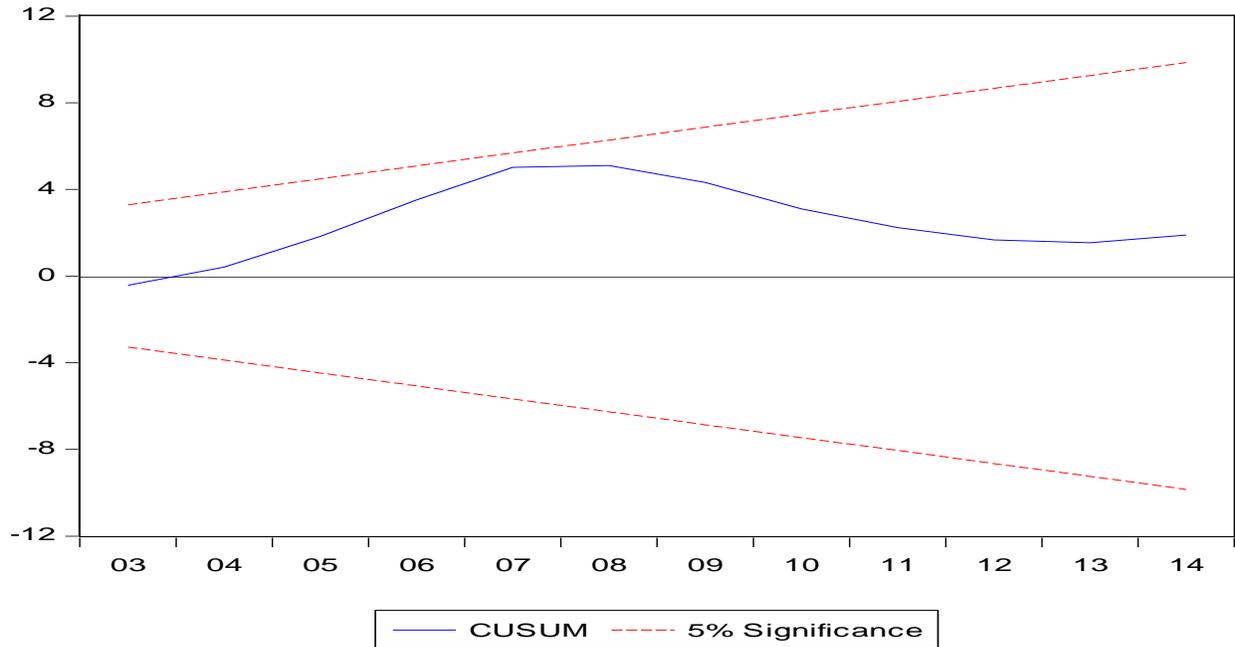
Table 5.8 Test for Causality

Null Hypothesis	Observations	F-Statistic	Prob
LDSEXP does not Granger cause LRGDPG	32	5.44672	0.0103
LRGDPG does not Granger cause LDSEXP		0.60483	0.5534
LEDGDP does not Granger cause LRGDPG	32	0.82301	0.4498
LRGDPG does not Granger cause LEDGDP		0.96713	0.3930
LGDINVGDP does not Granger Cause RGDGP	32	3.50763	0.4498
LRGDPG does not Granger cause LGDINVGDP		0.96713	0.3930
LHK does not Granger Cause LRGDPG	32	9.80392	0.0006
LRGDPG does not Granger cause LHK		0.37844	0.6885
LLF does not Granger cause LRGDPG	32	5.78287	0.0081
LRGDPG does not Granger cause LLF		3.64389	0.0397
LOPEN does not Granger cause LRGDPG	32	4.68344	0.0179
LRGDPG does not Granger cause LOPEN		0.37765	0.6890

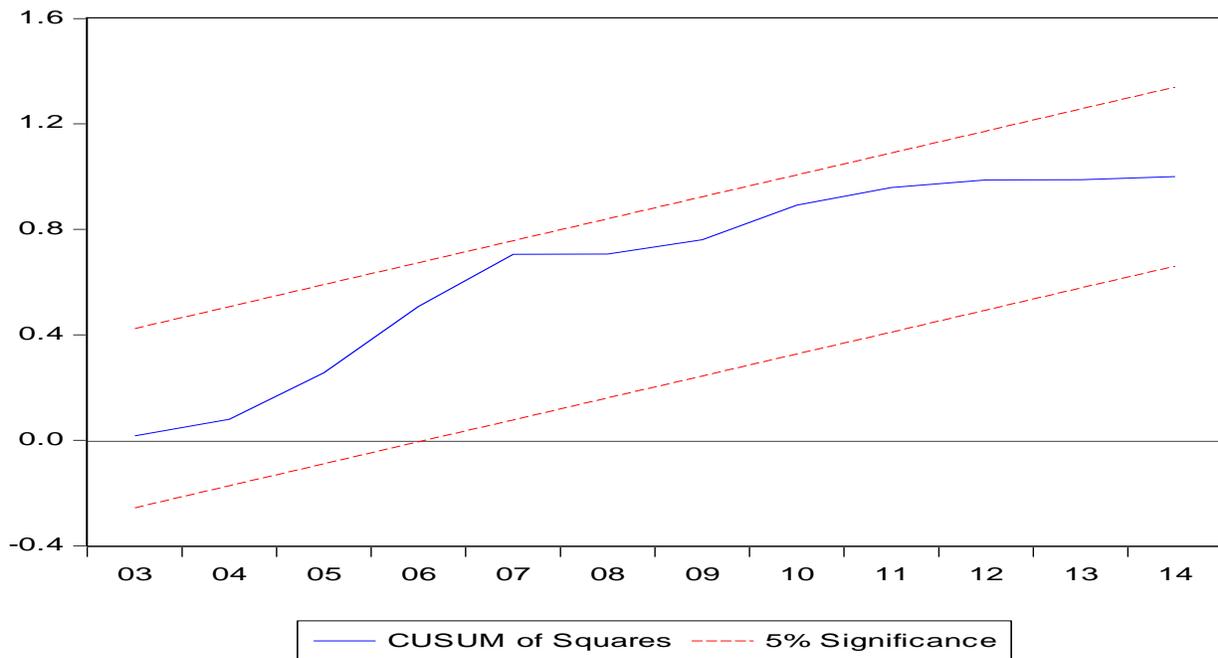
The granger causality test indicates that there is a unidirectional causality running from LDSEXP to LRGDPG in the long run.

### 5.6.. CUSUM and CUSUM Square Test of Stability

**Figure.2. CUSUM Plots**



**Figure 3. CUSUM Square Plots**



The plots of both the CUSUM and CUSUMSQ did not cross the critical value line, which was an indication of the stability of estimated parameters and hence these parameters could be used for policy purposes safely.

## **6. Conclusion and Recommendations**

### **6.1. Conclusion**

Every economy suffers from inadequate financial resources; hence, external borrowings become necessary in order to supplement the internal resources. Many developing countries have acquired external debt so much so that they are faced with critical problems of debt overhang and crowding out effect.

The study attempted to examine the long run and short run relationship between external debt and economic growth, considering real RGDP Growth rate as function of total external debt as percentage of GDP, debt service as percentage of export, annual education expenditure (proxy for human capital), real domestic investment as share of GDP, total labor force as share of total population, and openness in the economy.

The empirical analysis carried out revealed a significant long run relationship between Real GDP Growth rate (LRGDPG), stock of external debt (LED), External debt service (LDS) and Gross domestic investment GDP ratio (GDINVGDP), Human capita (HK) and an insignificant long run relationship between LRGDPG and Labor force (LLF) and openness (OPEN). Both real domestic investment and human capital are found to have positive relationship with economic growth. This is in line with the conventional and modern growth theories. On the other hand, the variable labour force (both employed and unemployed labour force) as share of total population is found to have negative but insignificant relationship with economic growth. A positive relationship between labour force and output depends most importantly on employed labour force. But, the variable labour force includes both the employed and unemployed labour force. Therefore, the negative relationship is consistent with the argument of (Todaro, 1994) which implies that the contribution of the labour force can be negative (adversely affect economic growth) for developing countries, in that additional unskilled and inefficient labour makes output to decline rather than increasing it. The effect of external debt is not positively felt in Ethiopia due to the fact that the funds are not always channeled to the real productive sectors, mismanagement and mismatch of the funds and/or diversion of the funds to private hands.

Also the Granger causality test showed that economic growth (LRGDP) Granger causes Debt service Export ratio (LDSEXP).

## 6. 2. Recommendations

- The study therefore, recommends that external borrowings should be channeled to the real sectors of the economy as against social consumption to be felt in the economy.
- The government could play fundamental part in stimulating the economy if the resources gained from the debt relief initiatives are applied at productive public investments and social expenses for the poor in the country.
- The funds should be properly managed in order to avoid wastages and mismatch. Also, measures that would prevent the diversion of the funds should be instituted.
- Introducing effective external debt management policy is crucial so as to remove miss-utilization of resources.
- Policies that encourage domestic investments, foreign direct investment and increased trade earnings can be effective in rising GDP growth and reducing dependence on external debt for sustained economic development.

## REFERENCES

- Adepoju A. A., Salau A. S. and Obayelu A. E. (2007) *The Effects of External Debt Management on Sustainable Economic Growth and Development: Lessons from Nigeria*. Munich Personal RePEc Archive (MPRA) Paper. No. 2147, pp. 1-30.
- Aluko F. and Arowolo D. (2010). Foreign aid, the Third World's debt crisis and the implication for economic development: The Nigerian experience. *African Journal of Political Science and International Relations*. 4(4), pp. 120-127.
- Bannerjee, A. D and Mestre R. (1998) "Error-correction mechanism test for cointegration in single equation Frame work", *Journal of Time Series Analysis*, pp 267-283
- Chowdhury, Structural Analysis of External Debt and Economic Growth: Some Evidence From Selected Countries in Asia and the Pacific, *Applied Economics*, 26 (12), (1994), 1121- 1131.
- Clements, B., Bhattacharya, R. and Nguyen, T. Q. (2003). "External Debt, Public Investment, and Growth in Low-Income Countries". IMF Working Paper WP/03/249, December.

Cohen, D., (1993) “Low Investment and Large LCD Debt in the 1980.s”, *The American Economic Review*, 83(3), pp 437-449

Cohen, D. (1993), “Low investment and large LDC debt in the 1980s”. *The American Economic Review*, June 1993.

Cunningham, R.T. (1993): “The Effects of Debt Burden on Economic Growth in Heavily Indebted Nations”, *Journal of Economic Development*, pp 115-126.

Degefe, B. (1992). ‘Growth and Foreign Debt: The Ethiopian Experience: 1964-86’. AERC Research Paper No. 13. Nairobi: African Economic Research Consortium.

Greene, J. E., and S. M. Khan (1990). ‘The African Debt Crisis’. AERC Special Paper 3. Nairobi: African Economic Research Consortium.

Greene, J., Villanueva, D. (1991). “Private investment in developing countries.” *IMF Staff Papers* 39(1), pp. 33-58

Fosu, the External Debt-Servicing Constraint and Public Expenditure Composition in Sub-Saharan Africa, World Institute for Economic Research, Working Paper **W36**, (2009).

Hameed, H. Ashraf and M. A. Chaudhary, External Debt and its Impact on Economic and Business Growth in Pakistan, *International Research Journal of Finance and Economics*, **Issue 20** (2008), 132-140.

Iyoha, M. A. (1999). ‘External Debt and Economic Growth in Sub-Saharan African Countries: An Econometric Study’. Paper presented at AERC workshop, Nairobi.

Iyoha, Milton. A. (1999), "External Debt and Economic Growth in Sub-Saharan African Countries", Benin city Nigeria: University of Benin.

Jonse (2002): “External Debt and Economic growth” The case of Ethiopia: Addis Ababa University

J. Sachs, the Charade of Debt Sustainability, *The Financial Times* dated on Tuesday, 26th September, 2000. Available at:

[http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2000/FT\\_2000\\_TheCharadeofDebtSustainability\\_09\\_26\\_00.pdf](http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2000/FT_2000_TheCharadeofDebtSustainability_09_26_00.pdf) accessed on 15.02.2013.

Karagol, E. (2002): “The Causality Analysis of External Debt Service and GNP:” *The Case of Turkey*”, *Central Bank Review* pp 39-64.

Krugman, P. (1989) “Financing vs. Forgiving a Debt Overhang”, *Journal of Development Economics*, No. 29, pp 253-268.

Kappagoda and N. C. Alexander, Debt Sustainability Framework for Low Income Countries: Policy and Resource Implications, Paper Submitted for the G-24 Technical Group Meeting, Washington, D.C., September 27-28 (2004). Available at: <http://www.nsi-ins.ca/wp-content/uploads/2012/10/2004-Debt-Sustainability-Framework-for-Low-Income-Countries-Policy-and-Resource-Implications.pdf> accessed on 15.02.2013.

Ministry of Finance and Economic development, (2014) statistical bulletin.

Ministry of Education, (2014) statistical bulletin.

National Bank of Ethiopia, (2015) statistical Bulletin.

Ogunmuyiwa M.S. (2011). “Does External Debt Promote Economic Growth in Nigeria?”, *Current Research Journal of Economic Theory*, vol. 3 Issue: 1, pp. 29-35

Pattillo, C., Poirson, H. and Ricci, R. (2004), “What Are the Channels Through Which External Debt Affects Growth?” *IMF Working Paper*, No. 04/15

Were, Maureen (2001). “The Impact of External Debt on Economic Growth in Kenya: An Empirical Assessment”, UNU-WIDER Research Paper, DP2001/116