Public External Debt, Capital formation and Economic growth in Ethiopia

Teklu Kassu (Corresponding Author)
Ethiopian Civil Service University
E.mail: teklukasu@gmail.com

Professor D.K Mishra
Ethiopian Civil Service University

Melesse Asfaw, Ph.D., PMP
Ethiopian Civil, Service University
E-mail: drmelesse@gmail.com

Abstract

This study examined the nexus between public external debt, Capital formation and economic growth in economy of Ethiopia during the last recent four decades. The purpose is to identify the existence of cause and effect relationship between external public debt, Capital formation and Economic growth. To this end, secondary time serious macroeconomic data for the period under review were collected from ministry of Finance and Economic Development and African Development Indicators of World Bank data base and analyzed by qualitative description and quantitative econometric techniques. The result from qualitative and quantitative analysis has shown that Ethiopia were under serious external debt problem until 1990's. Its good name was affected and access to external concessional borrowing window was denied. There were debt overhang, crowding out and liquidity problems birthed out of unfavorable policy followed by Dergue regime which include large borrowing from multilateral, bilateral and commercial creditors to finance war, in appropriate macroeconomic policy and channeling of resources for inefficient public undertakings which led to very low rate of return. The present government which inherited a mounting debt, fragile macro economy and very unstable country highly vulnerable to distress and conflict, with the help of IDA and IMF established a stable macroeconomic environment, adopted comprehensive debt management strategy, utilized available debt relief optimally, improved debt indicator ratios and brought the country's external debt from un sustainability to sustainability. According to the quantitative analysis public external debt as percentage of GDP has a negative and significant relationship with real GDP in the long run and no significant effect in the short run. On the other hand external debt as percentage of GDP has positive and significant effect on capital formation in the long run and negative in the short run.

Keywords: Public External Debt, Economic growth, Capital formation, and Debt distress

1. Introduction

Accelerated, sustained and equitable economic growth is a prime agenda of the new Ethiopia to end poverty, transform economy, and bring social development to renew her good name of early civilization. Theses golden objectives are challenged by lack of adequate domestic financial resources for development finance among others. Economic theories have shown that financial resources are more important than natural resources in the process of economic development. A country richly endowed with natural resource cannot use them fruitfully without capital and skilled labor, the availability of which depends up on financial resources. According to Hicks (1965), choosing appropriate method of finance cannot make a bad plan good, but it can make it better, using wrong methods can wreck even the best plan. Rosenstein Rodan in his theory of big push pointed out that for achieving economic progress, investment at initial stage must be sufficiently big to bring a country into self sustaining growth. Economists preached adequate mobilization of financial resources as basic issue to the whole questions of economic development. But this important factor of development is very scarce in Ethiopia.

The National saving of Ethiopian economy was only about 6 percent of GDP during the recent planning periods (SDPRP and PASDEP). It has shown some improvement during GTP and rose to 17 percent in2013/14 which itself is by far less than the African average of 20 percent. The revenue productivity of taxes in Ethiopia is very low due to tax evasion and avoidance problems. It is about 13 percent of GDP which is less than sub Saharan African countries average of 16 percent. Investible profits of public enterprises are negligible due to their operational inefficiencies and social objectives. There is twin gap: saving – investment and trade gap in Ethiopia. According Tadese (2011), "Ethiopian economy is known for the presence of resource gap. The saving investment gap has grown from 1.1% of GDP during 1964-74 to 6% of GDP during 174-1991 and 11.7% of GDP during 1991-2008" the gap was grown to 16.7% in 2010/11 and come down to 10 percent in 2014. So to fill this resource gap external financing particularly public external debt becomes an important source of

development finance.

A public debt is defined as is an obligation of a government to make payments of specified amount to holders of the debt instrument. During the process of undertaking the debt the government receives command over resources in exchange for its promise to make future payments. Those future payments include interest plus principal payments (Buchanan).

Based on different criteria's public debt can be divided into different categories. For example based on the source of loan public debt can be divided into domestic and external debt. On the other hand based on the use of the loan public debt is categorized into productive and dead weight debt. Since no country in the world have been bankrupted due to domestic accumulation of public debt because the government can easily monetize its debt through inflationary tax the focus of this paper is only on external debt which can be defined as, government plus government-guaranteed external debt.

There are two opposing views on the necessity of debt, one in favor of it, the other against it. For example as Cole porter has put it we and government fall in debt but if our debt is to buy houses and for capital investment that have a long run payoff and can be able to pay back, borrowing can be beneficial. But if it is to wage war or to cover current expenditure it is harmful for legal, economic and psychology of the borrower. On the other hand In the Book of Proverbs, the Bible warns that the borrower is servant to the lender. Similarly, more than two thousand years ago, the Roman author Publilius Syrus declared that debt is the slavery of the free.

Countries where government has budget deficit, then the best alternative is to look for other sources where such deficit can be eliminated. Government borrows in order to close the resource gap between savings and investment. Debt is one of the sources of financing capital formation in any economy. Adepoju et al. (2007) note that developing countries in Africa are characterized by inadequate internal capital formation due to the vicious circle of low productivity, low income, and low savings. In developing countries saving is too low because their financial systems are underdeveloped, capital markets are highly distorted or subject to financial repression, and private agents are subject to considerable uncertainty regarding the incidence of taxes,. So due to this developing, countries borrow externally because of their inability to generate enough domestic resource which could be used for investment.

On the other hand recent research on public external debt shows as that when government plus government-guaranteed debt exceeds 50 percent of GDP, further accumulation of this type of debt does more harm than good (Fry 1989). Similarly Foreign debt accumulation is associated with higher inflation after the debt ratio exceeds about 50 percent, that national saving starts to decline after the debt ratio exceeds about 50 percent, and that the growth-inhibiting effect of foreign debt accumulation is greatest when the debt ratio exceeds about 50 percent

When we see the Ethiopian case where the economy is characterized by: by low human development index (0.392%), relatively low life expectancy (59 years), low road density (4 km of road per 100 sq km), low telecommunication service (0.97 per 1000 people) and low electric consumption (54 kwh per capita) requires huge investment to overcome those problems. But financing those investments through domestic resource mobilization is impossible because the country's financial system is underdeveloped and characterized by: low population to financial service coverage, Low percentages of adults which have accesses to formal credit (1.197% in 2006 and has increased to 1.86% in 2011), low number of depositors in commercial banks (was only 65.97 per 1,000 people in 2006 and has increased to 114.76% in 2010, low population-to-branch ratio (one branch for 62,063.6 people). Similarly the taxing system is also underdeveloped and with low tax to GDP ratio (only 9.28%), and low saving to GDP ratio only 15% .Therefore the government did not have any alternative other than borrowing from abroad to finance its huge investments. For this reason the country's external debts has been increasing from time to time and have its own impact on domestic economy. This study has tried to investigate the effect of public external debt on capital formation and economic growth of Ethiopia using macroeconomic time serious data..

2. Literature review

The effect of public debt on capital formation and economic growth is the concern of this paper. Different theories have come with different opinions about the role and effect of public debt. The Classical economists like Hume, Smith, and Ricardo, discussed public debt early in terms of its general effects on the economy. They analyzed the neutrality he government debt (i.e., the hypothesis that deficit and tax financing of government budgets are equivalent with respect to capital accumulation) and they also agreed in that all government expenditure was considered to be wasteful and unproductive; therefore, the real evil of public debt lay in the destruction of capital which it facilitated, not in the debt itself. On the other hand J. S. Mill, claim that the public debt has a double burden, one which is borne by the current generation of laborers because resources are withdrawn from private employments, and one which is shifted forward to future generations because of the taxes required for the interest payments

Whereas the intergenerational distribution of the debt burden were first discussed by Ricardo. He

pointed out the possibility of public debt neutrality, which was later called the ''Ricardian equivalence theorem,'' this theorem was further analyzed and revived by Barro (1974). The Ricardian equivalence hypothesis of David Ricardo was based on, restrictive assumptions. These assumptions include: Individuals are infinitely lived; there are perfect capital markets; there is no uncertainty; individuals are rational and far sighted; and all taxes are non-distortionary, or lump-sum, taxes). Based on those assumptions he pointed out three areas of analysis on the effect of public debt. The first argument is that budget deficits today require higher taxes in the future when a government cuts taxes without changing present or future public spending. As a consequence, households will reduce their consumption and increase savings in order to meet the future tax burden. Therefore tax and deficit finance are equivalent, in that the burden of each is on current, not future, generations. His second argument is that Bond-financed deficits will have no adverse effect on investment or net exports because the budget deficit will be matched dollar for dollar by additional private saving, leaving the interest rate unchanged. A third argument sees deficits as a symptom rather than a cause of economic problems. The perception here is that the government can finance any given level of its expenditures by taxing, by borrowing money from the public, or by expanding the money supply. According to this argument, all the adverse consequences that are attributed to deficits are in fact due to excessive levels of government expenditures, not to the deficit itself.

In this Ricardo's analysis, the law of markets assures an economy operating at full employment. Thus there is no need for public expenditure to stimulate aggregate demand, for a loan financed increase in government spending is accompanied by an equal reduction in private spending. Funds that would have been spent privately are instead taxed away and spent by the government which is called crowding out. This has a depressing effect on savings, investment and growth, due to the assumption that while some private spending is productive in more modern terms, it is investment spending rather than consumption spending, all (or nearly all) public spending is unproductive. If borrowing occurs for long term productive investment in equipment, materials, or skills, then future production will reap the benefit in the form of additional income, which can then be used to repay the principal and interest of the loan. However, borrowing setting for consumption purposes increases current consumption spending, and reduces future consumption spending by a larger amount. Thus, according to Ricardo, larger future sacrifices are required to finance current consumption spending beyond a nation's means.

 Barro (1979) contribution as a tax is smoothing and shows one mechanism by which public debt and deficits can be welfare improving. The crucial finding in Barro (1979) is that the social planner should keep the tax rate constant. The level of taxes is determined by the government's inter- temporal budget constraint, which says that the present value of spending, which is exogenous in the model, has to be equal to the present value of taxes. Budget deficits and surpluses are used as a buffer when spending is temporarily high or low, or revenues are temporarily low or high, respectively.

On the other hand the neoclassical economists argued that deficits, especially structural deficits are seen as the source of economic problems. The most frequently mentioned negative effect of deficits is its impact on interest rates and, through that channel, on private investment. Since deficit occurs when the government borrows from the public to finance its expenditures, this borrowing necessarily competes with other borrowers for the available loanable funds, so that increased government demand for credit puts upward pressure on interest rates and crowds out private investors competing for the same funds. If the government invests the funds in productive capital, then the deficit leads to a substitution of public sector capital for private sector capital, and the burden on future generations is accordingly reduced; in fact, if public sector capital is more productive than the displaced private sector capital, then the deficit actually makes future generations better off. But there is some limited empirical evidence on the productivity of public investments except investment in infrastructure.

According to the neoclassical economists another adverse effect of deficits arises from their impact on export sectors. To the extent that government borrowing increases domestic interest rates, domestic investment appears more attractive to foreign investors and capital flows from abroad to the domestic economy. These capital inflows in turn increase the demand for the domestic currency, which then appreciates relative to other currencies. A more valuable domestic currency enables domestic consumers to buy foreign goods more cheaply; however, it also makes it more difficult for domestic businesses to sell their products overseas. Deficits therefore crowd out domestic exporters, which lead to a loss of employment and income in export sectors of the economy. Similarly when the government deficit is financed through external debt, an additional burden emerges. The servicing of debt requires that principal and interest on the debt be paid. When these payments are made abroad, they constitute a transfer from domestic citizens to individuals living overseas, thereby reducing the living standards of those citizens that must make the payments. Current and future generations are now burdened because current consumption increases at the expense of future consumption. Research in the mid-1980s indicated that

Another strand of economics which is dominant in the 1970s was the Keynesian. According to this view market economies are inherently unstable and, in particular, not capable of generating an aggregate demand that is high enough to guarantee full employment in an economy. Consequently, the government has to intervene

in order to assure that demand is sufficiently large so that labor demand rises and approaches its full employment level. In addition, according to that view public debt does not pose a problem if the government runs into debt in the home country. They further argued that debt finance was necessary to ensure an adequate level of aggregate demand because savings cannot be fully absorbed by private investments. In addition, the Keynesians took up the position originally held by Ricardo that the burden of public debt is completely shouldered by the generation that issues the debt. This view can be summarized by the phrase ''we owe the public debt to ourselves.'' Government budget deficits and hence rising government debt do not, therefore, pose particular problems: they are not harmful, and they are desirable in times of low aggregate demand and high unemployment to restore the full-employment equilibrium

The inter-generational redistribution aspect of debt is also justified in the so called golden rule of public finance. According to that rule, governments should finance public investments that yield long-term benefits by public debt in order to make future generations contribute to the financing. Since future generations will benefit from today's investment, their contribution to the financing is justified. Otherwise, the current generation would have to bear all the costs but only benefit some part of the investment which is unfair.

In the Endogenous growth models of Roemer (1986, 1990) and Aghion and Howitt (1992) emerged the line of research the long-run growth rate of economies is no longer an exogenous variable but becomes itself an endogenous variable that depends on parameters and in this model governments cannot only influence the levels of economic variables but also their growth rates through fiscal policies. Further, it is well known that the government can affect the dynamics of economies by its debt and deficit policy.

In the empirical front there are two opposing views: on the one hand there finds a negative relationship between debt and economic growth and on the other hand others find that there is positive relationship between debt and economic growth. For example Levy and Chowdhury (1993), Cunningham (1993), Sawad (1994),Chowdhury (2001), Siddiqui and Malik (2001), Easterly (1999, 2001 and 2002) and Sen (2007) comes to the same conclusion that external debt negatively affects economic growth even though the line of causation and their method of analysis is different.

On the other hand Smyth and Hsing (1995) find that in early 1980, debt ratios rose but debt-financing have stimulated economic growth. In another study Patillo (2002) indicated that on average, external debt is growth-enhancing up to about 160% of export to debt level, and growth-reducing thereafter (i.e. the debt overhang range). Maghyereh (2002) comes to the conclusion that in Jordon, external debt below the threshold level of 53 % of GDP has a positive relationship with GDP and thereafter the relationship turns to be negative. Blavy (2006) finds that „threshold level of debt" is 21% of GDP, below that level, debt is positively associated with productivity, but the coefficient for the "above threshold debt" becomes negative and significant.

3. Data and methodology

The data employed for this analysis is collected from Ethiopian Ministry of Finance and Economic development and the World Bank African Development Indicators and covers periods from 1970 to 2013.

Since Nations that have significant debt stock requires to spend portion of its resources to service its debt having significant implications on decisions regarding the employment of labor and capital in the production function. Owing to this Cunningham (1993) has introduced debt burden into the production function Therefore, a debt-inclusive production function can be written in the following form.

$$Y = A(k,L,DEBT) \text{--1}$$

Since debt can affect growth through investment, saving and capital formation it is important to analyze a three step procedure to capture the effect of public external debt. But this paper only tries to capture the effect of public debt in two steps on economic growth and on capital formation. Therefore the model on growth debt relation would be:

$$PGDP_t = \beta_0 + \beta_1 OPP_t + \beta_2 Inf + \beta_3 EDBEXPO + \beta_4 EDBGDP + \beta_5 INVGDP + \beta_6 sGDP + \varepsilon_t \text{-------2}$$

And the model for debt and capital formation relationship would be;

$$Capform_t = \beta_0 + \beta_1 OPP_t + \beta_2 Inf + \beta_3 EDBEXPO + \beta_4 EDBGDP + \beta_5 INVGDP + \beta_6 sGDP + \varepsilon_t \text{----3}$$

Where The dependent variables are: PGDP=real per capita GDP (PGDP),

Capform= capital stock growth rate

The independent variables are:
- the debt variables EDBGDP= external debt-to-GDP ratio,
     EDBEXPO= total external debt-to-exports ratio
- And control variables Inf   = consumers price index
     OPP   = Export – import
     INVGDP = investment to GDP ratio
     SGDP   = Saving to GDP ratio

And ε_t is the error term

3.1. Estimation procedure

Equation 2 and 3 are the model of growth and capital formation in Ethiopia where the variables are set. One could actually estimate a complete VAR model and test for the co integrating vectors, and if there is any co integration we can, estimate the VECM. But before we perform estimation procedure first we must test for unit root test and the result was presented below.

4. Result and Discussion

4.1. Descriptive analysis Ethiopian public debt

 Ethiopia was one of Severely Indebted Poor Country (SILIC) of the world until the end of the first half of 1990's. So its credit worthiness, access to external borrowing from concessional windows are reduced and its image of good name was affected. MoFED(2013). There were debt overhang, crowding out and liquidity problems birthed out of unfavorable policy followed by Dergue regime which include large borrowing from multilateral, bilateral and commercial creditors to finance war, in appropriate macroeconomic policy and channeling of resources for inefficient public undertakings which led to very low rate of return. Poor debt servicing capacity due to inadequate export earning followed by restrictive policy, selection of projects without proper appraisal, delays in project implementation and luck of proper follow up were some of the core causes that had contributed for debt distress problem and put adverse effect on optimum use of external borrowing. W.B (1995). The present government led by Ethiopian People Democratic Front (EPRDF) come to power in mid 1991, inherited a mounting debt, fragile macro economy and very unstable country highly vulnerable to distress and conflict. Immediately after a couple of years, the transitional government of Ethiopia has carried out serious public sector reform and recovery program supported by International donor community specially IDA and IMF and established a stable macroeconomic environment. It adopted comprehensive debt management strategy, utilized available debt relief optimally, improved debt indicator ratios and brought the country's external debt from un sustainability to sustainability.

Ethiopia's external debt has changed significantly in magnitude, structure, and composition over the years under study. The stock of external debt the Military regime inherited from the past government was US$372 million, (14%) of GDP at current prices. Whereas the Debt stock at the commencement of the new current regime stood at US$8.8 billion, equivalent to 95% of GDP at current prices. Thus, during its 17-year tenure, the military government increased the country's total debt 24-fold, at an annual average growth rate of 21% (Degeffee).

According to MoFED (2011), during 2009/10 fiscal year the total external debt outstanding of the country stood at USD 5.6 billion. During the same period the amount of external outstanding debt of the country increased by 29.4 percent compared to the previous fiscal year. As long as there is deficit financing, the importance of external resource is unquestionable. To fill the gap the government needs some kind of source from other sources. The figure below shows that the trend of the determinants of GDP growth and capital formation of those the external debt variables such as debt to export ratio (DEBEXPO), debt to GDP ratio (DEBGDP) and debt service to GDP ratio are some of them. When we see the trend of those variables in relation to GDP, capital formation and other variables of interest in the model for the period between 1970 and 2013 and except openness and inflation all are measured as ratios expressed in terms of real GDP. OPP expressed as a ratio of export to import.

As shown in the figure below both external debt to GDP ratio and external debt to export ratio are in its highest stage in the 1990's though the highest is debt service ratio to export has by far the highest almost 882% percentage of export in 1990 and 998% in 1991 but decreased to 9.56% of export in 2013.. The other variables experienced similar pattern except per capita was shown a sign of highest increase since 2005 and inflation reaches its peak in the country in 2010 and decreased after that almost to one digit level in 2013.
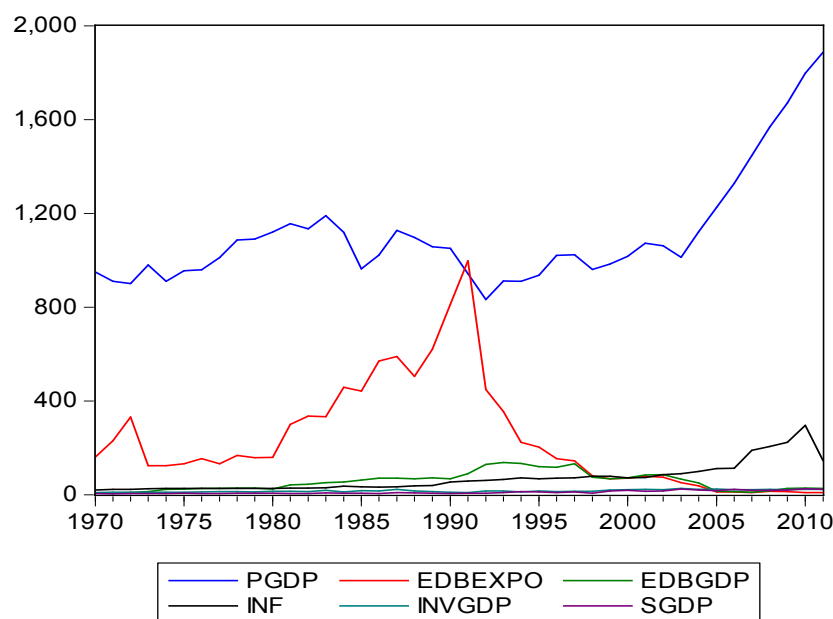
Figure one trend determinants of GDP and capital formation.

In summary, the growth in debt accumulation and debt service cost did not compromise economic growth, equity, employment and poverty reduction during current government regime. The country's debt utilization and management capacity significantly increased and the country get out of the external debt problem of 1990's under which the country was in. During the recent two decades, external Public debt of Ethiopia was well managed. There is no alarm of debt distress, no significant manifestation of debt crises risk as it has track record in economic growth history and favorable growth potential along with not high present value of external debts outstanding. The 1990's debt problems are not issue of worry now. The potential of the country to mobilize external debt finances at international level is improved. The country was rated as B and B+ by leading international raters for its credit worthiness. More over the country stayed as an island of stability in very unstable neighborhoods.

4.2. Econometric Analysis

Table 1 Unit Root Test Result

variable	level		1st difference		Order of integration
	Test static trend	Critical value at 5%	Test static trend	Critical value at5%	
Log RGDP	0.94722*	-2.931404	-5.220820	-2.605593	I(1)
Log capform	-1.95882*	-2.933158	-10.47102	-2.933158	I(1)
Logedbexpo	0.090337*	-2.931404	-5.761626	-2.936942	I(1)
LogedbGDP	-2.139311*	-2.931404	-4.489731	-2.936942	I(1)
Loginf	-0.337273*	-2.938987	-3.936484	-2.943427	I(1)
LoginvGDP	-1.441169*	-2.933158	-10.78790	-2.936942	I(1)
LogsGDP	-0.583209*	-2.933158	-9.876594	-2.93642	I(1)
Opp	-2.050561*	-2.931404	-8.288735	-2.936942	I(1)

Test H_0: Existence of unit root. *, denotes the rejection of Null at 5% significance level

The unit root tests conducted revealed all variables have unit root in their level, thus have to be differenced to achieve stationary. This result is confirmed using ADF tests. Unit root tests revealed that all variables used in this study are I(1). Thus, the determination of co integrating relationships doesn't suffer from mixed order of integration. The existence of cointegrating vectors in the model will now be tested using Johansen's approach. Unlike the Engle-Granger two step procedure or single equation error correction model, this approach allows the existence of multiple co integrating relationships.

3.2. Co integration Analysis

As noted above the determination of the co integrating relationships in the model is done using the VAR based Johansen's approach. Once the co integrating vectors are identified from the two   model VARs, an error correction model consisting of differenced endogenous variables and error correction models derived from the model of VARs will be estimated (see also Durevall and Ndungu, 1999).

The VAR models for per capita GDP and capital formation would be:

$$RGDP_t = \beta_0 + \beta_{1j}\sum_{j=1}^{k} RGDP_{t-j} + \beta_2\sum_{j=1}^{k} inf_{t-j} + \beta_{3j}\sum_{j=1}^{k} EDBEXPO_{t-j} + \beta_{4j}\sum_{j=1}^{k} EDBGDP_{t-j} +$$
$$\beta_{5j}\sum_{j=1}^{k} INVGDP_{t-j} + \beta_{6j}\sum_{j=1}^{k} SGDP_{t-j} + \varepsilon_t \text{---}3$$

$$Capform_t = \beta_0 + \beta_{1j}\sum_{j=1}^{k} RGDP_{t-j} + \beta_2\sum_{j=1}^{k} inf_{t-j} + \beta_{3j}\sum_{j=1}^{k} EDBEXPO_{t-j} + \beta_{4j}\sum_{j=1}^{k} EDBGDP_{t-j}$$
$$+ \beta_{5j}\sum_{j=1}^{k} INVGDP_{t-j} + \beta_{6j}\sum_{j=1}^{k} SGDP_{t-j} + \varepsilon_t \text{---------------------------------------}4$$

Where all the variables are defined as above and k is the appropriate lag length defined based on Akaike and Schwarz information criteria. And since the variables in the model are I(1), the appropriate modeling strategy is VECM. In determining the number of cointegrating relationships first the lag length used should be determined using the above criterias and presented as follows.

3.2.1.   Growth model

Table 2 Lag length for PGDP Model

Lag	LogL	LR	FPE	AIC
0	1.266266	NA	0.078273	0.286687
1	42.37942	65.78104*	0.010553*	-1.718971*
2	42.60937	0.356421	0.010993	-1.680468
3	43.03834	0.643460	0.011345	-1.651917
4	44.31090	1.845206	0.011233	-1.665545

*indicated the length selected by different criteria's

The Johansen procedure test results for cointegration with one lags as determined by the above criteria in the system indicates that there are one cointegrating relationships. Based on the trace test fail to reject the null hypothesis none of them have cointegration relationship whereas maximum Eigenvalue tests fail to reject the null of at most one cointegrating equations in the system. The trace and maximum Eigenvalue test statistics are given in table determined using various information criteria

Table 3 Cointegration Test for Growth Model

Hypothesized No. Of CE(S)	Eigenvalue	Trace Test		Max-Eigenvalue Test	
		Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None *	0.756526	157.0507	125.6154	59.33522	46.23142
At most 1 *	0.585565	97.71550	95.75366	36.99522	40.07757
At most 2	0.453934	60.72028	69.81889	25.41063	33.87687
At most 3	0.311359	35.30965	47.85613	15.66747	27.58434
At most 4	0.214389	19.64219	29.79707	10.13431	21.13162
At most 5	0.186627	9.507874	15.49471	8.675748	14.26460
At most 6	0.019618	0.832126	3.841466	0.832126	3.841466

* indicates rejection of the null at 5% level of significance level

Therefore the potential cointegration equation for the growth equation is:

ECM_1 = logrGDP-o.58002log Edbexpo + 0.646625logEdbGDP + 1.140486log Inf -3.566393
        logInvGDP – 3.326083log SGDP + 6.56 OPP

As can be seen from the cointegration equation, real per capita GDP is negatively related to external debt to GDP ratio which means an increase in external debt to GDP ratio by one percent decrease real per capita income by 0.58 percent in the long run. Whereas external debt to export ratio is positively related which is unexpected sign because as external debt to GDP ratio increases the country's foreign currency available to import capitl goods decreases therefore it has an implication for decreasing per capita income.   On the other hand the other control variables have the expected sign investment and saving to GDP ratio has the expected sign which is positively related to real per capita GDP. Inflation and openness is negatively related to RGDP.

And the short run error correction model for the growth equation would be:

$$\Delta PGDP_t = \beta_0 + \beta_{1j}\sum_{j=1}^{k} \Delta PGDP_{t-1} + \beta_2\sum_{j=1}^{k} \Delta inf_{t-1} + \beta_{3j}\sum_{j=1}^{k} \Delta EDBEXPO_{t-1}$$
$$+ \beta_{4j}\sum_{j=1}^{k} \Delta DBGDP_{t-1} + \beta_{5j}\sum_{j=1}^{k} \Delta INVGDP_{t-1} + \beta_{6j}\sum_{j=1}^{k} \Delta SGDP_{t-1} + \delta_1 ECM_1 + \varepsilon_t \text{------}5$$

Where Δ is first difference operator, δ_1 is the long run equilibrium adjustment coefficient and $\beta^{'s}$ are coefficients of the long run (cointegrating) equation in the model. All the other variables are as defined in the preceding sections.

Diagnostic tests were conducted to test the adequacy of the model38. The model satisfies all diagnostic tests. Autocorrelation tests indicate that there is no problem of autocorrelation. The null of no serial correlation at lag

order of 12 cannot be rejected using LM test. Moreover, the residuals of the model are homoskedastic as the null of homoskedastic residuals cannot be rejected using White Heteroskedasticy (no cross terms) test. Jarque-Bera test of residual normality cannot reject the null of multivariate normal residuals implying that the residuals of the model are also normally distributed. The estimated cointegration equation also produces a sound impulse response. Therefore the result of the Error correction for the Growth model will be presented in table 4 below:

3.2.2.   The capital formation model

Table 5 Lag length for Capital Formation Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	22.98115	NA	0.026429	-0.799057	-0.503504	-0.692194
1	24.19264	1.938384	0.026199	-0.809632	-0.471856	-0.687503
2	26.99436	4.342669*	0.023999*	-0.899718*	-0.519720*	-0.762323*
3	27.70239	1.062041	0.024424	-0.885119	-0.462900	-0.732458
4	27.78881	0.125315	0.025661	-0.839441	-0.374999	-0.671513

*indicated the length selected by different criteria's

The Johansen procedure test results for cointegration with two lags as determined by the above criteria in the system indicates that there are at least two cointegrating relationships based on the trace test reject the null hypothesis at most two cointegrating relationship of them have cointegration relationship where as maximum Eigenvalue tests fail to reject the null of at most one cointegrating equations in the system. This result can be complemented by the fact that the characteristic polynomial of the model has six roots with modulus equal to one. Provided the number of variables in the model is seven, existence of six roots with unit modulus indicates that the adjustment coefficients for six potential cointegration equations are leaving only one potential cointegrating relationships (Harris, 1995) at the same time even though the trace test supports the two contegrating relationship where as the maximum Eigen tests supports only one contegrating relationship therefore this research paper also takes only one cointegration. The test presented below.

Table 6 Contegration Test for Capital Formation Model

Hypothesized No. Of CE(S)	Eigenvalue	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None *	0.869144	200.5789	125.6154	46.23142	0.0000
At most 1 *	0.677860	117.1990	95.75366	40.07757	0.0084
At most 2 *	0.444450	70.75550	69.81889	33.87687	0.4483
At most 3	0.407143	46.65584	47.85613	27.58434	0.2508
At most 4	0.266909	25.22096	29.79707	21.13162	0.4774

* indicates rejection of the null at 5% level of significance level

The potential cointegration equation for capital formation is:

ECM_2 = log Capform+ 0.582149log Edbexpo – 0.618587log EdbGDP + 0.33125 log inf – 2.3341455log InvGDP – 2.300842log SGDP + 7.19OPP

 Where capital formation is negatively related to external debt to export ratio in the long run or an increase in one percent in the external debt to GDP ratio decreases capital formation by .58 percent. On the other hand contrary to the growth model external debt to GDP ratio is positively related to capital formation this may be because most of the external debt of Ethiopia is for building infrastructure projects this may increase the stock of capital formation. The other control variables have as expected sign where investment and saving to GDP ratio have positive effect on capital formation and inflation and openness have negative effect.

Therefore, the shrt run cointegration model for capital formation be:

$$\Delta Capform_t = \beta_0 + \beta_{1j} \sum_{j=1}^{k} \Delta PGDP_{t-1} + \beta_2 \sum_{j=1}^{k} \Delta inf_{t-1} + \beta_{3j} \sum_{j=1}^{k} \Delta EDBEXPO_{t-1}$$

$$+ \beta_{4j} \sum_{j=1}^{k} \Delta DBGDP_{t-1} + \beta_{5j} \sum_{j=1}^{k} \Delta INVGDP_{t-1} + \beta_{6j} \sum_{j=1}^{k} \Delta SGDP_{t-1} + \delta_1 ECM_1 + \varepsilon_t ------6$$

Where Δ is first difference operator, δ_1 is the long run equilibrium adjustment coefficient and β's are coefficients of the long run (co integrating) equation in the model. All the other variables are as defined in the preceding sections.

Diagnostic tests for adequacy of the model indicate that the model satisfies all tests. There is no problem of autocorrelation in the model as the null of no serial correlation cannot be rejected at lag order 12 using LM test. Similarly, the null of homoskedastic residuals cannot be rejected using White Heteroskedasticity Test (no cross terms) implying that the residuals of the model are homoskedastic. VEC normality Tests also indicate that residuals are normally distributed since the null of multivariate normal residuals cannot be rejected using Jarque-Bera test.

3.2.3.   Regressions result and discussion

 The result of the Error correction model for both models after necessary taste have been passed will be presented below. According to the results given in the table seven below, the coefficients of the error correction terms are interpreted as speed of adjustment to long run equilibrium or the disequilibrium periodically transmitted to growth from determinants of growth. Positive coefficient of the error correction term implies that any disequilibrium the model continuously grows making convergence difficult where as negative coefficient implies convergences to its long run equilibrium. As the coefficient of the error correction term in this model is negative and significant it shows us that the existence of a stable long-run relationship among the variables in Ethiopia (Bannerjee et al., 1998). The coefficient of the error correction term also represents the speed of adjustment. That is following a disturbance in the unrestricted model how quickly the variables returned backs to their long-run values. Therefore the results suggest that following a shock, approximately 10.2%, adjustment towards the long-run equilibrium is completed after one year.

        The results also tell that external debt as percentage of GDP and external debt as percentage of export has not significant effect on growth in the short run this may because most of the debt in Ethiopia will be for long gestation projects they did not short run effect. When we see external debt as percentage of GDP, it has a no significant effect in the short run. Similarly, Openness which is export minus import and inflation does not have any significant effect on the growth of the country. On the other hand investment and saving to GDP have a positive and significant effect on per capita GDP in the short run.

Table seven: result for the Error correction model for growth equation.

Variable	Coefficient	Standard error	t-stastic
D(LOG_PGDP(-1))	0.411404	(0.15722)	[2.61671]
D(LOG_EDBEXPO(-1))	0.024612	(0.06131)	[0.40141]
D(LOG_EDBGDP(-1))	-0.039291	(0.26565)	[-0.151941]
D(LOG_INF(-1))	-0.081218	(0.11212)	[-0.72437]
D(LOG_INVGDP(-1))	0.345810	(0.13579)	[-2.54661]
D(LOG_SGDP(-1))	0.267711	(0.09986)	[2.68087]
D(OPP(-1))	2.42E-12	(2.1E-12)	[1.13984]
C	0.042328	(0.02191)	[1.93217]
CointEq1	-0.102094	(0.04424)	[-2.30793]

Table 8 Error Correction Model for Capital Formation

Variable	Coefficient	Standard error	t-stastic
D(DLOG_CAPFORM(-1))	0.122982	(0.20630)	[0.59613]
D(DLOG_CAPFORM(-2))	0.159656	(0.12444)	[1.28304]
D(LOG_EDBEXPO(-1))	- 0.245728	(0.07873)	[3.12130]
D(DLOG_EDBEXPO(-2))	-0.192097	(0.05983)	[3.21058]
D(LOG_EDBGDP(-1))	-0.339111	(0.11017)	[-3.07794]
D(DLOG_EDBGDP(-2))	-0.491023	(0.12815)	[-3.83151]
D(LOG_INF(-1))	0.160541	(0.12873)	[1.24709]
D(DLOG_INF(-2))	0.066459	(0.11349)	[-0.58561]
D(LOG_INVGDP(-1))	-1.287626	(0.34387)	[-3.74455]
D(DLOG_INVGDP(-2))	0.574151	(0.20875)	[-2.75046]
D(LOG_SGDP(-1))	0.763036	(0.14491)	[5.26542]
D(DLOG_SGDP(-2))	0.414221	(0.09794)	
D(OPP(-1))	-1.53E-12	(1.8E-12)	[-0.82930]
D(DOPP(-2))	-4.48E-12	(2.3E-12)	[-1.93753]
C	-0.000928	(0.01858)	[-0.04997]
CointEq1	-1.686709	(0.29818)	[-5.65660]

When we see the capital formation equation similar to the growth equation its error correction coefficient is negative and significant which shows us that it is disequilibrium will be adjusted in the long run and its speed of adjustment is about 168%. On the other hand when we analyze the sort run impact of the variables of our interest the first and second difference of external debt to GDP ratio and external debt to export ratio have significant and negative effect on capital formation. Similarly the first difference investment to GDP ratio has negative and significant effect on capital formation where as the second difference has positive and significant effect. On the other hand the first and second difference of saving to GDP ratio has positive and significant effect on capital formation. Like in the above model of growth inflation and openness did not have any significant effect on

capital formation.

4.   Conclusion and Policy Implications

This study has tried to analyze the effect of public external debt on capital formation and economic growth in the economy of Ethiopia during 1970-2013 periods of Dergue and the present government. For this purpose secondary macroeconomic time serious data about external borrowing disbursed for the decades under review were collected from the Ministry of Finance and Economic Development of Ethiopia and the World Bank African development indicators data base for the variables which are not available in domestic sources. The study employed VECM model and various tests such unit root test and co integration test. The result revealed that in the long run the model establishes a stable relation with negative and significant coefficient, therefore in the long run the model moves towards equilibrium.

In Ethiopia, public external debt as percentage of GDP has a negative and significant relationship with real GDP in the long run and no significant effect in the short run. And external debt as percentage of export has positive and significant effect on real GDP in the long run and no significant effect in the short run. On the other hand external debt as percentage of GDP has positive and significant effect on capital formation in the long run and negative in the short run. Whereas external debt to export debt to export ratio have significant and negative effect on capital formation both in the short run and long run. The control variables investment and saving as percentage of GDP have positive and significant effect on both real GDP and capital formation in the short run and in the long run. Therefore, the results strongly confirm that external debt have no effect in the short where as there is some implication of the existence of "Debt Overhang effects" in the long run. On the other hand, only in the short run inflation and openness did not have any effect on growth and capital formation where as investment, saving have positive and significant effect. In this study government is advised to balance its revenue and expenditure, monitor external sector public borrowing and enhance improve its export item and volume for enhanced debt servicing capacity.

Reference

Alfredo Schclarek Curutchet2006Essays on Fiscal Policy, Public Debt andFinancial Development Distributed by the Department of EconomicsLund University SWEDEN

Andrew L. Yarrow2008 Forgive Us Our Debts The Intergenerational Dangers of Fiscal Irresponsibility Yale University PressNew Haven and London

Antony Rowe Ltd, Chippenham,Wiltshire Nancy Churchman2001 David Ricardo on Public DebtPrinted and bound in Great Britain

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

Barro, R., & Sala-i-Martin, X. (2003). Economic Growth (2nd eddition), Cambridge,: MIT Press.

Barro, Robert J., (1991) "Economic Growth in a Cross Section of Countries," Quarterly Journal of Economics, 106(2) pp. 407–33.

Blavy, R. (2006). "Public Debt and Productivity: The Difficult Quest for Growth in Jamaica." IMF Working Paper No. 06/235 .

By Alfred Greiner And Bettina Fincke (2009) Public Debt and EconomicmGrowth Bielefeld University, Germany Springer-Verlag Berlin Heidelberg 2

Chowdhury, A. R. (2001). "External Debt and Growth in Developing Countries; A   Sensitivity and Causal Analysis." WIDER Discussion Paper No. 2001/95 .

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

Durevall, D. and Ndungu, N. S. (1999), "A Dynamic Model of Inflation in Kenya, 1974-1996," IMF Working Paper No. 77/99.

Easterly, W. (1999). "How did highly indebted poor countries become highly indebted? Reviewing two decades of debt relief." Washington Dc: The World Bank .

Easterly, W. (2001) The Elusive Quest for Growth: Economists Adventures and Misadventure in the Tropics, Cambridge, The MIT Press.

Easterly, W. (2002). "Can Foreign Aid Buy Growth?"   The Journal of Economic Perspectives, 17(3), pp. 23-48.

Harris, R. (1995), Using Cointegration Analysis in Econometric Modelling, Prentice Hall, London.

Levy, A. & Chowdhury, K. (1993) "An integrative analysis of external debt, capital accumulation and production in Latin America, Asia-Pacific and Sub-Saharan Africa", Journal of Economics and Finance, 17(3), pp 105-119.

Maghyereh, A., Omet, G., & Kalaji, F. (2002). "External Debt and Economic Growth in Jordan: The Threshold Effect." The Hashemite University Jordan.

Pattillo, C., Poirson, H. and Ricci, R. (2002) "External Debt and Growth", IMF Working Paper, No. 02/69.

 Reinhard Neck andJan-Egbert Sturm2008 Sustainability of Public Debt The MIT Press Cambridge, MassachusettsLondon, England Massachusetts Institute of Technology

Romer, P. (1994), "The Origins of Endogenous Growth", Journal of Economic Perspectives   8, pp 55–72.

Sawada, Y. (1994): "Are the Heavily Indebted Countries Solvent? Tests of Inter Temporal Borrowing Constraints", Journal of Development Economics, pp 325-337.

Sen, S., Kasibhatla, K. M., & Stewart, D. B. (2007). "Debt overhang and economic growth–the Asian and the Latin American experiences." Economic Systems , 31, pp 3–11.

Siddiqui, R. & Malik, A. (2001), "Debt and economic growth in South Asia", The Pakistan Development Review, pp 677-688

Smyth, D., Hsing,Y. (1995): "In search of an Optimal Debt Ratio for Economic Growth", Contemporary Economic Policy, pp 51-59.

The Collected Works of James M. Buchananvolume 2 1999 Public Principles of Public Debt A Defense and Restatementby Liberty Fund, Inc.Printed in the United States of America

World Development reports (various editions) Washington, D. C.: World Bank

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