



## THE DETERMINANTS OF TAX REVENUE IN ETHIOPIA

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### ABSTRACT

*Tax revenue to GDP ratio is very low in Ethiopia as compared to some of Sub-Saharan African countries. In present study an attempt is made to analyze empirically the determinants of tax revenue and assess the response of tax revenue to changes in its determinants in Ethiopia. The study is essential because its results can be used to help policy maker take appropriate option when raising tax revenue and also used as stepping stone on making appropriate tax reform in an event of resource scarcity or budget deficit. The study mainly used secondary data collected over the period 1970-2009 from Ethiopia Revenue and Customs Authority (ERCA), Central Statistics Authority (CSA), Ministry of Finance and Economic Development (MoFED), National Bank of Ethiopia (NBE), World Bank (WB), Ministry of Trade and Industry and Ethiopian Economic Association (EEA). For the present study, Vector Autoregressive (VAR) model is used. The result suggest that per-capita income, inflation, service sector share of GDP, agricultural share of GDP and trade liberalization are the significant determinants of tax revenue in Ethiopia in the long run. The result also indicates that import and exchange rate are important determinants of tax revenue in the long run in Ethiopia but they are insignificant. Finally, it is found that Ethiopia's tax revenue is very responsive to changes in its determinants which create more challenge to the government in creating a stable tax system.*

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## THE DETERMINANTS OF TAX REVENUE IN ETHIOPIA

### 1. Background

Resources are needed by governments in developing countries for a wide variety of expenditures, ranging from public administration and defense to the maintenance and provision of social services and infrastructure. The costs of these expenditures are usually partly met through tax Revenue (Ahmed and Nicholas, 1989).

Like any developing countries, Ethiopia also needs sources of revenue to finance at least three functions such as defense, maintenance of law and order, and socio-economic development. Therefore, in order to finance these activities, government raises revenue from different sources of finance namely; internal and external sources of financing. Among internal sources of financing, taxation has been taken a lion share in providing sufficient fund for public expenditures.

#### Statement of the problem

Many developing countries have faced a problem of collecting sufficient tax revenues for public expenditure. They rely extensively on external sources for financing development activities. However, external financing has its own drawbacks; it will lead to long run debt, a phenomenon faced Latin American countries such as Mexico and Argentina (Wawire, 2011; Mishkin, 2004). Therefore, internal source of financing is better than external sources of financing. In a similar way, Ethiopia is a small open economy where the public sector is leading by investment in different development activities. This in turn needs financing which can be obtained from internal sources of financing (tax revenue) and external sources (borrowing and aid). As a previous study shows that internal financing (tax revenue) is the safest way of financing economic development (NBE, 2011).

Despite the government of Ethiopia has carried out various reform measures to boost tax revenue; the efforts did not seem to bring the desired results. For instance, Ethiopian tax revenue to GDP ratio for the past three years, 2006, 2007, and 2008 was 8.3, 7.8 and 6.7 respectively which was very low comparing with some of the Sub-Saharan African countries such as Botswana, South Africa, Benin, Burundi, Ghana, Kenya, Malawi, Mauritania and Senegal which have high tax-to-GDP ratios that ranged in between 16.8% to 26.3% in the same period being considered (International tax dialogue, 2010).

#### Objectives of the study

The general objective of this study is to pinpoint the major determinants of tax revenue in Ethiopia in the period 1970-2009 G.C. In line with the above general objective, the study has the following specific objectives:

- To show the impact of Per-capita income on tax revenue of Ethiopia.
- To reveal the impact of inflation on tax revenue of Ethiopia.
- To reveal the impact of the share of service sector to GDP on tax revenue of Ethiopia.
- To show the impact of import on tax revenue of Ethiopia.
- To show the impact of exchange rate on tax revenue of Ethiopia.
- To reveal the impact of trade Liberalization on tax revenue of Ethiopia
- To reveal the impact of the share of agriculture to GDP on tax revenue of Ethiopia

#### Research Hypothesis

The following research hypothesis was formulated based on the knowledge gained from the reading of both the theoretical and empirical analysis regarding the determinants of tax revenue.

H1: per-capita income is positively impacts tax revenue in Ethiopia.

H2: Agricultural share of GDP impacts negatively tax revenue in Ethiopia.

H3: Inflation may positively impacts tax revenue in Ethiopia.

H4: Service sector share of GDP has a positive impact on tax revenue in Ethiopia.

H5: Exchange rate may negatively impacts tax revenue in Ethiopia.

H6: Import is positively impacts tax revenue in Ethiopia.

H7: Trade liberalization may have a positive impact on tax revenue in Ethiopia.

## **REVIEW OF LITERATURE**

### **Theoretical Literature**

This chapter mainly concerned with literature review of both theoretical and empirical literature Tax revenue is the enforced proportional contributions from persons and property levied by the State by virtue of its sovereignty for the support of government and for all public needs (Sempagala-Mpagi, 2011)

Tax revenue can be classified into:

1. Direct Taxes: A tax is said to be direct, if the tax payer bears the burden of the tax. He cannot shift the burden to any other person. For example, income tax, wealth tax and gift tax.
2. Indirect taxes: Indirect tax is shifted by the payer to others. If sales tax is imposed on sugar, the producer or dealer who pays it passes it on to the next buyer and ultimately the burden is borne by the consumer. Value added tax (VAT), turn over (TOT) etc.

### **Empirical literature**

Chaudhry and Farzana (2010) they identified the determinants of low tax revenue by employing time series econometric techniques over the period 1973- 2009. The empirical results suggest that openness, broad money, external debt, foreign aid and political stability are the significant determinants of tax efforts for Pakistan economy with expected sign. The results also indicate that the determinants of low tax revenue in Pakistan are narrow tax base, more dependence on agricultural sector, foreign aid and low level of literacy rates. The study conclude that "Pakistan economy can generate high tax to GDP ratio by boosting the openness, literacy level, political stability and broadening the tax base and by controlling income inequality, tax evasion and tax exemption".

Eltony (2002) by taking the data of 16 Arab countries during for period 1994-2000, regressed the tax share in GDP on agriculture share, mining share and export share, per capita income, imports, and the outstanding foreign debt. The result showed the negative and significant effect for mining and agricultural share, positive and significant effect for per capita income and import. The study concluded that the main determinants of the tax share in the GDP for Arab Countries are per capita income, share of agriculture and mining.

Gupta (2007) took per capita in GDP, share of agriculture in GDP, trade openness, foreign aid corruption, political and economic mater as the determinants of revenue performance to GDP ratio by using the data of developing countries. His results showed a strong negative and significant relationship between agriculture share and revenue performance, per capita GDP is significantly positive, positive relationship between openness and revenue performance, foreign aid has a positive effect on revenue performance but the relationship appear weaker than that for some other variables.

Agbeyegbe, Stotsky, and Aseggedech (2004) examined the relationship between trade liberalization, exchange rates, and tax revenue Using a panel of 22 countries in Sub-Saharan Africa, over 1980–1996. The results obtained suggest that the relationship between trade liberalization and tax revenue is sensitive to the measure used to proxy trade liberalization, but that, "in general, trade liberalization is not strongly linked to aggregate tax revenue"

## **RESEARCH DESIGN AND METHODOLOGY**

### **Research Design**

The present study undertakes a quantitative research using time series secondary data covering the period 1970-2009 to identify the determinants of tax revenue in Ethiopia. In this study since there are many macro economic variables which interact with each other, Vector Autoregressive (VAR) method is used. VAR is one of the most widely used method in the study of the interaction between many economic variable.

### **Data Type and Source**

The study mainly used secondary data collected from Ethiopia customs authority (ECA), Central statistics authority (CSA), Ethiopian Economic Association (EEA), Ministry of finance and Economic

Development (MoFED), National Bank of Ethiopia (NBE), World Bank (WB), and Ministry of Trade and Industry. The definition and measurement of the sources of data is found in table 1 below.

Table 1: Definitions, measurement and sources of data

Variable	Definition	Unit	Sources
TR	Tax Revenue as percentage of GDP	percent	MOFED
Y	Per-capita income	Birr	ERCA & NBE
M	Import	percent	ERCA
EX	Market Exchange Rate	Birr	NBE
CPI	Consumer price Index	Index number	NBE
AGDP	Agricultural Share of GDP	Percentage	ERCA & EEA
SGDP	Service Sector Share of GD	Percentage	ERCA & EEA
DD	Dummy variable for Trade liberalization	It take value 1 for existence of liberalization	

### 3.3 Model specification

There are various sources of tax revenue in developing countries which help to raise economic growth. The Keynesian theory to national income determination is used in this study to model the sources of tax revenue in Ethiopian context. The Keynesian theory of national income determination is given as:

$$Y + M = C + G + I + X \tag{1}$$

From equation (1), the theoretical framework for our tax model is developed as follows:

$$TR = I(Y, r) - S(Y, r) + X(Y^*, E) - M(Y, E) + G \tag{2}$$

Where, Y, r, Y\* and E are domestic income, interest rate, foreign income, and exchange rates respectively.

Thus, a comprehensive model of tax revenue which incorporates the various sources of tax revenue is given as:

$$LnTR = \beta_0 + \beta_1 LnAGDP + \beta_2 LnSGDP + \beta_3 LnM + \beta_4 LnY + \beta_5 LnP + \beta_6 LnEx + \beta_7 D + \varepsilon_t \tag{3}$$

Where; TR, AGDP, SGDP, M, Y, P, Ex, D and  $\varepsilon_t$  are respectively, Total Revenue which is defined as the income that is gained by governments from taxation, Agricultural share of GDP, Service share of GDP, Import, Per-capita income, inflation, exchange rate, Dummy variable for trade liberalization, and a random error term.

### 3.4 Stationary test

Time series analysis was used to help understand an empirical modeling of dynamic response of tax revenue to changes in their determinants. For the present study therefore, vector autoregressive (VAR) model which is the most extensively used method in the study of the interaction between many macroeconomic variables is used. It is a model in which each variable included in the model is a function of its own past. VAR implies that all the variables in the model are treated to be endogenous.

### 3.5 Co-integration Test

Many macroeconomic time series are not stationary at levels and become stationary at first differences. Even though individual time series are non stationary, Linear combination of the non

stationary variables could be stationary. In such cases, we say there is co-integration (long run relationship) between the variables. (Maddala, 1992)

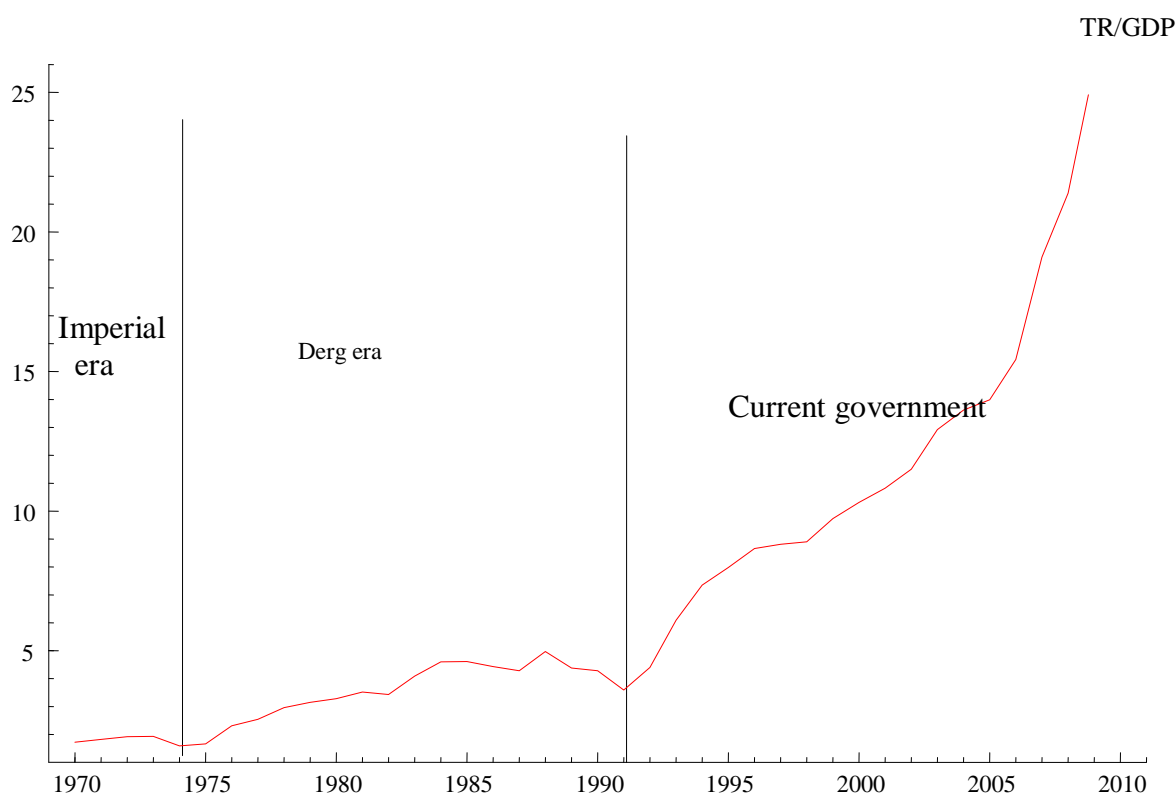
#### Trend analysis of total tax revenue to GDP ratio

The trend of tax revenue shares to GDP ratio indicates the change of tax revenue over time in Ethiopia. Therefore, looking at the trends of tax revenue would enable us to understanding the change of tax revenue over the study period. Ethiopia has been experienced three distinctive periods such as the Imperial period, the Derg period and the current Ethiopian government. Therefore, the trend of total tax revenue share is presented in all of these three distinctive regimes.

The average tax revenue during the Imperial Era was 490.20 million birr whereas the average tax revenue during the Derg and current Ethiopian government are 1482.26 and 11,583.22 million birr respectively. In other words, tax revenue as percentage of GDP is 1.80, 3.70 and 12.25 during the Imperial Era, Derg Era and the current Ethiopian government respectively. Therefore, the trend analysis in figure 1 below indicates the changes of total tax revenue to GDP ratio in Ethiopia in three different periods. During the imperial era (1970- 1974) the total tax revenue to GDP ratio indicates a decreasing trend. Whereas during the Derg regime the total tax revenue to GDP ratio shows an increasing and erratic trend. The figure below also indicates that the total tax revenue to GDP ratio started to increase since the end of Derg regime in 1991. In general the total tax revenue to GDP is increasing over time after the period of Imperial. Especially, as the figure below reveals that the total tax revenue to GDP during the current government is regularly increasing.

However, despite the recent rise in the total tax revenue in Ethiopia, the country has experienced very low tax revenue to GDP comparing with some of Sub Saharan African countries.

Figure 1: Trend analysis of total tax revenue to GDP ratio



Sources: Researcher's own calculation based on the data collected from  
aforementioned sources (MOFED)

4.3

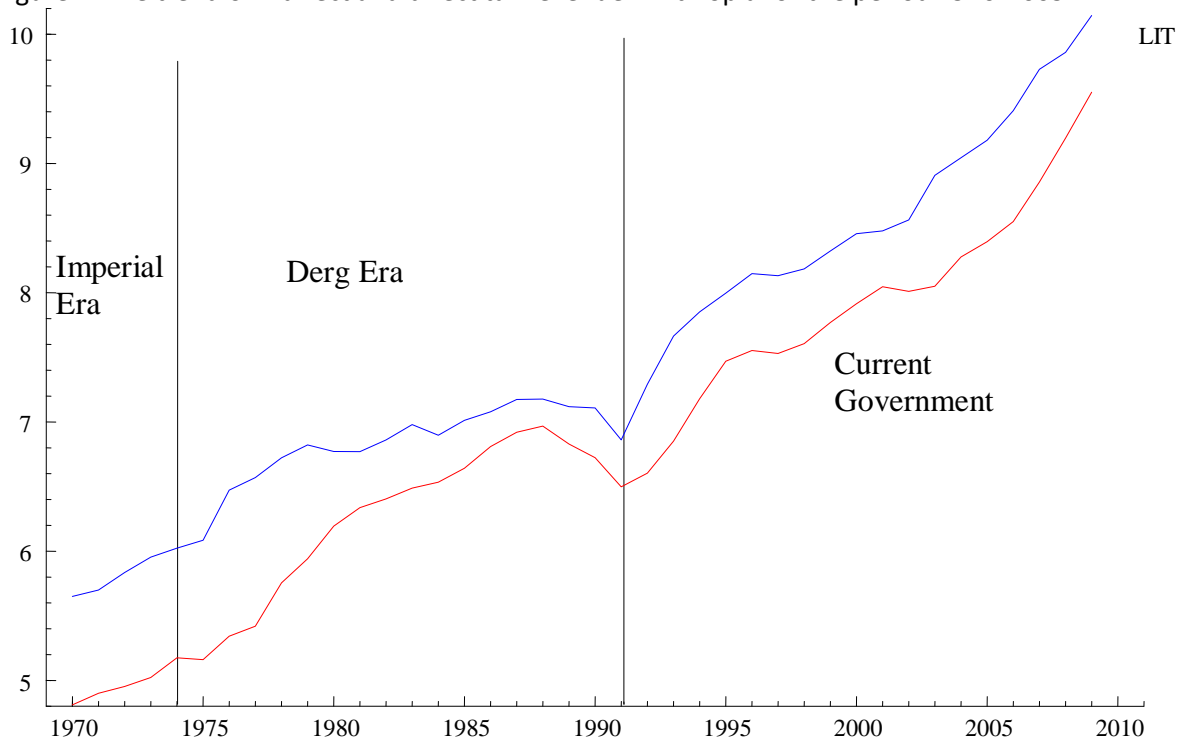
The Direct & Indirect tax revenue in Ethiopia for the period 1970-2009.

Tax revenue in general can mainly be categorized in to indirect and direct tax revenue in any economy where the direct tax revenue comprises of the urban and rural land tax and profit income tax revenue.

As can be seen from figure 2 below, the indirect tax revenue in Ethiopia is higher than that of direct tax revenue for the period under consideration, 1970-2009.

As evidenced from the figure, the direct tax revenue was low during the Imperial Era and rising during the socialist government in Ethiopia. The following figure also shows that both the direct and indirect tax revenue started to rise since the end of the socialist government in 1991. Moreover, it is clear from the following figure that the direct and the indirect tax revenues in Ethiopia have been raising at increasing rate since 2003 when Ethiopian economy started to grow at a rate of more than 11%.

Figure 2: The trend of indirect and direct tax revenue in Ethiopia for the period 1970-2009.



Source: Data from ERCA, 2009

4.10 Results of unit root test - As stated in preceding chapter the first step in time series econometric analysis is to determine the stationarity of the variables. Working with non-stationary variables lead to spurious regression results and further inference from such kind of result is meaningless. Thus, to perform the stationarity test for the variable included in the model, the conventional Augmented Dickey – Fuller (ADF) test were used. Therefore, the test results that presented in appendix 1 showed that all the variables are not stationary at level with lag of zero. Likewise, at lag one and two all the variables are non stationary at level except exchange rate which remains stationary in lag two. However, the test applied to the same variables after first difference become stationary at the conventional 5% level of significance (see appendix 2). It means that, all the series are integrated of order (1). Therefore, the series can be tested for the existence of a long-run relationship (co integration).

#### 4.11 Estimation of lag length, based on VAR model

Having found that a variable in the model is non-stationary at level, the next step is to check whether the variables have long-run relationship (cointegrated) or not. To this end, the model is first estimated using VAR modeling approach, to determine the lag length of the model.

The result of the test shows that lag length one is significant for our model. Therefore, the lag length selected based on the F-test criteria for tax revenue model is one. This is shown as shown blow in table 2.

Table 2: lag length determination for tax revenue model using F-test.

LTR_1	1.09326	[0.4101]	LTR_2	0.441072	[0.8627]
LY_1	1.78303	[0.1561]	LY_2	1.91309	[0.1300]
LM_1	2.06680	[0.1049]	LM_2	0.950380	[0.4955]
LEX_1	5.91977	[0.0013] **	LEX_2	0.407255	[0.8847]
LCPI_1	2.39278	[0.0672]	LCPI_2	1.46644	[0.2442]
LAGDP_1	1.42410	[0.2592]	LAGDP_2	0.434723	[0.8669]
LSGDP_1	8.36324	[0.0002] **	LSGDP_2	1.29946	[0.3087]

The asterisk (\*\*) shows the significance of the lag in explaining the dependant variable

#### 4.2 Determinants of tax revenues.

The main determinants of Ethiopia's tax revenue are estimated by means VAR model using a variety of independent variables expected to influence the tax revenue.

##### 4.2.1 Estimation of the Long Run Model

For the tax revenue equation, unit root test is made and the result is presented in appendix 1 and 2. The result of the test showed that all the variables are stationary at first difference. One of the most important steps after stationary test is the determination of the lag length which should be incorporated in the model. Once the optimal lag length is determined for the model, the next step in Johansen's co-integration analysis is to determine the number of co-integrating vector for the model. In section 4.11, a common lag length of one is selected for tax revenue equation. Finally, the results of co-integration test are obtained for the tax revenue equation using the Johansen maximum likelihood methods and the result of the test is given in the following Table.

Table 3: The Johansen's Cointegration Test for number of cointegrating vectors

Ho:rank=p	$\lambda_{max}$	Adj. $\lambda_{max}$	95%	$\lambda_{trace}$	Adj. $\lambda_{trace}$	95%
p = 0	60.88**	48.39	51.4	183**	145.5	156.0
p <= 1	43.41	34.51	45.3	122.2	97.1	124.2
p <= 2	28.31	22.5	39.4	78.75	62.6	94.2
p <= 3	17.12	13.61	33.5	50.44	40.09	68.5
p <= 4	16.13	12.82	27.1	33.32	26.48	47.2
p <= 5	6.946	5.521	21.0	17.18	13.66	29.7
p <= 6	6.553	5.209	14.1	10.24	8.136	15.4
p <= 7	3.683	2.928	3.8	3.683	2.928	3.8

The asterisk (\*\*) shows the rejection of the null hypothesis of zero co-integrating vector against the alternative hypothesis of one co-integrating vector

As can be seen from tables 3 above, the trace test indicates that the null hypothesis that there is no cointegration ( $r^* = 0$ ) against the alternative ( $r = 1$ ) is rejected. Since the trace Statistic- $\lambda_{trace}$  (183) is greater than the 95 percent critical value (156). But, the null hypothesis of one co-integration vector is not rejected because the trace Statistic- $\lambda_{trace}$  (97.1) less than the 95 percent critical value (124.2). Similarly, maximum eigenvalue test indicates that the null hypothesis that there are no cointegration vector ( $r=0$ ) against the alternative hypothesis of one cointegration vector ( $r= 0+ 1$ ) is rejected since the test statistic (60.88) is greater than the 95 percent critical value (51.4).

Once the existence of one cointegration vector is supported by the Johansen cointegration test statistics, thus we can formulate the long run equation from the  $\beta$  coefficient of the cointegration regression result. For this purpose, the first row of  $\beta$  and the first column of  $\alpha$  matrix from the cointegration analysis are essential. As indicated in table 4(A) below, the first row of  $\beta$  represents the long run coefficients of the variables; whereas the first column of  $\alpha$  coefficient as can be seen in table

\* r stands for cointegration/ relationship

4(B) represents the speed of adjustment of the long run coefficients towards their long run equilibrium relationship

Table 4: Cointegration Results of the tax revenue equation

A) standardized \beta' coefficient								
LTR	LY	LM	LEX	LCPI	LAGDP	LSGDP	DD	
1.0000	-1.4896	-0.3297	0.1271	-0.0631	1.3396	-1.4114	-0.6481	
-15.217	1.0000	14.056	10.224	0.63108	-1.7529	-6.3899	-8.5847	
0.2176	-1.6898	1.0000	-0.2364	-0.0330	1.9513	-3.0208	-0.8618	
3.5611	3.7251	-2.8356	1.0000	-0.1165	1.0176	-3.6101	1.5169	
4.3696	-2.3553	-3.4691	-1.4811	1.0000	-5.9658	6.8023	1.1645	
0.1950	0.1474	-0.1388	-0.0326	0.0143	1.0000	-0.2066	-0.3143	
-0.4002	-0.1699	-0.1131	-0.1343	0.1348	0.3711	1.0000	0.3694	
1.2703	-2.1995	-2.3165	0.9922	-0.4635	2.3668	2.1284	1.0000	

B) standardized \alpha coefficients								
LTR	LY	LM	LEX	LCPI	LAGDP	LSGDP	DD	
-0.3377	0.0169	0.0591	0.0129	-0.0137	-0.0475	0.0297	0.0318	
-0.0575	-0.0017	0.0431	-0.0443	-0.0004	-0.0452	0.0094	0.0261	
-0.0526	0.0098	0.1294	0.0426	0.0057	0.0841	0.1046	0.0668	
-0.0825	-0.0156	-0.1007	-0.0709	0.0185	0.2792	0.0991	-0.0078	
-0.1536	0.0102	-0.5774	-0.0152	-0.0439	0.3617	-1.1184	0.0410	
-0.0849	0.0037	-0.0168	-0.0307	0.0112	-0.1042	-0.1108	0.0198	
-0.2036	-0.0017	0.1216	0.0040	-0.0024	-0.0062	-0.0570	0.0021	
0.4101	0.0346	0.0627	-0.0165	-0.0018	0.1194	0.0748	0.0296	

4.2.2 Significance test of the long-run coefficients

Test of significance on the long run parameters are performed by imposing a zero restriction on  $\beta$  coefficients. The test results using likelihood ratio (LR) test with their respective probability reveals that per capita income, inflation agricultural share of GDP, service sector share of GDP and dummy variable for trade liberalization are the main significant long run determinants of tax revenue in Ethiopia.(see Table 5).

Table 5: The test of Significance on  $\beta$ -coefficient

Variable	LY	LM	LEX	LCPI	LAGDP	LSGDP	DD	
$\beta$ -Coeff.	-1.4896	-0.32977	0.1271	-0.06310	1.339	-1.4114	-0.6481	
LR-test	17.349	1.529	0.62068	5.0785	15.249	9.706	8.4571	
P-Value	0.0000 **	0.2162	0.4308	0.0242*	0.0001 **	0.0018**	0.0036**	

After testing the significance of the explanatory variables, the long run equation of the model is formulated by taking the opposite signs (normalizing) of the first row of beta coefficients from table 4(A) above. Thus, the long run normalized equation for our model with the corresponding signs and significance is presented as follows:

$$LTR = 1.48LY + 0.32LM - 0.1271LEX + 0.063LCPI - 1.339LAGDP + 1.41LSGDP + 0.64D$$

(0.0000 \*\*) (0.2162) (0.4308) (0.0242\*) (0.0001 \*\*) (0.0018\*\*) (0.0036\*\*)

Note, the figure in the parentheses indicates probability that the null hypothesis of no significance is rejected. That is the variable is significant in affecting the concern variable

The diagnostic test summary from appendix 3 reveals that the null of no serial correlation are not rejected at any conventional significant level. However, vector normality problem is detected at 1% level of significance. But, the Johnson results hold even with the presence of non normality (Harris, 1995). Test of heteroscedasticity is not displayed in the test summary using PcFilm software due to the small sample size of the data.



As can be seen from the long run equation, the sign of all the variables incorporated in the model are as expected. That is, tax revenue is positively related to per-capita income, import, inflation, service sector share of GDP and trade liberalization. On the other hand, tax revenue is negatively related with agricultural share of GDP and exchange rate. However, the most important significant determinants of tax revenue in the long run are per-capita income, inflation, agricultural share of GDP, service sector share of GDP and dummy for trade liberalization. But, import and exchange rate are insignificant.

As the theory predicts when income increases tax revenue also increases. Our regression results also indicate the positive relationship. That is a 1% increase in per capita income leads to a 1.5% increase in tax revenue. This result is also consistent with the findings of Eltony, (2002); Gupta, (2007); Stotsky and Aseggedech(1997).

Another significant determinant of tax revenue is agricultural share of GDP which is negatively related to tax revenue. The negative and the significant effect of agricultural share of GDP is due to the fact that small farmers are known to be difficult to tax and a large share of agriculture is normally subsistence, which does not generate large taxable surpluses, as many countries are unwilling to tax the main foods that are used for subsistence. The regression result shows that a 10% decrease in impact of agricultural share of GDP would lead to 13.3% raise tax revenue. This result is consistent with the work of Stotsky & WoldeMariam, (1997); Eltony, (2002); Salami A., Abdul, B., Kamara and Zuzana, B. (2010)

Moreover, the service sector share of GDP and trade liberalization positively and significantly affects our dependent variable which is tax revenue. A one percent increase in service sector share of GDP results in 1.4% increase in tax revenue. Where as a one percent increase in trade liberalization would leads to 0.64% increase in the amount of tax revenue. This finding is in line with the work of Viner, (1950) ; Stotsky, & WoldeMariam (2004)

#### 4.2.3 The Short-run dynamic model

After the long run model and its coefficient are determined, then the short run model is also determined. The short-run dynamic or error correction model is therefore, obtained by estimating the first difference of the dependent variable on its own lag, on the first difference of all explanatory variables and their lags and also including one year lagged error term which is obtained from the long-run model estimation. The reason for including one year lag of the error term is, to indicate how the time path matter to correct any error or deviation from the long run equilibrium.

The change in the variables entered into the model to represent variation in the short run, while the coefficients obtained from the error correction term will represent the speed of adjustment towards the long run equilibrium relationship. As shown in the long run, the existence of one co-integrating vector is supported by the Johansen cointegration test. This indicates that there is no problem of simultaneity. Therefore, Ordinary Least Square (OLS) is efficient and can be used in this case to estimate the short run dynamics.

Table 6: Results for the dynamic short run tax revenue equation (DLTR)

Variable	Coefficient	Std.Error	t-value	t-prob
DLTR_1	0.316241	0.1445	2.19	0.037
Constant	-0.0145613	0.02195	-0.663	0.512
DLY	0.287600	0.1546	1.86	0.073
DLM	0.250329	0.07127	3.51	0.001
DLM_1	0.238695	0.08914	2.68	0.012
DLEX	-0.125684	0.07668	-1.64	0.112
DLCP	0.0449094	0.02247	2.00	0.055
DLSGDP	0.508466	0.2258	2.25	0.032
ECT_1	-0.904989	0.2040	-4.44	0.000

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R <sup>2</sup>	0.812961	F (8, 29) =	15.76 [0.000] **	DW	1.56
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Before interpreting the short run dynamic regression result, the adequacy of the model is checked by using different diagnostic tests. The test does not reject the null hypothesis of no error term autocorrelation (AR1-2). The test for autoregressive conditional heteroscedasticity (ARCH) fail to reject the null of no ARCH indicates the existence of constant variance. The test for normality cannot reject the null hypothesis of normality and indicates that the error term is normally distributed. Finally, the RESET (regression specification test) does not reject the null hypothesis of no functional misspecification in the estimated equations and it reveals that there is no problem of model misspecification.

Moreover, as shown in the above table all explanatory variables together explain about 81.3 percent of the variation in the model. The F statistics rejects the null hypothesis that all the coefficients in the model are jointly insignificant. Durban Watson (DW) test also suggests that there is no autocorrelation problem, as its value is reasonably close to two.

Therefore, the estimated result of the short-run model shows that the main determinants of tax revenue in the short run are its own lag, per capital income, import, inflation and service sector share of GDP. It is the same to the previous work of Eltony, (2002); Stotsky & WoldeMariam, (1997); Thuto (2010)

#### Conclusion

The government of Ethiopia has undertaken varies reform measures to boost tax revenue. But, the effort did not seem to bring the desired results. For example, Ethiopia tax revenue to GDP ratio for the past three years, 2006, 2007, and 2008 was 8.3, 7.8 and 6.7 respectively which is very low comparing with some of the Sub-Saharan African countries such as Botswana, South Africa, Benin, Burundi, Ghana, Kenya, Malawi, Mauritania and Senegal which have high tax-to-GDP ratios that ranged in between 16.8% to 26.3% in the same period being considered. As a result the country is forced to rely more on external sources of finance for its budget requirement.

#### Recommendation

- The positive or high per-capita income provides the biggest benefit for Ethiopia. Increasing per-capita income would be considered as the most effective tool of raising tax revenue of Ethiopia. The raises of tax revenue in turn stimulate the growth of the economy of the country. The Federal government of Ethiopia therefore highly expected to increases per-capita income to raise tax revenue by accumulating wealth.
- The negative and significant impact of agricultural share of GDP is due to the fact that small farmers are known to be difficult to tax; this also due to the fact that the products of these farmers are transacted between them in an informal market which is hard to tax. Hence, the Federal government of Ethiopia should increases tax revenue by managing or changing this informal market in to formal (making these informal market legal).
- Trade liberalization is believed to give benefits, by generating tax revenues for those countries which encourage freer trade. In our country Ethiopia here also that tax revenue increased after the introduction of trade liberalization as it evidenced by graphical representation and regression result. It is therefore, indispensable for the Federal Government to continue with the use of trade liberalization
- The share from service sector industries also contributes a large share of tax revenue to the government since it cover a wide area of the economic activities. The federal government of Ethiopia therefore expected to encourage these sectors further to collect more tax revenue through avoiding various mislaid, and should raise tax revenue by taxing unspecified services that are similar to those services specified as taxable.

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