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EXTERNAL DEBT AS A CONTROL OF ETHIOPIAN ECONOMIC PROGRESS: A TIME SERIES ANALYSIS FROM 1991/92-2018/19

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ABSTRACT

This paper analyzes the impact of public external on Ethiopian economic growth from 1991/92 to 2018/19 using ARDL model. The result reveal that debt service payment and debt service export earnings ratio has adverse effect though it is trivial in Ethiopian economic growth while the total public external debt stock to real GDP has a negative and substantial consequence on real GDP. ADF test result shows that all the variable are non-stationary at levels or I()) but at first difference I(1).Johansen co-integration test result indicates that there is long-term relationship between external debt and GDP. On the other hand, the Granger causality test indicates there is causation between the total stock of external debt as percentage of GDP (TEDTGDP) and GDP. The economic analysis result confirms that the ratio external debt to GDP hasa negative impact on GDP both in the short and long run time period at 5% and 1% significance level. While debt service, total external debt stock and debt service export ratio has insignificant effect on GDP. The study concludes that huge accrual of external debt slowdown economic progress of the country and existence of debt over hang problem in Ethiopian economy 1991/92-2018.

KEYWORDS: *External Debt, Economic Growth, Error Correction Model*

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1. INTRODUCTION

Debt is means of financing capital formation in any country's economy. A number of developing countries are categorized under in sufficient internal capital formation due to low productivity, low income, and low savings (Akshaya, 2017). As a result, such countries necessitate technical, managerial and financial provision from developed countries to meet their financial requirements, close their budget deficit and to smooth consumption in anticipation of future higher incomes or to bridge their resource gap(Bruno *etal*., 2015).

Even though, debt is vibrant to fill the resource gap of a developing country, exacerbated external debt without a certain limit leads to vulnerability to the financial crisis in the international market which in turn directs to defaulting, poor image and low reliability. According to UN (2015) report external debt becomes a problem when external debt is unrelated with productive investment. Large amount of external debt causes current account deficit reflecting limited export capacities and high dependence on imports consumption and investment purpose.

The external debt of developing countries has grown steadily since the 1970s. After the year 2000 the rate of growth increases, and debt is accumulated at a much faster rate. By 2012, developing countries owe just under $5 trillion to non-residents (Bruno et *al*., 2015). In history, the size of Ethiopia's debt highly increased after the fall of the Imperial Regime in the mid-1970s, where in the last decades the volume of debt outstanding augmented considerably at due to continuous borrowing from both external and domestic sources in order to implement infrastructure projects; For instance, at the end of June 2015 the total debt stock (domestic and external) of the country reached US$ 34.056.00 million (Birr 705,391.00 million) of which 55% is the external debt while the rest45% is the domestic debt (MoF, 2019).

According to world bank (2018) external debt of Ethiopia is changed over the last two decade for instance in 1992/93 it stood at about USD 6,695.1million (56,8% of GDP) and in 2006/7 decreased to USD2,300 million(11.8% of GDP),While, in 2011/12 and 2016/7 this figure increased to 11,222.7 million USD and 21.740 million USD respectively. Based on World Bank report of highly indebted economies Ethiopia is registered one of the severely indebted low income country in 2004(Hassen*et* al,.2014)

As various studies indicate, Ethiopia engaged a reasonable level of borrowing in order to improve its economic growth as such improvement occurred through capital formation and output intensification. On the other hand, public debt problem is becoming more acute due basic reasons like: large size of debt relative to economy that canbring capital flight and discourage private investment as well as debt servicing payments which form a significant proportion of the annual export earnings (Agernew, 2016).

Similarly, Adane*et* al., (2018) pointed out over accumulation of debt lead to debt overhang and crowding out effects. Debt overhang situation occur in low growth rate economy of the country, on the other hand, increasing of external debt increases burdens of debt servicing which act as distinctive to investors and affect economic growth which results crowding out investment (Garedaw, 2016). Halima (2013) also explained that debt overhang problem occur in once country when the expected the present value of potential future resources transfer is less than debt. it implies that country's total debt stock greater than it repayment ability with some probability in the future.

Various researchers conducted a study on the effects of external debt on economic growth in different period of time in the case of Ethiopia and other underdeveloped countries. Mulugeta (2014); Gebrehidane *et* al (2013); Ager new (2016); Kassu*et* al(2014) and Garedew(2016) analysis the relationship between external debt and economic growth in Ethiopia using ARDL approach. All researchers found that external debt have negative effect on economic growth. On the contrast, Hanna (2013) in the case of Ethiopia and Paul and Ndubuisi (2017) in Nigeria found that external debt has positive effect on economic growth. Thus, this study is aimed at investigating existed long run connection among Ethiopian public external debt and progress of economy in examining presence of crowding effect and debt overhang problem from 1991/92-2018/19.

2. METHODOLOGY

The data incorporated for analysis in this study covers a year from 1991/92-2018/19. Sources of these data were pervious empirical studies; Ministry of Finance and Economic Development (MoFED) and the National Bank of Ethiopia (NBE), World Bank Reports and IMF publications. The study adopts econometric analysis techniques like augmented dickey fuller test, bound test, Co- integration and Vector Error Correction Model. Analysis was performed in E-views 9 statistical program.

Unit Root test: -Unit Root test is used to test stationery and order of integration of the variable by Appling ADF tests. The null hypothesis of this test, $H0$: $\beta=0$ (β has a unit root), while $H1$: $\beta<0$ expresses an alternative hypothesis. *This* is to ensure that all the variables are integrated at

I (1) to avoid spurious result.

Johansen Co- Integration: is a test for co-integration that allows for more than one co-integration relationship.

Granger Causality Test: - This test is essential to determine the direction of causality between the variables based on error correction (ECM), which suggests that while the past can cause or predict the future, the future cannot predict or cause the past. The null hypothesis of this test, H0, αiX=βiy=0 for all i's is tested against the alternative hypothesis (H1), αiX≠0 and βiy=0. If the co-efficient of αiX are statistically significant but that of βi y are not, then X causes Y. If the reverse is true, then Y causes X. However, where both co-efficient of αiX and βiy are significant then causality is bi-directional.

Model Specification

Here is model specified for the evaluating the effect of public external debt in Ethiopian economic progress from 1991/92-2018/19:

$$GDP = f(TED, TEDS, TEDSTEX, TEDTGDP) \quad (1)$$

$$\nabla RGDP_{t+1} = \beta_0 + \beta_1 \nabla TED_{t-1} + \beta_2 \nabla TEDS_{t-1} + \beta_3 \nabla TEDSTEXX_{t-1} + \beta_4 \nabla TEDTGDPX_{t-1+} \sigma(-1) + \varepsilon t \quad (2)$$

$$RGDP_{t+1} = \beta_0 + \beta_1 TED_{t-1} + \beta_2 TEDS_{t-1} + \beta_3 TEDSTEXX_{t-1} + \beta_4 \beta_4 \nabla TEDTGDPX_{t-1} + \sigma(-1) + \varepsilon t \quad (3)$$

Where: GDP is Gross Domestic Product, TED is total public external debt, TEDTRGDP is Total External Debt to RGDP which captures the debt overhang effect (+/-), TEDSTEX is Total External Debt Servicing to total Exports earnings which reflect the 'crowding out' effect (-), TEDS is total external debt servicing.

3. RESULT AND DISCUSSIONS

Unit Root Test Result

The results reported in table 1 indicated that all variables (GDP, TED, TEDS, TEDTGD, TEDSTEX) does not change in the first difference as there level of as simulation is one I(1).This is because absolute values of ADF statistics of GDP, TED, TEDS, TEDTGD, and TEDSTEX are greater than their respective critical values at 1%, 5% and 10%.

Table 1: Augmented Dickey Fuller Test Result

	At level I(0)				At First Difference I(1)			
		Test Critical Values				Test Critical Values		
Variable	ADF Statistic (p-value)	1%	5%	10%	ADF Statistic (p-value)	1%	5%	10%
GDP	-4.928436 (0.0026)	-4.339330	-3.587527	-3.229230	-7.897460 (0.0000)	-4.356068	-3.595026	-3.233456
TED	0.672561 (0.9992)	-4.356068	-3.595026	-3.233456	-5.142812 (0.0018)	-4.374307	-3.603202	-3.238054
TEDS	2.065769 (1.000)	-4.339330	-3.587527	-3.229230	-5.614107 (0.0006)	-4.356068	-3.603202	-3.233456
TEDTGD	-2.303617 (0.4170)	-4.374307	-3.603202	-3.238054	-4.084483 (0.0181)	-4.356068	-3.595026	-3.233456
TEDSTEX	-2.875757 (0.1852)	-4.339330	-3.587527	-3.229230	-8.871866 (0.0000)	-4.356068	-3.595026	-3.233456

Source: Author's Computation from E-view-9

Johansen Co-integration Test Results

As shown in table 2 both Trace statistic and Max-Eigen values indicate three co-integrating equations at 5%significance level. As result, we reject the null hypothesis at none*, at most 1* and 2* hypothesized number of co-integrating equation as the value of Max-Eigen and trace statistics is more than the critical value at 5%significance. This depicts the occurrence of stable and extended relation amid GDP and independent factors.

Table 2: Johansen Co-Integration Test Result

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	5% Critical Value	Prob.**	Max-Eigen Statistic	5% Critical Value	Prob.**
None *	0.936317	154.7526	76.97277	0.0000	66.09198	34.80587	0.0000
At most 1 *	0.870398	88.66057	54.07904	0.0000	49.03895	28.58808	0.0000
At most 2 *	0.653868	39.62163	35.19275	0.0156	25.46244	22.29962	0.0175
At most 3	0.319085	14.15918	20.26184	0.2786	9.223631	15.89210	0.4102
At most 4	0.185880	4.935553	9.164546	0.2906	4.935553	9.164546	0.2906

Source: Own Computation Using E-view

Pair Wise Granger Causality Tests

As show as in table 3, Pair wise granger causality tests results reveal that, the ratio of total external debt stock to real gross domestic product (TEDTGDP) granger causes real gross domestic product (GDP) significant at 10% level. This result suggests that there is causality relationship between TEDTGDP and GDP. Similarly, total external debt stock (TED) has causal relationship with external debt service (TEDS). However, total external debt stock and GDP has unidirectional causality, this finding in line with the finding of Paul and Ndubuisi (2017).

Table 3: Granger Causality Test Result

Pair Wise Granger Causality Tests			
Date: 08/21/20 Time: 18:46			
Sample: 128			
Lags: 2			
Null Hypothesis:	**Observations**	**F-Statistic**	**Prob.**
TED does not Granger cause GDP	26	0.37711	0.6904
GDP does not Granger cause TED		1.50698	0.2446
TEDS do not Granger cause GDP	26	0.41976	0.6626
GDP does not Granger cause TEDS		1.06610	0.3623
TEDSTEX does not Granger cause GDP	26	2.57499	0.1000
GDP does not Granger cause TEDSTEX		0.68876	0.5132
TEDTGDP does not Granger cause GDP	26	2.61984	0.0964
GDP does not Granger cause TEDTGDP		3.05303	0.0686
TEDS do not Granger cause TED	26	0.53183	0.5952
TED does not Granger cause TEDS		5.66457	0.0108
TEDSTEX does not Granger cause TED	26	3.75967	0.0402
TED does not Granger cause TEDSTEX		1.98361	0.1625
TEDTGDP does not Granger cause TED	26	2.87527	0.0788
TED does not Granger cause TEDTGDP		0.20382	0.8172
TEDSTEX does not Granger cause TEDS	26	5.96990	0.0089
TEDS do not Granger cause TEDTGDP		0.69870	0.5084

To check the long run relationship between the dependent and independent variable applying bound test is necessary. When the value of F-statistic is below lower bound (I0), upper bound and inconclusive, we accept null hypothesis. However, when the value is further away from(I1), it leads to cull down the null hypothesis. As indicated in Table 4, the value of F- statistic is estimated to be 7.27 which is evidently higher compared to(I1). Thus, we clearly reject

the null hypothesis in favor of the other alternative. Thus, the extended relationship between the dependent variable (GDP) and explanatory variables (TED, TEDS, TEDSTEX and TEDTGDP) is highly supported.

Table 4: Testing Long Run Relationship between the dependent and Explanatory Variables

ARDL Bounds Test		
Date: 08/22/20 Time: 21:28		
Sample: 128		
Included observations: 27		
Null hypothesis: No long run relationships exist		
Test statistic	**Value**	**K**
F- Statistic	7.270520	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.45	3.52
5%	2.86	4.01
1%	3.74	5.06

Source; from EViews9

As shown in Table 3.5and 3.6, the coefficients of external debt to GDP ratio have an adverse and noteworthy effect to GDP in short run and long run time period at 5% and 1% precision. The long run and short run elasticity of coefficient TEDTGD Pillustrates 12.5 % and 21.4% decrement in GDP from a unit increment in TEDTGDP. That is, existing debt runs decline progress of economy. Hence, the debt overhang hypothesis in Ethiopian case both in short run and long run is confirmed. Kassu*et* al., (2014) result shows that external debt as percentage of GDP has negative influence on economic growth in the long run but not on the short run.

The debt overhang variable, represented by the ratio of external debt to GDP, stands adverse as well as extremely momentous. This finding is congruent with the finding of Agernew (2016) and Mulugeta (2014) in Ethiopia. On the other hand, the coefficients of Total External Debt Servicing to total Exports earnings (TEDSTEX) and debt service payment (TEDS is not statistically significant. This specifies the absence of clear indication that signals existence of crowding out effect in Ethiopia (1991-2018). The coefficient of the error correction model (ECM) is equal to -1.1464, which is negatively significant at 1% significance level, thus, the speed of adjustment is 114.6%.The large sizes of coefficient of error of correction figures indicate that the speed of adjustment is fast for the equation to return to their equilibrium level once it has been shocked. Thus, it takes quite less a year to adjust fully.

Inline to the table 5 below, the probability of (F- statistic)is 0.00000at 1% significance level indicating that the model is well specified and can be used to forecast policy analysis and the Durbin-Watson value 1.610413 indicates absence of positive Serial Auto-correlation among the variables used in the model. The R-square value of 0.640 indicated that the explanatory variables (TED, TEDS, TEDSTEX and TEDTGDP) explained 64.09% changes in GDP in the long run and other explanatory variables not modeled explained 35.91%. Thus, the goodness of fit of this model is adequate with high predictive power.

Table 5: ECM Regression Result

ARDL Cointegrating and long run form				
Dependent Variable: GDP				
Selected Model: ARDL (1, 0, 0, 0, 1)				
Date: 08/31/20 Time: 17:13				
Sample: 128				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TED)	0.000262	0.000394	0.664140	0.5142
D(TEDS)	-0.004531	0.006088	-0.744242	0.4654
D(TEDSTEX)	0.070430	0.094839	0.742623	0.4663
D(TEDTGDP)	-0.214953	0.101582	-2.116059	0.0471
ECM (-1)	-1.146475	0.196518	-5.833938	0.0000
R-squared	0.640917	Mean dependent var		0.470370
Adjusted R-squared	0.443993	S.D. dependent var		5.676712
S.E. of regression	4.232891	Akaike info criterion		5.916777
Sum squared resid	376.2646	Schwarz criterion		6.204741
Log likelihood	-73.87649	Hannan-Quinn criterion		6.002404
F-statistic	5.152397	Durbin-Watson stat		1.610413
Prob(F-statistic)	0.003072			

Source; from EViews software

Table 6: Long Run Coefficient Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TED	0.000228	0.000344	0.664212	0.5141
TEDS	-0.003952	0.005312	-0.743869	0.4656
TEDSTEX	0.061432	0.083399	0.736603	0.4699
TEDTGDP	-0.125107	0.040433	-3.094196	0.0057
C	11.757320	2.441630	4.815357	0.0001
$ECM_{(-1)}$ = GDP - (0.0002*TED -0.0040*TEDS + 0.0614*TEDSTEX -0.1251 *TEDTGDP + 11.7573)				

Source; own computation from EViews9

4. CONCLUSION AND RECOMMENDATION

Every developing country economy suffers from inadequate financial resources; hence, external borrowings become necessary in order to complement the internal resources. These countries acquired external debt so much so that they are faced with critical problems of debt overhang and crowding out effect. This study attempted to examine the impact of public external debt on economic growth in Ethiopia which covered the period from 1991/92-2018/19. It was considering GDP Growth rate as function of total external debt to GDP ratio, debt service to export ratio, total external debt stock and debt service. The granger causality test suggested that there is a causal relation between TEDTGDP and GDP. Similarly, total external debt stock (TED) has causal relationship with external debt service (TEDS).The estimated results of this study revealed the adverse effect on GDP raised from the ratio of total external debt to GDP. This showed a debt overhang problem in the Real GDP which signaled debt overhang hypothesis in Ethiopia. The result also revealed that absence of a 'crowding out' effect on Real GDP in Ethiopia since debt servicing have no substantial adverse effect on GDP.

Thus, it is sounding those external borrowings should be channeled to the real sectors of the economy rather than social consumption to be felt in the economy. Government Policies should encourage domestic investments, foreign direct investment and increased trade in intensifying GDP growth and reducing dependence on external debt for sustained economic development. Moreover, optimizing domestic resource mobilization in more productive ventures is necessary in reducing dependence on external debt.

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