



The Role of Value Added Tax (VAT) on Economic Growth of Ethiopia

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To cite this article:

Assefa Belay. The Role of Value Added Tax (VAT) on Economic Growth of Ethiopia. *International Journal of Business and Economics Research*. Vol. 11, No. 5, 2022, pp. 295-303. doi: 10.11648/j.ijber.20221105.14

Received: September 7, 2022; **Accepted:** October 14, 2022; **Published:** October 31, 2022

Abstract: The achievement of economic growth is crucial for countries sustainable development. Recently, Value Added Tax (VAT) becomes a major worldwide tax instrument which enhances economic growth. Thus, this paper analyses the role of VAT on economic growth of Ethiopia from 1990 to 2021 based on theoretical and empirical evidences. The main objective of this study is to analyze role of tax in Ethiopia from (1990 to 2021). The method of analysis was econometrics analysis. This paper used Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) in order to investigate the long-run and short run relationship between the dependent variable and its determinants. To test stationary Augmented Dickey –Fuller (ADF) test and Phillpes Perron (PP) test were used. The error correction coefficient, estimated at -0.75452 is highly significant, has the correct negative sign, and imply a very high speed of adjustment to equilibrium. R-squared is 0.6568: This implies that 65.68% of the real gross domestic product function is explained by the selected explanatory variables. In other words, 65.68% of variation of the dependent variable is due to the variation of the independent variables which included in the model and the remaining variation 34.32% is explained by the variables which are not included the model. To meet this objective, time series macro-economic data on GDP, VAT, and tax revenue excluding VAT, non-tax revenue, population, human capital and gross capital formation were used. This data is collected from National Bank of Ethiopia, Central Statistical Agency, World Development Indicator (WDI), the Global Economy, World Data Bank, National Bank of Ethiopia websites, Ethiopian Revenue and Customs Authority. The finding of the study reveals that strong and positive impact of VAT revenue on the economic growth (GDP) of Ethiopia during the periods under review. i.e. One per cent increase in the growth of net VAT revenue causes 20.35% increase in the growth of nominal GDP. However, to be effective, it requires strong administrations and cooperation's of the tax payers with taxing authority and the government in general.

Keywords: Economic Growth, VAT, ARDL, ECM, Ethiopia

1. Introduction

Most developing countries are currently dependent on external financial resources to fund their development activities. As a result, their budgetary problems become more serious. To change this situation, these nations should exploit and strengthen their domestic financial resource base in order to bring about sustainable development [21].

One of these sources is taxation, which is a system of raising money internally to finance government expenditure. Hence, a tax is a compulsory payment to government without expectation of direct return or benefit

to tax payers. This means it is a compulsory contribution imposed by the public authority, irrespective of the exact amount of service rendered to the taxpayers in return to the amount of tax paid by them. Thus, a tax is not paid in exchange for a specific benefit. A clear example for this is that a person, who accomplished his tax obligation, and another one who did not, both will be benefited equally from the public goods, which are commonly available for everyone. It is clear that public goods usually are financed by tax revenue [18].

Tax can be classified as direct and indirect tax. Direct taxes refer to those taxes that are collected from the people or organizations on which they are apparently imposed. The economic effect of this tax necessarily falls at the point where it is legally levied. For instance, a tax on employment paid by employers will have a direct impact on the employee, not on the employer. In contrast, indirect taxes are collected from someone other than the person presumably responsible for paying the taxes. They are avoidable taxes. That means indirect taxes can be avoided if the customers (indirect tax payers) refused to purchase and use the taxable goods (Wikipedia, the Free Encyclopedia). Funds provided by taxation have been used by states and their labor equivalents to carry out many public functions. Some of these include expenditures on defence (military), the enforcement of law and public order, protection of property, economic infrastructures, public works and operation of government itself, such as office activities [24].

Value added tax, VAT, is one of the most important sources of internal funds for developing countries such as Ethiopia. It is a family of indirect taxes paid on the value added to goods and services by enterprises at each stage of the production and distribution process. It arises whenever a "taxable person" makes a supply of goods or services in the course of business operations. Thus, in some countries, it is called "Goods and Services' Tax" or GST. Maurice Laure, a French economist and Director of the French Tax Authority, started VAT first in 1954. It was invented because very high sales taxes and tariffs encouraged cheating and smuggling [26]. Ethiopia introduced value added tax (VAT) in the year 2003 as a replacement to sales tax. VAT is the principal source of revenue for the Ethiopian government. For instance, in the 2006–07 fiscal years, federal VAT revenue (on domestic transactions) accounted for about 41 per cent of total federal revenues from domestic sources [13]. Furthermore, since its introduction, VAT has been more revenue productive than sales tax [29]. To sustain VAT's revenue role in the government's finance, it is important to ensure that the revenue generated by this tax is raised as efficiently as possible. However, in Ethiopia revenues raised by VAT are usually garnered at the expense of erosion in its salient features. This may be caused by factors including poor VAT administration, i.e., the incapacity of tax authorities to implement the attributes of the tax in practice [5].

1.1. Statement of the Problem

Fifty years ago the value-added tax (VAT) was rarely heard of outside of France and a few dry specialist texts. Now it raises about 20 percent of the world's tax revenue, and affects about 4 billion people. Widely adopted in sub-Saharan Africa and elsewhere, it has been the centerpiece of tax reform in many developing countries [22].

The rapid widespread and rise of the VAT is still the most dramatic and most important development in taxation in the latter part of the twentieth century and even now. As to Victoria Summers *et al* (2002) the reasons to this

development are: to do away distortions created by other indirect taxes, government's need to increase their revenue and to replace import tariff revenues lost as a consequence of trade liberalization [9].

The study conducted by Bird, R. M. reveals VAT as the 'money machine' tax which necessarily adopted by both developed and developing countries that allow the government to collect sufficient amount of revenue. Hence, the majority of economists as well as experts of political scientists think that VAT is the best preferable general consumption tax recently available that enhances economic growth [7].

In the recent decades, it is commonly contended that VAT increases government revenue, improves economic efficiency, promotes exports, raise revenue rapidly, simplify the tax administration procedures and widen the tax base and fosters growth [8]. Hence there is a growing recognition among developing countries for the crucial role of VAT revenue as an instrument of economic growth. According to [2], the main aim of VAT was to increase the revenue base of government and make funds available for developmental purposes that will accelerate economic growth.

Emmanuel. (2013) [14] also investigated the effects of Value Added Tax (VAT) on economic growth (GDP) of Nigeria using time series data from 1994-2010 and found one per cent increase in VAT revenue causes 1.47% increase in economic growth (GDP).

In general, many studies were conducted on the contributions of Value added tax revenues for the economy by using gross domestic product as macro level indicator both in developed and developing countries. Among them, [27, 28, 2] was the common. To the extent of the researcher's knowledge, with the exceptions of [6] that use micro economic sectors to empirically evaluate the contributions of VAT for the Ethiopian economic development and social spending however, their scholarly contribution in this regard was unnoticed of the role of VAT on economic growth in the Ethiopian context. Most of the studies suggests that VAT has a positive relationship with economic growth, so this study will try to come up with evaluating the role of VAT on economic growth of Ethiopia and show the revenue performance of VAT both theoretically and empirically including all relevant variables as there is no compressive work that is conducted on the role of VAT on economic growth in the Ethiopian context since its introduction [3].

1.2. Objective of the Study

1.2.1. General Objective of the Study

The general objective of the study is to assess the role of value added tax in the economic growth of Ethiopia from 1990 to 2021.

1.2.2. Specific Objectives of the Study

The specific objectives are:-

- 1) To assess the performance of VAT in revenue generation.

- 2) To assess the share of VAT for the government revenue.
- 3) To examine the impact of VAT in economic growth of Ethiopia.

2. Literature Review

Empirical studies have shown the inter-links between the VAT performance of a country and its level of development. The revenue gains from VAT are likely to be higher in an economy with higher level of per capita income, lower share of agriculture, and higher level of literacy [11]. VAT proves to be an efficient tool for revenue collection; its performance, therefore, has direct impact on fiscal mobilization, macroeconomic stability, and development. The study concluded that VAT can be a good way to raise resources and modernize the overall tax system but this requires that the tax be well designed and implemented. used panel data covering 14 developed countries and quarter periods from the second quarter in 1980 (1980 Q2) to the third quarter in 2010 (2010 Q3) and picking up 53 cases of the change of the VAT rate and empirically found three kind of trends of aggregate consumption and economic growth when the VAT rate is changed [25]. The first trend is that aggregate consumption and economic growth increases or decreases just before the rise or reduction of the VAT rate. The second trend is that they decrease or increase relatively dramatically as soon as the rise or reduction is implemented. The third trend is that after the dramatic decrease or increase they increase or decrease gradually [12].

Examined whether or not the adoption of value-added tax (VAT) in developing countries is an effective way of stabilizing tax revenues. Using a large panel of 103 developing countries observed over 1980-2008, they found robust evidence that the presence of VAT leads to significantly lower tax revenue instability. On average, countries with VAT experience 40-50% less tax revenue instability than countries which do not have a VAT system. These effects decrease with the level of economic development and the openness of trade.

Keen, M. & Lockwood. (2007) [22] estimated, on a panel of 143 countries for 25 years, of a system of equations describing both the probability of VAT adoption and the revenue impact of the VAT and found that the effect of the VAT proves to be significantly positive but fairly modest adoption of the VAT is associated with a long run increase in the overall revenue-to-GDP ratio of about 4.5%.

Examines the role of VAT revenue in the economic growth (GDP) of Pakistan using Ordinary Least Square (OLS) Regression technique, the key outcome from this econometric study shows strong and positive impact of VAT revenue on the economic growth (GDP) of Pakistan. One percent increases in the growth of net VAT revenue causes 0.24% increase in the growth of nominal GDP [20].

Study focused on the introduction of value added tax

(VAT) in Kenya that replaced sales tax in 1990. The study analyzed the structure, administration and performance of VAT. The estimated buoyancy and elasticity coefficients were less than unity implying a low response of revenue from VAT to changes in GDP. This suggested the presence of laxity and deficiencies in VAT administration. However, the estimation of buoyancy and elasticity coefficients were done in total disregard of the time series properties and without taking care of unusual observations in the data. Therefore, the results were not reliable for planning purposes [1].

Empirically investigated the contribution of Value Added Tax (VAT) to GDP in Nigeria for the period 1994-2008. They used time series data of GDP and VAT revenue for the period and did simple regression analysis and descriptive statistical method. Their findings show a positive and significant correlation between VAT revenue and GDP. They further concluded that no causality exist between GDP and VAT revenue [2].

Alan Schenk and Oliver Old Man. (2001) [4] also investigated the effects of Value Added Tax (VAT) on economic growth (GDP) of Nigeria using time series data from 1994-2010 and found one per cent increase in VAT revenue causes 1.47% increase in economic growth (GDP).

Unegbu and Irefer. (2011) [27] studied the impact of value added tax (VAT) on economic and human developments of Adamawa State of Nigeria from 2001 to 2009. They collected data from both primary and secondary sources. They found that the facts obtained via secondary data attest to a very significant VAT impact on economic and human development of the State but data obtained from primary sources suggest minimum VAT impacts [9].

3. Research Methodologies

3.1. Research Approach and Design

The research was use a quantitative research approach to the role of value added tax on economic growth of Ethiopia. Furthermore, the study was employing an explanatory research design in order to achieve its objectives. It is the most appropriate design for identifying the role of value added tax on economic growth of Ethiopia.

3.2. Data Type and Source

This study employs secondary data for the period 1990-2021. To achieve the objectives set, data was collected from Central Statistical Agency (CSA), Ethiopian Revenue and Customs Authority (ERCA), National Bank of Ethiopia (NBE), WB, IMF websites and other publications.

3.3. Econometric Model Specification

The role of value added tax on economic growth model is mathematically expressed as follows:

$$RGDP = (GCF, LAB, RAIN, HUM, TR, NTR, D, POP)$$

Whereas RGDP – Real Gross domestic product, GCF =

Gross domestic capital formation, HUM = Human capital,

POP = Population, TR = Tax revenue, NTR = Non-tax revenue, D = Dummy of VAT where; 0=before introduction 1

= after introduction Thus, an explicit estimable econometric model is formulated as follows;

$$RGDP_t = \beta_0 + \beta_1 GCF + \beta_2 HU + \beta_3 POP + \beta_4 TR + \beta_5 NTR + \beta_6 D + e_i \quad (1)$$

Since the success of any econometric analysis ultimately depends on the availability of the appropriate data [16], the researcher tries to deal with only those variables that the data obtained are believed to be reliable and adequate, particularly for the econometric analysis.

Thus even among the economic variables this study used only those variables that adequate and reliable data are obtained and are believed to be very much relevant in explaining growth in Ethiopia.

3.4. Estimation Procedure

To test the long run relationship between dependent variable (real gross domestic product) and independent variables (gross domestic capital formation, human capital population, tax revenue, non-tax revenue and dummy VAT. The study was first investigating the time series properties of our data / unit root tests of our data /by using Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests. After testing unit root test researcher was use ARDL model based on unit root result [10].

3.5. Model

To time series data we have three main types of models,

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta + \sum_{i=1}^p \beta_2 \Delta X_t - 1 + \beta_3 \Delta X_t - 1 + \beta_4 X_t - 1 + \beta_5 X_t - 1 + u_t \quad (2)$$

Where Δ denotes for first difference operation, RGDP is for a vector of dependent variables, X_t is a vector of independent variables, p is optimal lag length, u_t is the residual term which is assumed to be white noise. To test the significance of lagged level of the variables under consideration, the appropriate statistic is F or Wald test as Pesaran et al. (2001) proposed for bound test approach was applied. The bounds test is mainly based on the joint Wald test or F- test which its asymptotic distribution is non-standard under the null hypothesis of no co integration.

$$H_0 = \theta_0 = \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0$$

(meaning no long run relationship among the variables) against the alternative one: $H_1: \theta_0 \neq 0, \theta_1 \neq 0, \theta_2 \neq 0, \theta_3 \neq 0, \theta_4 \neq 0, \theta_5 \neq 0$.

The F-test has no standard distribution which depends on (i) whether the variables include in the model are $I(0)$, or $I(1)$, (ii) the numbers of regressors, and (iii) whether the model contains an intercept and/or a trend [15]. According to Gujarati: (2004), there are two sets of critical value bounds for all classifications of regressors' namely upper critical bound value and lower critical bound value. The critical values for $I(1)$ series are referred to as upper bound critical values; while the critical values for $I(0)$ series are referred to as lower bound critical values. If the calculated F statistic is greater than the upper bound critical values, we reject the null hypothesis of no long run relationship among the variables. If the calculated F statistic is less than the lower

Vector Error Correction (VECM) model, Auto Regressive Distributed Lag model (ARDLM) model and Vector Auto Regressive (VAR) model. All the variables in a VAR model are endogenous, there is no exogenous variable. Based on data researcher was use one of among models. Researcher was chosen model after testing of data. The variables were integrated of different order, that is a model having combination of variable with $I(0)$ and $I(1)$ order of integration, due to this reason researcher was used ARDL model. ARDL model uses a combination of endogenous and exogenous variables, unlike a VAR model that's strictly for endogenous variables, from the bound test of the result. Because of the variables are integrated of different order, that is a model having combination of variable with $I(0)$ and $I(1)$ order of integration, which are not integrate order two and co integrated, researcher was apply both long run (ARDL) and short run (VECM) models. ARDL model is relatively more efficient in the case of small and finite sample data sizes. According to [16], the ARDL modeling of unrestricted error correction model using Ordinary Least Square (OLS) can be representing as follows.

bound critical values, we can't reject the null hypothesis rather accept the null hypothesis of no co integration among the variables. However, if the calculated F statistic is between the upper and lower bound critical values, inference is inconclusive and we need to have knowledge on the order of integration of underlying variables before we made conclusive inference [16].

3.6. Unit Root Test

It is fundamental to test for the statistical properties of variables when dealing with time series data. Time series data are rarely stationary in level forms. Regression involving non-stationary (i.e., variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression. This occurs when the regression results reveal a high and significant relationship among variables when in fact, no relationship exist. Moreover, Stock and Watson (1988) have also shown that the usual test statistics (t , F , DW , and R^2) will not possess standard distributions if some of the variables in the model have unit roots. The other necessary condition for testing unit root test when we applying ARDL model is to check whether the variables enter in the regression are not order two (i.e. $I(2)$), which is precondition in ARDL model. Therefore, it is necessary to test for time series variables before running any sort of regression analysis. Non-stationarity can be tested using Augmented Dickey-Fuller (ADF) test, Phillips Perron (PP) test

and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. However, to ensure reliable result of test for stationarity, the study employs both Augmented Dickey-Fuller (ADF) test and

Philip Perron (PP) tests.

The testing procedure for the ADF unit root test is specified as follows:

$$\Delta \text{RGDP}_t = \alpha + \beta t + \Delta \text{RGDP}_t - 1 + \sum_{i=1}^p \lambda \Delta \text{RGDP}_t - 1 + \varepsilon_t \quad (3)$$

Where RGDP_t is a time series variables under consideration in this model at time t is a time trend Variable, λ speed of adjustment, Δ denotes the first difference operator; ε_t is the error term; p is the optimal lag length of each variable chosen such that first -differenced terms make a white noise. Thus, the ADF test the null hypothesis of no unit root (stationary).

That is: $H_0: = 0$; $H_1: \neq 0$

If the t value or t -statistic is more negative than the critical values, the null hypothesis (i.e. H_0) is rejected and the conclusion is that the series is stationary. Conversely, if the t -statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary test result.

3.7. Description of the Dependent and Independent Variables

Gross Domestic Product (GDP): is often considered as the best measure of how well the economy is performing. It is the market value of all final goods and services produced in an economy in a given period of time. Economist, call the evaluation of goods and services at current market price nominal GDP (Mankiw, 2007). But a better measure of economic wellbeing would tally the economy's output of goods and services and would not be influenced by changes in prices. For this purpose economist, use real GDP which is the value of goods and services measured using a constant set of prices [23].

Gross Capital Formation: Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. And it has positive relationship with economic growth. Hence its expected coefficient has positive sign [19].

Human Capital: Due to the fact that human capital is multifaceted and includes a complex set of human attributes, the stock of human capital held by individuals is hard to measure with accuracy in quantitative form. However, for the purpose of this study school enrollment is used as a proxy. School enrollment is the ratio which measure the number of students enrolled at a grade level relative to the total population of corresponding age group. This variable is expected to influence economic growth positively.

Population: population growth is an increase the number of people that reside in a country or state. Rapid population growth may affect economic growth and development in many channels. With increased population, consumption increases at the expense of saving and investment. This reduces real GDP per worker. So that the expected sign of the

coefficient is negative.

Tax Revenue: Tax revenues are the main source of government revenue which comprises both direct and indirect types of taxes. And the expected coefficient has positive sign.

Non-tax Revenue: Non-tax revenue is revenue collected from other sources that is not tax. These includes those revenues collected from charges, fees, fines, pension contributions, investment revenues etc. It covers certain part of government revenue. Hence its expected coefficient has positive sign.

Value added tax: VAT is an indirect source of government revenue which can be used throughout the world, including many African countries to raise government revenue with less administration and economic costs than other broadly based taxes. It is also believed to enhance economic growth. [11]. There for it is expected to have positive relationship with economic growth. In order to examine the relationship between the dependent variable and the explanatory variables this study employs the growth of all explanatory variables.

3.8. Methods of Data Analysis

The study was using econometric methods of data analysis. To analyze the data, econometrical technique would apply to analyze the major the role of VAT on economic growth under the study period. In econometric part researcher was use the following multivariate models i.e, Auto Regressive Distributed Lag model (ARDL) model and Vector Error Correction (VEC) model. Finally, Eview10.0 versions have been used as statistical software package for the entire analyze running this study.

4. Econometric Analysis

4.1. The Unit Root Test Analysis

In order to determine the degree of integration, a unit root test is carried out using the standard Augmented Dickey-Fuller (ADF) and Phillips-Person test statistic (PP) test. Moreover in applying ARDL model all the variables entered in the regression should not be integrated of order two. To check these conditions, unit root test is conducted before any sort of action taken. Even though the ARDL framework does not require per-testing variables to be done, the unit root test could convenience us whether or not the ARDL model should be used. The result in Table 1 shows that there is a mixture of $I(0)$ and $I(1)$ but not any order two.

Table 1. Unit root test (Augmented Dickey-Fuller test).

Variables	Augmented Dickey-Fuller test statistics (ADF-Test)					
	With Intercept			Trend and Intercept		
	At Level	At first difference	Order []	At Level	At first difference	Order ()
Real Gross domestic product (RGDP)	-1.79	-6.177	I[0] at 1, 5 and 10%	-1.86	-6.088	I[0] at 1, 5 and 10%
Gross domestic capital formation (GCF)	0.747	3.11	I[0] at 1, 5 and 10%	-1.581	-3.085	I[0] at 1, 5 and 10%
Human capital formation (HUM)	-0.1144	-4.248	I[0] at 1, 5 and 10%	-2.07	-4.1257	I[0] at 1, 5 and 10%
Population (Pop)	-1.680	-4.422	I[0] at 1, 5 and 10%	-3.83	-2.895	I[1] at 1, 5 and 10%
Tax revenue (TR)	-1.887	-7.598	I[0] at 1, 5 and 10%	-3.35	-3.083	I[1] at 1, 5 and 10%
Non tax revenue (NTR)	-3.48	-2.065	I[1] at 1, 5 and 10%	-2.546	-3.2205	I[0] at 1, 5 and 10%
MacKinnon (1996) with constant, no trend with constant and trend						
Test critical values:			1% level = -3.67 5% level = -2.96 10% level = -2.62	Test critical values:		1% level = -4.2967 5% level = -3.5683 10% level = -3.2183
Note: If absolute value of t- Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary i.e we accept null hypothesis				Note: If absolute value of t- Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary i.e we accept null hypothesis		

Source: Eview 10.0 results.

As we have seen form Table 1. real gross domestic product, gross domestic capital formation human capital, population Tax revenue and non-tax revenue are integrated of order zero (i.e. I(0)) while dummy of VAT is integrated of order one (I(1)). Meaning real gross domestic product, gross domestic capital formation human capital, population Tax

revenue and non-tax revenue are integrated of order zero are stationary in level where as Dummy of VAT is stationary in first difference (with intercept). However, with trend and Intercept, except human capital and tax revenue all the variables are stationary in level.

Table 2. Unit root test (Phillips-Perron test statistic test).

Variables	Phillips-Perron test statistic (PP Test)					
	With Intercept			Trend and Intercept		
	At Level	At first difference	Order []	At Level	At first difference	Order []
Real Gross domestic product (RGDP)	-1.83	-6.165	I[0] at 1, 5 and 10%	-1.98	-6.0844	I[0] at 1, 5 and 10%
Gross domestic capital formation (GCF)	11.09	0.516	I[1] at 1, 5 and 10%	6.32	-1.789	I[1] at 1, 5 and 10%
Human capital formation (HUM)	-0.2722	-4.25	I[0] at 1, 5 and 10%	-2.08	-4.134	I[0] at 1, 5 and 10%
Population (Pop)	-1.517	-7.09	I[0] at 1, 5 and 10%	-3.624	-2.923	I[1] at 1, 5 and 10%
Tax revenue (TR)	-1.887	-7.598	I[0] at 1, 5 and 10%	-3.082	-3.783	I[0] at 1, 5 and 10%
Non tax revenue (NTR)	-1.338	-4.894	I[0] at 1, 5 and 10%	-0.496	-4.91949	I[0] at 1, 5 and 10%
MacKinnon (1996) with constant, no trend with constant and trend						
Test critical values:			1% level = -3.679 5% level = -2.967 10% level = -2.622	Test critical values:		1% level = -4.31 5% level = -3.57 10% level = -3.22
Note: If absolute value of t - Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary i.e we accept null hypothesis				Note: If absolute value of t - Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary i.e we accept null hypothesis		

Source: Eview 10.0 results.

Similarly, the PP test shows that there is a mixture of integration order zero and order one. That is, real gross domestic product,, population, tax revenue, non-tax revenue and human capital in level while gross domestic capital formation is e stationary in first difference (with intercept only). However, except population and gross domestic capital formation all the variables are stationary at level with intercept and trend. Form table 1 and 2 we can conclude that none of the variables entered in the regression are order two, which are not desire in applying ARDL model. So ARDL co integration technique proposed by Pesaran *et al.* (2001) is the most appropriate method for estimation or to check the long run relationship among the variables.

4.2. Long Run ARDL Bounds Tests for Co-integration

Since researcher determined the stationary nature of the variables, the next task is the bounds test approach of co-integration is estimating the ARDL model specified in equation (3) using the appropriate lag-length selection criterion. According to Pesaran and Shine (1999), as cited in Narayan (2004) for the annual data are recommended to choose a maximum of two lag lengths. From this, a lag length that minimize AIC is 2. In addition to this, researcher have also used AIC to determine the optimal lag because it is a better choice for smaller sample size data as this study.

Apart from this, AIC found to produce the least probability of under estimation among all criteria available (Liew *et al.*, 2004) as cited in [17]. As we discuss in the third part of this study, the F-test through the Wald-test (bound test) is performed to check the joint significance of the coefficients specified in equation (3). The Wald test is conducted by

imposing restrictions on the estimated long-run coefficients of Gini coefficient, real GDP per capital, primary school of enrollment rate, unemployment rate, trade openness and inflation rate. The computed F-statistic value is compared with the lower bound and upper bound critical values provided by Eview's 10.0 result.

Table 3. F-Bounds test.

F-Bounds test statistics value	Lag length	Critical value	Lower Bound	Upper Bound
			Or I(0)	Or I(1)
6.100904	2	1 percent	3.06	4.15
		5 percent	2.39	3.38
		10 percent	2.08	3
Note: Decision criteria for Bounds test, If the calculated F-statistics is greater than the critical values for upper bound I(1), then we can conclude that there is co integration. That is along run relationship. Reject the null hypothesis. Estimate the long run model which is the error correlation model (ECM). If the calculated F- statistics is lower than the critical value for lower bound I(0), then we conclude that there is no co-integration, hence no long run relationship. Do not reject the null hypothesis. Estimate the short run model which is Autoregressive Distribute Lag (ARDL) model. If the F-statistics falls between the lower bound I(0) and the upper bound I(1), the test is considered inclusive.				

Source: Eview's 10.0 results.

As it is depicted in Table 3 above, with an intercept and trend, the calculated F statistics (6.100904) is higher than upper bound critical values at 1% 5% and 10% level of significance. This implies that the null hypothesis of no long-run relationship is rejected; rather accept the alternative hypothesis (there is long-run relationship) based on the above critical values at 1%, 5% and 10% level of significance. Therefore, there is co integration relationship among the variables in long run. Then researcher must estimate the short

run model which is the Error Correlation Model (ECM).

4.3. ARDL Model Estimation

After confirming the existence of long-run co-integration relationship among the variables, the next step is running the appropriate ARDL model to find out the long run coefficients and ECM model to find out short - run coefficients, which are reported the following tables below.

Table 4. Estimated long run Coefficients.

Dependent variable is Real Gross Domestic Product (RGDP)			
Regressors	Coefficient	Standard Error	T- Ratio [Prob]
Gross domestic capital formation (GCF)	0.2998***	0.0780	3.8435[0.0001]
Human capital formation (HUM)	0.0840***	0.0230	-3.6521[0.0013]
Population (Pop)	0.2579*	0.0696	3.7054[0.0116]
Tax revenue (TR)	0.0830	0.0567	1.4638[0.1590]
Non tax revenue	0.1291	0.1973	-0.6538[0.5201]
Constant [C]	0.0103***	0.0015	6.8666[0.0000]
R-Squared =0.7560		Adjusted R- Squared =0.6590	
Durbin -Watson statistics =1.9819		P (F- Statistics)=0.0009	
NOTE: Decision criteria for significance, If the Absolut value of t- ratio or t-critical is greater than t- statistics, for some chosen level of significance (Usually 1%, 5% or 10%) then the null hypothesis is can be rejected and variables are significant.			

Source: Eview's 10.0 results

Note: *, **, *** indicate significance at the level 10%, 5% and 1%, respectively.

From chapter three the model has the following specification.

$$RGDP_t = \beta_0 + \beta_1 GCF_t + \beta_2 HU_t + \beta_3 POP_t + \beta_4 TR_t + \beta_5 NTR_t + \beta_6 D_t + e_t$$

From the above ARDL estimation result the following regression model is obtained.

$$RGDP = 0.0103 + 0.2998GCF_t + 0.084HU_t - 0.1291POP_t + 0.2579TR_t + 0.0830NTR_t$$

$$SE = (0.0015) (0.0780) (0.0230) (0.1973) (0.0696) (0.0567)$$

$$t = (6.6500) (3.7452) (-3.4525) (-0.7546) (3.6018) (1.8731)$$

But researcher was put only significant variables as follows.

$$LNRGDP = 0.0103 + 0.2998GCF_t + 0.2579HU_t - 0.0840POP_t$$

$$SE = (0.0015) (0.0780) (0.0696) (0.0230)$$

$$t = (6.6500) (3.7062) (3.6018) (-3.4525)$$

Interpretation of the ARDL Model Estimation Coefficients

As the ARDL model estimation shows, all the variables have a sign as expected by the paper. Gross domestic capital formation, human capital, tax revenue, non- tax revenue, Dummy of VAT and constant term have a positive sign. When the variables unit increased the real gross domestic product coefficient also increased, vice versa. On the other hand, population has a negative sign. This means, when this variables unit increased the gross domestic product coefficient decreased, it changed in the opposite direction. As we have discussed in the theoretical and empirical literature parts, Gross domestic capital formation, human capital, tax revenue, non- tax revenue, Dummy of VAT have positive impact on real gross domestic product while population has an inverse impact on real gross domestic product regardless of significant. As the ARDL model estimated result of the above table showed, gross domestic capital formation has a positive impact on real gross domestic product and statistically significant at 1%, 5% and 10% percent level of significance. Holding other things constant, the RGDP coefficient will be increased by 0.2998 when gross domestic capital formation increased by 1%. The real GDP human capital coefficient, which is 0.0840, has a positive value and it is statically significant at 1%, 5% and 10% percent significant level. Holding other variables constant, the RGDP coefficient will be increased by 0.0840, when the human capital increased by one level. The thread significant variable is population rate. The coefficient of population rate, which is 0.2579, has a negative sign and it is statically significant at 10% level of significant. Other things remains constant, if the of the number of population increased by 1%, the RGDP coefficient will decrease by 0.0840. R-squared is 0.6568: This implies that 65.68% of the real gross domestic product function is explained by the selected explanatory variables. In other words, 65.68% of variation of the dependent variable is due to the variation of the independent variables which included in the model and the remaining variation 34.32% is explained by the variables which are not included the model. If the value of R-Squared is higher, than model is the greatest the goodness of fit. There for, is R- Squared in the regression model reveals that there is good fitness of value for a given result. The overall model is statistically significant because of P (F- Statistics) is 0.0009, which is less than 5% percent.

5. Conclusion and Recommendation

5.1. Conclusion

Economic growth has been one of the overriding issues among the macroeconomic objectives of developing countries. In their attempt to attain continuous and broad based growth, governments of these countries have been implementing various macroeconomic policies by identifying the potential determinant factors for growth. One of these determinant factors is taxation which helps to enhance sufficient funds and reduce budget deficits.

This study investigated both theoretically and empirically the role of VAT on economic growth of Ethiopia using time series data from 1990 to 2020. The data for the study is obtained from National Bank of Ethiopia, Ethiopian Revenue and Customs Authority and Central Statistical Agency. Both descriptive statistics and econometric model is adopted to investigate the existence of short run and long run relationship between GDP growth which is used as dependent variable and VAT, GCF, HUM, POP, TR and NTR which are the explanatory variables.

The main objective of this study is to analyze role value added tax on economic growth by using macro variables during the specified period. All variables have a sign as expected by this paper based on theoretical framework. To determine the long run and short run relationship among the variables, Autoregressive Distributed Lag (ARDL) and ECM model were applied. Before applying the ARDL model, all the variables are tested for their time series properties (stationarity properties) using the ADF and PP tests. The result revealed that, no functional form problem (the model is correctly specified), the residual is normally distributed, no multicollinearity, no autocorrelation and hetroscedasticity problem. The result of the econometric analysis found that there is a strong and positive relationship between the growth of VAT revenue and the economic growth (GDP) and it is statistically significant both in the short run and in the long run. It is also found that non-tax revenue and population growth have a positive and significant impact in the long run but population growth has insignificant and negative impact in the short run.

5.2. Recommendations

Based on the above conclusion the following policy implications emanate from this study:-

1. Using VAT as policy instrument is possible, because of its power to influence consumers and business men to act in a desired manner. This is because VAT touches every angle of the economy directly or indirectly.
2. Even if its performance is satisfactory but, it is desirable if government through its tax authority creates strong cooperation's with tax payers supported by strong and efficient administrations of tax systems and also it is crucial to strengthen the current enforcement mechanism by enhancing administrative efficiency and capability.
3. In order to reduce the tax cascading effect the government must give educational training to tax payers, because in the Ethiopian context, the businessmen have poor accounting records and educational background.
4. For economic growth to be consistent the level of tax evasion should be reduced and there must be transparent and accountable government officials to achieve sustainable economic growth.

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