

Service sector growth, public external debt and economic growth: A relook in to the experience of Ethiopia

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Abstract

Ethiopia is experiencing a robust economic growth in recent times which is mainly due to the expansion in service sector though; agriculture is its mainstay in terms of employment and export earnings. During this time, Ethiopia has also experienced rising external debt mainly of public sector. Several studies have appeared in recent times on the negative impact of growing debt on economic growth. This paper is an attempt to relook into the relationship of external debt and economic growth in Ethiopia. It traces out the effect of service sector growth, agricultural growth along with public sector external debt on economic growth using time series methods. For this purpose the study employed ARDL co-integration technique and the error correction model for investigating long run as well as short run relationship among these variables for the study period 1981-2012. The empirical evidence suggests that service sector growth and agricultural sector growth have contributed positively to the economic growth of Ethiopia. Contrary to the apprehensions about public external debt, it does not have significant influence on economic growth. In view of these findings it is suggested that Ethiopia should continue with the existing agricultural and service sector policies and need not excessively worry with its growing foreign debt.

Keywords

Service Sector, Agriculture, External Debt, GDP, Cointegration, Error Correction, ARDL Model

1. Introduction

Ethiopia is experiencing a robust economic growth in recent times. Its growth performance has been impressive after its integration with the global economy through its trade liberalization and structural adjustment programs starting from 1991 that coincides with the emergence of the new policy regime¹ which lifted the country from a low and stagnant performance that was hovering around an average growth rate of 1.8% during the previous decade. During the current regime, the country grew at 6.47% in real terms and in the entire study period i.e. 1981-2011; the trend growth of GDP in real terms was 4.41 per cent which rose to 7.0 per cent during 2012 and to 7.6 percent during 2013. Achieving such a high economic growth was ascribed mainly to service sector growth though; agriculture is its mainstay in terms of

employment and export earnings (NBE, 2013). Ethiopia's economic strategy involves concentrating government expenditures on human capital and social sectors and a dominant role for public enterprises in undertaking critical infrastructure investments (IMF, 2014). It further states that, Ethiopia's development approach has been informed by the recent successful transformations in East Asia between the 1960s and 1980s. A number of countries and jurisdictions—including China, Singapore, South Korea, Thailand, Taiwan, and Vietnam—underwent rapid economic growth and socio-economic change over a period of 30 years. With supportive public policies, these countries went from being poor agrarian societies in the 1960s to producers of high technology and high value-added goods by the 1990s. Ethiopia aims at achieving an average annual growth rate of over 11 percent and the Millennium Development Goals

(MDGs) (IMF, 2013). The economic strategy of Ethiopia is built around agriculture development led industrialization (ADLI) along with private sector lead industrialization; exports and public-private investment partnerships in infrastructural development. The country initiated major economic reforms and continuously implementing various policy measures with an objective of promoting sustainable and environment friendly economic growth. As a result, structural transformation is taking place in Ethiopia leading to a significant rise in economic growth mainly caused by the growth in service sector. The service sector in Ethiopia has been growing at a rapid rate in recent times which acted as an engine of economic growth along with the improved performance in agriculture exports and the growth in infrastructural and basic facilities. The service sector in Ethiopia grew by 7.53% (trend growth rate) and contributed about 43% to GDP during 2013. The country could not bore the brunt of recent financial recession mainly on account of its macroeconomic management which includes cautious financial integration with the global economy and prudent external debt management. However, during the study period, Ethiopia's external debt has risen in absolute magnitudes (13.0% during 1981-2013 though, its growth rate has declined to 1.65% % during 1992-2013) on account of its development programs and infrastructural facilities.

External debt magnitudes of larger proportion have not been uncommon in Sub Saharan Africa as many countries in this region are suffering from debt burdens (Ramakrishna, 2003). Ethiopia is not an exception though; there is a reversal of this trend in recent years. World Bank in its report (1987-88) has cautioned that 'huge burden of external debt may become an obstacle to the restoration of conditions needed for growth in these countries'. The Growing external debt in African countries has been viewed with skepticism mainly because its growth outweighing the magnitudes of exports and even the GDP. The theoretical models on debt and growth linkage have indicated that reasonable amounts of debt may lead to an increase in growth initially, but larger inflows of foreign debt may act as a deterrent. The famous debt overhang hypothesis is a case in point and empirical evidences are provided by researchers on existence of debt Laffer curve for Africa including Ethiopia (See Ramakrishna, 2003). The conclusion emerged from these studies is in favor of debt per capita leading to a decline in per capita economic growth in these countries. In fact it is said that "most developing countries in general and Sub Saharan Africa (SSA) countries in particular face an undiversified export base, a large share of agriculture in GDP (which itself is characterized by low productivity) with large share of labor force in the primary sector, and complex governance and instability problems. Debt management becomes even more complex if the countries in question have persistent current account and budget deficits and low savings and investments rates relative to their GDPs. Several of these countries follow public investment-led growth strategy, with all the dangers for the debt equation to unravel if and when the government-led

growth 'stumbles or stagnates' (Hassan et al, 2014).

Ethiopia was considered as one of the Severely Indebted Countries (SIDC) till recently. Its debt burden was severe, credit worthiness and the growth performance was dismal until early nineties. As a result, it was on the wrong side of debt Laffer curve and was experiencing debt overhang. As a consequence, it experienced a negative association between external debt and economic growth. The economic mismanagement mainly in terms of restrictive policies and inefficient investment allocations of the earlier regimes led to a decline in the economic activity, export earnings and rise in external borrowing. However, in recent times, with prudent debt management policies, the country could stall the rise in external debt and debt servicing ratios. Given this background, the present study tries to relook in to the nexus between debt and growth in a multivariate framework involving other determinants such as service sector and agriculture growth. This became warranted as the earlier studies are not based on systematic enquiry using long period data that includes recent period and appropriate empirical methods. There are no studies available on the impact of sectoral growth along with the public external debt on Ethiopia's economic growth. The present study is an attempt in this direction and studies growth determinants of Ethiopia in terms of service sector growth, agriculture growth and public external debt.

The main objectives of the paper are: 1) to verify the shift in the sectoral growth and the external debt growth of Ethiopia during 1981-2012 and 2) to study the impact of service sector growth, growth in agriculture and public external debt on economic growth. The paper is organized as follows: The second section is on the brief review of literature. The third section deals with the structural growth and the growth in external debt of Ethiopia. The data sources and the econometric model are presented in section four. The fourth section is on the data analysis and findings. The fifth section brings out summary and conclusion.

2. Review of Literature

The development literature suggests that countries experience transformation from agriculture to manufacturing and further from manufacture to service sector in the process of economic development (Clark, 1941) and (Kuznets, 1957). The earlier studies have verified this hypothesis (Clark-Kuznets) and provided some empirical evidence in support of this. However, recent studies have tended to emphasize the growing importance of service sector activity in development. For instance, Kongsamut et al, (2001) have analyzed a sample of 123 countries for the period 1970-89 and concluded that rising per-capita GDP is associated with an increase in services and a decline in agriculture both in terms of share in GDP and employment. Contrarily, Gordon and Gupta (2004) concluded that the share of industry first increases modestly, and then stabilizes or declines.

The role of services as an argument for growth has not

received positive attention in the earlier works as classicals and socialists have treated it as an unproductive activity. Other economists have considered services less productive (Fisher 1935, and Clark 1940). Fuchs (1965) also came to a similar conclusion for the US economy in the 1960s. Such productivity differentials formed the basis of the well-known 'cost disease' hypothesis of services (Baumol, 1967). The low productivity argument in services has been questioned by Griliches (1992) on the grounds of incorrect measurement of services output. Besides, factors like technological change, deregulation and increased competition are set to raise productivity at least in select services (Maclean, 1996). Baumol et al (1985) have recognized the case of 'progressive' services with substantial productivity gains. The services also involve externalities for user or the user's goods in terms of gain in productivity or its potential (Hill, 1977). Services are perceived as innovation laggards and primarily consumers of innovation in manufacturing (Miles, 1993). However, increasingly such a view has come to be questioned in recent period. In contrast to a manufacturing innovation in terms of new or improved product/process, innovation in services often relates to how, where and when a service is delivered (Howells, 2000). Productivity-enhancing investment in ICT (i.e., information and communication technology), regulatory reform and growing tradability of services are among the major factors contributing to innovations in services (Pilat, 2000a). Another view is that high growth of services or the service-oriented economies is not sustainable. The decline in manufacturing and the corresponding shift to services is widely held to be unsupportable in the long run since services depend critically on manufacturing for their existence. Such well-entrenched notion of parasitic and dependent services has recently come under increasing scrutiny (Bryson and Daniels, 1998). Rather than services following and supporting manufacturing, manufacturing is seen as flowing to those countries and areas where the services infrastructure is efficient and well developed (OECD, 2000). Besides, the increasing resembling of services with commodities has enabled the former to emerge as the major driving force in economic growth.

Similarly, there exist competing views about the debt-growth relationship. As the development programs in developing countries require huge investments that are larger than their domestic saving capabilities, external debt has become an important component of financing these projects. Several Sub Saharan African countries experienced growing external debt which had negative impact on economic growth till recently. However, these countries now, are experiencing higher economic growth particularly Ethiopia, in the wake of economic reforms and the liberalization agenda. There exist competing views about the debt-growth relationship; some concluding a negative relationship and others, a positive relationship between debt and economic growth. For example Levy and Chowdhury (1993), Cunningham (1993), Sawada (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 has 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). Maghyreh (2002) comes to the conclusion that in Jordan, 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. Economic theory provides little practical guidance on the optimal level of public debt. However, empirical studies show that if debt exceeds 50 percent of a country's GDP then, the further rise can be harmful (Fry 1989). Similarly, it will be associated with higher inflation, decline in the savings rate and further a decline in economic growth. In their work based on eight (8) centuries of financial data, Reinhart and Rogoff (2013) have concluded that economic growth in emerging economies suffers once the debt-to-GDP ratio hits a threshold of 60 per cent. Other researches carried out within the specific context of developing and low income countries suggest a much lower (30 – 40 per cent) threshold of debt-to-GDP ratios. In the African context, there are several studies available including Ethiopia, revealing the negative impact of external debt on growth (Geda 1997, Oxfam 1997, Were 2001, Metwally 1994, Degefe 1992, Ramakrishna 2003, Hassan et al 2014 and Teklu et al 2014). Moody's (2014) makes an observation that Ethiopia's sovereign debt rating could go down if there is "acceleration of external debt that does not support growth and if there is an escalation of political and social tensions".

3. Data Sources and Econometric Model

The basic source for data collection is the World Bank Database, World Development Indicators. The study period considered for the analysis is 1981 to 2012. Annual data for various sectors and external debt indicators are collected and all the series have been transformed into natural logarithms for the required computations. The time period 1981-2012 is chosen on the basis of the data available on all the variables that also broadly includes two policy regimes, Derg and the present regime. The year 1991 has been chosen as the break year on the basis of policy change. To study the shifts in the growth trends a semi log functional form has been estimated. Growth rates are computed using a semi log trend equation with intercept and slope dummies. The equation is as follows:

$$\ln Y_t = \beta_0 + \beta_1 t + C_1 D + \beta_2 D_t + U_t$$

Where, $\ln Y_t$ = the natural log of a sector's output in

constant prices, $D_1 = 0$ for the period, 1981-91 and $= 1$ for 1992 to 2012, β_1 = Growth in the output of a sector for the period, 1981 to 1991 and β_2 = Change in the growth for the period, 1992 to 2012. If β_2 is statically significant, there is a shift in the growth rate.

The first step investigates the existence of a unit root in the variables. Since many macroeconomic series are non-stationary, unit root tests are useful to determine the order of integration of the variables and, therefore, to provide the time-series properties of data, the ADF test has been employed. Once ADF test has rejected unit roots, the second stage in the empirical analysis is the computation of co integration test. We have used ARDL bounds testing approach of cointegration developed by Pesaran (1997), Pesaran and Shin (1999) and Pesaran et al. (2001). The use of the bounds technique has several advantages compared to the other cointegration methods. First, the ARDL procedure can be applied whether the regressors are $I(1)$ and or $I(0)$. Second, the ARDL procedure is statistically a more robust approach to determine the cointegration relation in small samples. Third, the ARDL procedure allows that the variables may have different optimal lags. Finally, the ARDL procedure employs only a single reduced form equation, while the other cointegration procedures estimate the long-run relationships within a context of system equations.

Accordingly, the vector autoregression (VAR) of order p , denoted as VAR (p), may be expressed as follows:

$$M_t = \mu + \sum_{i=1}^p \beta_i z_{t-i} + \varepsilon_t$$

Where M_t is the vector of both x_t and y_t , and y_t is the dependent variable, i.e. the logarithm of GDP (LG), x_t is the vector which represents the set of explanatory variables, logarithm of agriculture value added (LA), logarithm of service sector value added (LS), logarithm of public external debt (LPD) and t is a time or trend.. The variable y_t must be $I(1)$ variable, but x_t can be either $I(0)$ or $I(1)$. Based on this a vector error correction model (VECM) is specified as follows:

$$\Delta M_t = \mu + \alpha t + \lambda M_{t-1} + \sum_{i=1}^{p-1} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{p-1} \gamma_i \Delta x_{t-i} + \varepsilon_t$$

Where Δ is the first-difference operator. The long-run multiplier matrix λ is:

$$\lambda = \begin{bmatrix} \lambda_{yy} & \lambda_{yx} \\ \lambda_{xy} & \lambda_{xx} \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either $I(0)$ or $I(1)$. If $\lambda_{yy} = 0$, then Y is $I(1)$ and if $\lambda_{yy} < 0$, then Y is $I(0)$. The unrestricted error correction model (UECM) specified is as follows:

$$\begin{aligned} \Delta(LG)_t &= \beta_0 + \beta_1(LG)_{t-1} + \beta_2(LA)_{t-1} + \beta_3(LS)_{t-1} \\ &+ \beta_4(LPD)_{t-1} + \sum_{i=1}^p \beta_4 \Delta(LG)_{t-i} + \sum_{i=0}^q \beta_5 \Delta(LA)_{t-i} \\ &+ \sum_{i=0}^r \beta_7 \Delta(LS)_{t-i} + \sum_{i=0}^s \beta_8 (LPD)_{t-1} \end{aligned}$$

Where Δ the first-difference operator and u_t is a white-noise disturbance term.

LG= Logarithm of Gross Domestic Product

LA= Logarithm of Agriculture value added,

LS= Logarithm of Service sector value added,

LPD= Logarithm of Public Sector External Debt as a ratio of GDP

The above equation can be viewed as an ARDL of order (p, q, r). The structural lags are determined using Schwarz Information Criteria (SIC). After estimating the equation, the Wald test (F -statistic) was used to ascertain the long-run relationship between the variables included in the model. The computed F -statistic value will be evaluated with the critical values. If the computed F -statistic is smaller than the lower bound value, then the null hypothesis is not rejected and we conclude that there is no long-run relationship between growth of GDP and its determinants. Conversely, if the computed F -statistic is greater than the upper bound value, then the variables share a relationship. If the computed F statistic is in between lower bound and upper bound values, the test is inconclusive.

4. Data Analysis and Findings

The sectoral transformation in the Ethiopian economy has not been in tune with the structural transformation hypothesis propounded in development literature as the share of agriculture in GDP came down gradually only to be replaced by the service sector². Ethiopia started growing around 7% per annum during the study period, a complete break from the Ethiopian growth rate of 1.8% of the earlier period (1970-80). The major contributor to the performance of Ethiopia's economic growth during 1990s has been the growth of service sector along with agriculture and growth in exports. The service sector is expected to continue to grow at similar rates even in the near future in spite of a near stagnation in industrial growth. Table 1 presents the average annual growth rates of Ethiopia's GDP and the other sectors. The trends for the period (1981 to 2012) suggest that, the share of the service sector is rising; agriculture's share is declining (with a marginal surge in recent years), while the share of industry and manufacturing remaining relatively stagnant. The Chart 1 clearly demonstrates this.

Table 2 presents the shift in sectoral growth trends in Ethiopia. A semi logarithmic time trend model that includes intercept and slope dummies has been estimated to verify the shift in the growth rates. The shift has been verified using 1991 as the break year which broadly coincides with the start of present regime. It is clear from the table that there is a shift in the growth rates of all the sectors including GDP. The shift

is more pronounced in the case of service sector as it is grown at 9.49% during 1992-2012 compared to 3.23% in the preceding one. The real GDP which was growing at 1.81%

during 1981-91 shifted to grow at 6.97% during the present regime. Similarly, agriculture and industry have registered a shift in their growth rates during the period, 1992-2012.

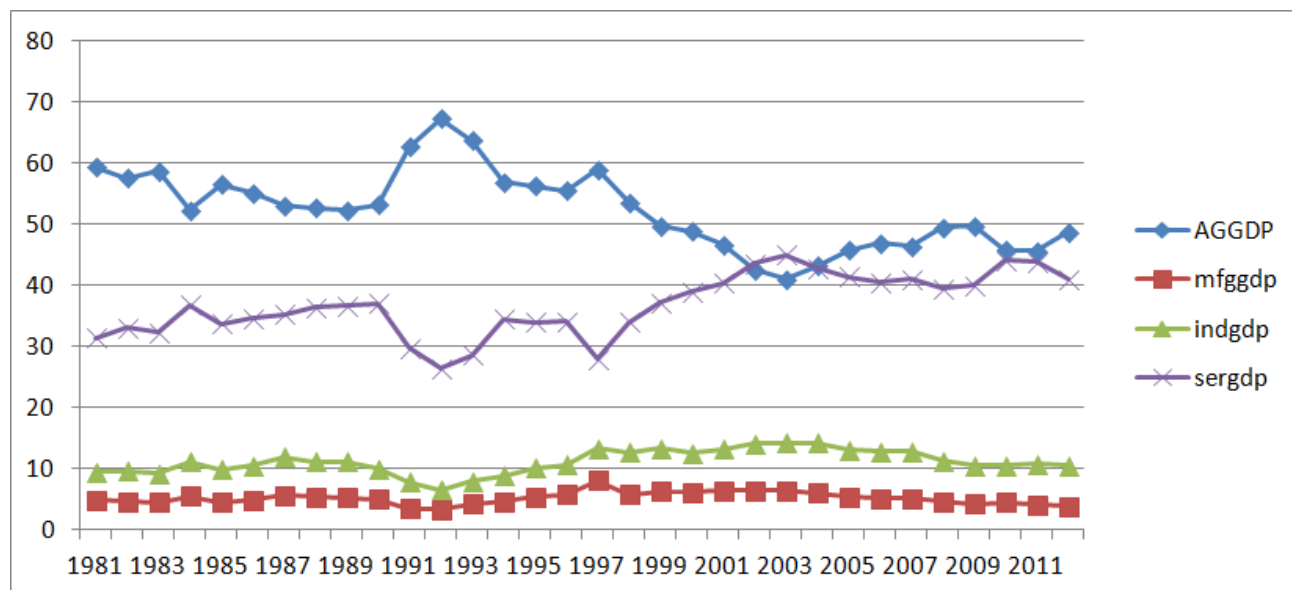


Chart 1. Trends in Sectoral Shares in GDP of Ethiopia

Note: AGGDP, mfgdp, indgdp and sergdp are the respective shares of agriculture, manufacturing, industry and service sectors in GDP. Source: World Bank, WDI Data Base, 2014.

Table 1. Trends in Sectoral Shares in Ethiopia

Sector	1981	1985	1991	1995	2001	2005	2011	2012
Agriculture	59.23	56.46	62.55	56.13	46.56	45.61	45.57	48.59
Industry and mfg	9.46	9.85	7.76	10.04	13.12	13.06	10.68	10.44
Manufacturing	4.76	4.36	3.43	5.28	6.35	5.36	4.07	3.75
Services	31.31	33.69	29.69	33.83	40.32	41.33	43.75	40.96
Real GDP	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: agriculture, industry, manufacturing (mfg) and services are the value added in the respective sectors in US Dollars. Source: World Bank, WDI Data Base, 2014.

Table 2. Shifts in Sectoral Growth Rates in Ethiopia

Sector	1981-1991	1992-2012*	1981-2012
Agriculture	1.29	4.72	3.48
Industry	5.94	8.39	4.40
Manufacturing	0.60	6.60	3.13
Services	3.23	9.49	5.90
Real GDP	1.81	6.97	4.64

Note: Growth rates are computed using a semi log trend equation with intercept and period slope dummies. The equation estimated is as follows: $\ln Y_t = \beta_0 + \beta_1 t + C_1 D + \beta_2 Dt + U_t$. Where, $\ln Y_t$ = the natural log of a sector's output in constant prices, $D = 0$ for the period, 1981-91 and $= 1$ for 1992 to 2012, β_1 = Growth in the output of a sector for the period, 1981 to 1991 and β_2 = Change in the growth for the period, 1992 to 2012. * indicates the significance of β_2 . Source: World Bank, WDI Data Base, 2014.

Sustainability of debt has become an important policy concern in Ethiopia these days. The recent studies have raised their concerns about debt sustainability capability of Ethiopia (Hassan et al, 2014). These studies have cautioned that Ethiopia again may fall in to debt overhang trap if it cannot control public investments in heavy projects. The commonly used indicators to measure the sustainability of a country's debt include: (a) debt to GDP ratio; (b) debt to export ratio; (c) reserves to debt ratio; (d) debt to revenue ratio (e) debt service to GDP/exports ratio (f) interest payments to exports/GDP ratio (g) trade balance; (v) the primary fiscal gap; (vi) debt service to budgetary revenue; and (viii) interest to domestic budgetary revenue. Some of these indicators for Ethiopia are presented in the following table:

Table 3. Trends in Foreign Debt Magnitudes of Ethiopia

Sector	1981	1985	1991	1995	2001	2005	2011	2012	Growth rate
Debt/Exp	143.78	673.31	1427.07	1420.42	546.32	389.34	157.51	147.73	-5.39
Long-term Debt/Debt	22.75	54.41	67.01	130.10	68.96	48.70	25.33	-	-2.20
Debt/GDI	25.36	55.59	68.74	136.80	70.86	50.72	27.19	24.31	-3.1
Det ser/GDP	0.80	1.71	1.05	2.07	2.28	0.77	1.13	1.01	-2.94
Debt Ser/Exp	10.90	24.56	30.63	18.50	18.50	4.76	6.05	7.19	-6.52
Int/ exports	4.76	4.36	3.43	5.28	6.35	5.36	4.07	3.75	-8.80
Res/GDI	31.31	33.69	29.69	33.83	40.32	41.33	43.75	40.96	-
Pub Debt/GDP	22.74	54.34	67.00	130.10	68.96	48.69	25.32	22.32	-3.2
Int/GDP	0.42	0.52	0.34	0.83	0.78	0.44	0.30	0.24	-3.0
GCF/GDP	16.21	12.77	12.37	20.16	24.53	26.53	27.86	33.08	2.25
GS/GDP	12.72	13.26	10.47	23.05	22.33	17.15	28.86	27.04	1.86

Note: Debt/Exp= External Debt/Exports, Long-term Debt/Debt= Long term Debt /External Debt, Debt/ GDI= External debt / Gross Domestic Income, Debt Ser/GDP= Debt Service/ Gross Domestic Product, Int/Exports= Interest payments/ Exports, Int/GDP= Interest payments/ Gross Domestic Product, Res/GDI= Reserves /Gross domestic Income, Pub Debt/GDP= Public external debt/ Gross Domestic Product, GCF/GDP= Gross Capital Formation/ Gross Domestic Product, GS/ GDP= Gross savings/ Gross Domestic Product . Source: World Bank, WDI Data Base, 2014.

A number of factors come into play to establish if a country will be able to service its debt. These factors include the existing debt stock and associated debt service, the prospective path of its deficits, the financing mix of the debt and the evolution of its repayment capacity in terms of foreign currency value of GDP, exports and government revenues (Abrego et al 2001). An examination of Ethiopia's external debt reveals that it is not any more a Severely Indebted Country (SIC) but may be classified as a medium performer. IMF (2013) reveals that Ethiopia is at a low risk of external debt distress. As per Debt Sustainability Analysis (DSA), the threshold for present value of debt to exports and remittances is 120 percent and is 16 percent for debt service to exports and remittances and the present value of debt to GDP and remittances is 36 per cent. The thresholds for the debt burden for medium performers are 150, 40, and 250 for the present value of debt to exports (PV), GDP, and revenue, respectively; debt service thresholds are 20 and 30 percent of exports and revenue, respectively. In the scenarios that include workers' remittances, the corresponding threshold for PV of debt to exports and remittances is 120 percent (compared to 135 in the 2011 DSA) and is 16 percent for debt service to exports and remittances; the PV of debt to GDP and remittances is 36 percent (IMF, 2013). The notable feature of Ethiopian external debt is, though, absolute amounts of public debt are rising, and all the debt indicators (table-3) have shown a trend decline in their growth rate during the study period, 1981-2012. The decline in the growth trends is more pronounced during the current regime. The current level of external public and publicly guaranteed debt (PPG) is largely concessional and is held equally between multilateral and bilateral creditors (AFRODAD, 2014).

Existing public debt relative to its GDP shows a trend decline of 3.2%. The public debt which was hovering around at an average of 41 per cent during 1990s has come down to 27% in 2012. This average gets lower if we exclude the pre-2006 period, for Ethiopia received a significant debt relief through the HIPC (highly indebted poor countries) initiative. Recently, Ethiopia is spending huge amounts on infrastructural development financed through external loans.

Some of these large public investment projects could pose risks to Ethiopia's debt risk rating and overall public debt sustainability. The air transport, telecommunications, rail and sugar projects are being financed by external loans. Ethiopia's external public debt should be a concern in that its growth rate has been dramatic and has not been matched by a vibrant and diversified export sector. However, the robust economic growth and rising exports and the inflow of FDI into export specific industries would address this problem in near future. The current regime (1991 onwards), which inherited a fragile and an unstable macro economy with huge external debt has implemented sound macroeconomic policy and prudent debt management. As a consequence, several debt indicators have shown decline in their growth trends. Table 4 presents these trends and the shift in the growth trends.

Table 4. Shift in Growth Trends in Foreign Debt of Ethiopia

Sector	1981-1991	1992-2012*	1981-2012
Real GDP	1.81	6.97	4.64
Debt/GDP	8.36	-11.64	-3.13
Debt Ser/Exports	12.56	-9.63	-6.52
Debt Ser/GDP	16.71	-23.29	-2.94
Pub Debt/GDP	14.89	-18.43	-3.20

Note: Growth rates are computed using a semi log trend equation with intercept and period slope dummies. The equation is as follows: $\ln Y_t = \beta_0 + \beta_1 t + C_1 D + \beta_2 Dt + U_t$

Where, $\ln Y_t$ = the natural log of a variable, $D_1 = 0$ for the period, 1981-91 and = 1 for 1992 to 2012, β_1 = Growth in the variable for the period, 1981 to 1991 and β_2 = Change in the growth for the period, 1992 to 2012. * indicates the significance of β_2

The relationship between service sector growth, public external debt and economic growth has been verified using cointegration models. Before estimating the model, to pre-empt the possibility of running spurious regressions, the time series properties of variables used in the analysis were tested. The time series uni-variate properties are examined using ADF (Augmented Dickey-Fuller) test. The following table (5) shows the results of ADF test for the variables considered in the model.

Table 5. ADF Unit Root Test

Specification	Level	First Difference				
	Variable	Test statistic	Lag Length	Variable	Test Statistic	Lag Length
Constant and Trend	LG	-0.203428	0	LG	-4.940452*	0
Constant		2.460385	0		-4.070245*	0
Constant and Trend		-2.035428	0		-7.069193*	0
Constant	LA	0.667748	0	LA	-5.117355*	1
Constant and Trend		-0.137938	0		-3.59379**	3
Constant		2.254467	0		-3.44899**	0
Constant and Trend	LS	-1.886616	1	LS	-3.80298**	5
Constant		-2.204247	0		-4.223578*	0
Constant and Trend		-3.53406**	1		5.704989*	0
Constant	LDS	-1.205852	0	LDS	-5.815056*	1
Constant and Trend		-1.856663	1		-3.796584*	5
Constant		-1.223802	0		-4.282671*	0

Note: * Significant at 1% and ** at 5% levels. ADF test includes intercept and slope for variables. Lag length has been chosen based on Schwartz criteria. ADF values are compared with Mc Kinnon critical values. Where, LG, LA, LS, LD, LDS, LPD are the natural Logarithms of GDP, Agriculture, Service Sector, External Debt, Debt Ser/GDP, and Pub Debt/GDP respectively.

All the variables appear to be stationary in their first difference form indicating that they are integrated of order one, I (1) and LDS is I (0). Once ADF test has rejected unit roots, the second stage in the empirical analysis is the computation of co integration test. Two or more variables are said to be co integrated if they share common trends i.e. they have long run equilibrium relationships. The cointegration test has been conducted using ARDL bounds test procedure. We have used logarithm of GDP (LG) as the dependent variable and the growth of agriculture value added (LA), growth of service sector value added (LS) and the logarithm of public external debt as a ratio of GDP (LPD) as the independent variables. The ARDL estimates are presented in the following table.

The model suggests that there is long run relationship between the variables included in the model. The joint significance of the LA (-1), LS (-1) and LPD tested by Wald statistic (18.455) is higher than the Pesaran critical values (3.710 and 5.018) at 5% significance level. Hence, there exists cointegration among the variables included in the model. In the final analysis we have also used dummy variable (Di=0 for 1981-1991 and = 1 for 1992-2012, and dummy times LPD but dropped as results have not improved. The results are presented in table (6). The results of diagnostic tests (table-6) indicate that there is no error autocorrelation and heteroskedasticity, and the errors are normally distributed.

The table 7 presents the static long-run coefficients of the ARDL model. The estimated coefficients show that the economic growth of Ethiopia is directly related to growth in services and agriculture sectors. Though the public external debt has the expected sign, it is not statistically significant.

The following table presents the results of error correction model (ECM). ECM model presents the short run dynamics of the estimated model. An ECM has two important parts. First, estimated short-run coefficients and second, error correction term (ECT) that provides the feedback or the

speed of adjustment whereby short-run dynamics converge to the long-run equilibrium path in model.

Table 6. Autoregressive Distributed Lag Estimates

Dependent variable is LG			
30 observations used for estimation from 1983 to 2012			
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LG(-1)	.75957	.19172	3.9618[.001]
LA	.56677	.021793	26.0070[.000]
LA(-1)	-.44044	.10679	-4.1243[.000]
LS	.41370	.023071	17.9318[.000]
LS(-1)	-.29866	.080785	-3.6970[.001]
LPD	.0034729	.0038852	.89389[.381]
C	.20348	.41811	.48667[.631]
R-Squared	.99966	R-Bar-Squared	.99957
S.E. of Regression	.0091736	F-stat. F(6, 23)	11348.9[.000]
Mean of Dependent Variable	22.9431	S.D. of Dependent Variable	.44460
Residual Sum of Squares	.0019356	Equation Log-likelihood	102.1601
Akaike Info. Criterion	95.1601	Schwarz Bayesian Criterion	90.2560
DW-statistic	2.1741	Durbin's h-statistic	*NONE*
Test Statistics	LM Version	F Version	
A: Serial Correlation	CHSQ(1)=1.0644[.302]	F(1,22)=.80927[.378]	
B: Functional Form	CHSQ(1)=4.1830[.041]	F(1,22)=3.5646[.072]	
C: Normality	CHSQ(2)=8.5391[.01]	Not applicable	
D: Heteroscedasticity	CHSQ(1)=.2403E-5[.999]	F(1,28)=.2242E-5[.999]	

Note: Note: ARDL(1,1,1,0) selected based on Schwarz Bayesian Criterion. A: Lagrange multiplier test of residual serial correlation, B: Ramsey's RESET test using the square of the fitted values, C: Based on a test of skewness and kurtosis of residuals and D: Based on the regression of squared residuals on squared fitted values

Table 7. Long Run Coefficients of the Model

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LA	.52542	.075664	6.9441[.000]
LS	.47847	.056288	8.5004[.000]
LPD	.014445	.023226	.62191[.540]
C	.84632	1.1891	.71174[.484]

Note: ARDL(1,1,1,0) selected based on Schwarz Bayesian Criterion

Table 8. Error Correction Model

Dependent variable is dLG			
30 observations used for estimation from 1983 to 2012			
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dLA	.56677	.021793	26.0070[.000]
dLS	.41370	.023071	17.9318[.000]
dLPG	.0034729	.0038852	.89389[.380]
dC	.20348	.41811	.48667[.631]
ect(-1)	-.243643	.081917	-2.9742[.042]
List of additional temporary variables created:			
dLG = LG-LG(-1)			
dLA = LA-LA(-1)			
dLS = LS-LS(-1)			
dLPG = LPG-LPG(-1)			
dC = C-C(-1)			
ecm = LG -.52542*LA -.47847*LS -.014445*LPG -.84632*C			
R-Squared	.98600	R-Bar-Squared	.98235
S.E. of Regression	.0091736	F-stat. F(4, 25)	404.9646[.000]
Mean of Dependent Variable	.049066	S.D. of Dependent Variable	.069046
Residual Sum of Squares	.0019356	Equation Log-likelihood	102.1601
Akaike Info. Criterion	95.1601	Schwarz Bayesian Criterion	90.2560
DW-statistic	2.1741		

Note: ARDL (1,1,1,0) selected based on Schwarz Bayesian Criterion

Estimation of the model suggests that the coefficients of all the regressors have the expected signs and are statistically significant at the 5 per cent level. Only, the coefficient of the public external debt is not statistically significant. The coefficient of the error correction term (ECT) is equal to -0.243, thus the speed of adjustment is 24%. Apart from LPD we have tried other debt indicators separately to study the impact on GDP growth. The results indicate that there is no long term relationship between LG and the debt variables.

Table 9. Growth and Debt relationship: Short run and Long run Coefficients

Dependent variable is LG			
30 observations used for estimation from 1983 to 2012			
Regressor	long run	Short run	Ect (-1)
LD	0.29068	-0.01441	1.1740
LDS	-.21815	-0.01856	2.1597
LPD	0.32682	-0.0422*	1.1129

5. Summary and Conclusion

In this paper an attempt is made to trace out the effect of service sector growth, agricultural growth along with external

debt on economic growth of Ethiopia for the period 1981-2012. We have studied the structural changes in the economy along with shifts in the external debt trends using the year 1992 as the break year which corresponds with the start of new regime. The study employed ARDL co-integration technique and the error correction model for investigating long run as well as short run relationship among these variables influencing economic growth. Based on our empirical analysis the following conclusions can be made:

- 1 Ethiopian economy has experienced structural change as the economy moved from agriculture to the service sector dominant economy.
- 2 The structural change in the economy is not as propounded in development literature in terms of Chenery-Clark hypothesis but broadly coincides with the modern explanation as service sector expanded with a declining share of agriculture, while the share of manufacturing and industry remaining more or less stagnant.
- 3 During this period, Ethiopia's external debt also shifted in its growth as the growth rates of debt ratios have shown significant trend decline in the current regime.
- 4 The absolute debt magnitude has risen and the public external debt rose by 0.48%. However, the debt ratio variables have shown a trend decline in their growth, the decline being more pronounced in the current regime. Other debt indicators such as debt servicing, interest payment as ratios of exports also have shown similar trends. External debt as a share of GNI and exports has presented a trend decline, the decline being steeper during 1992-2012. The debt sustainability ratios indicate that Ethiopia's debt is sustainable in the near future.
- 5 The empirical analysis based on ARDL cointegration and error correction models suggest that there is long run equilibrium relationship between the variables included in the model. Service sector growth and agricultural sector growth have contributed positively to the economic growth of Ethiopia both in short run and long run. Public external debt has a positive sign but not significant when included in the model. When studied independently, the debt variables had no effect on economic growth.
- 6 In view of these empirical findings it is suggested that Ethiopia should continue with the existing sectoral policies; and promoting public investments in the long term projects as they provide employment in the short run and economic growth in the long run. The fast growing countries such as Ethiopia can manage their foreign debt better as their credit worthiness would be higher and due to the rise in capital inflows in terms of FDI. However, with the continuous accumulation of the debt stock, the country should aim at reducing its non-concessional borrowing. The debt strategy for the public sector should be monitored in such a way that it promotes growth with equity.

End Notes

- 1 Ethiopia has witnessed broadly, three policy regimes: the imperial rule (prior to 1975), the socialist regime (1975-1991), and the present liberalized regime (1991 onwards). The first regime adopted non-interventionist approach, the second followed rigid inward looking strategy and the third initiated state led development with economic reforms and structural adjustment policies to address the problems of under development.
- 2 (a) Agriculture Share = $59.88 - 0.46t$
 $Se = (1.75) (0.09)$
 $R^2 = 0.45$
 (b) Industry Share = $9.54 + 0.09t$
 $Se = (0.64) (0.03)$
 $R^2 = 0.19$
 (c) Mfg sector = $4.99 + 0.007t$
 $Se = (0.36) (0.02) R^2 = 0.04$
 (d) Service Sector Share = $30.59 + 0.37t$
 $Se = (1.32) (0.07) R^2 = 0.48$

Note: The trend equations are estimated using the data from World Bank Database, 2014.

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