ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE EFFECT OF ETHIOPIAN FISCAL POLICY INSTRUMENTS ON COUNTRY'S UNEMPLOYMENT (1990-2019 G.C)

BY

ALEMAYEHU DENBOBA GADISA

JUNE 2020

ADDIS ABABA, ETHIOPIA

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A Thesis Submitted to St. Mary's University, School of Graduate Studies in Partial Fulfillment of the Requirements for the Degree of Master of Developmental Economics

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Kurabachew Menber (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

<u>Alemayehu Denboba</u>   _____
Name   Signature

St. Mary's University, Addis Ababa   June 2020

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Kurabachew Menber (PhD)   _____
Advisor   Signature

St. Mary's University, Addis Ababa   June 2020

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APPROVED BY BOARD OF EXAMINERS

Wondimagegne Chekol (PhD) _____
Dean, Graduate Studies   Signature

Kurabachew Menber (PhD) _____
Advisor   Signature

Nigussie Semie (PhD) _____
External Examiner   Signature

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ACRONYMS

ADF   Augmented dickey fuller

AUC   African union commission

CSA   Central statistical agency

ECA   Economic commission for Africa

ERCA   Ethiopian revenues and customs authority

ETB   Ethiopian birr

FGLS   Feasible generalized least square

MOFED Ministry of finance and economic development

NBE   National bank of Ethiopia

NEPSE   National employment policy and strategy of Ethiopia

OLS   Ordinary least square

PASDEP Plan for accelerated and sustained development to end poverty

SOEs   State owned enterprises

VIF   Variance inflating factor

WDI   World development indicator

ABSTRACT

The effect of fiscal policy instruments in the economy and in turn the actual response of the market is questioning. However, the role of the macroeconomic variables in the economy usually depends on the type of the country's economy, government and market structure. The study investigates the effect of Ethiopian government expenditure and tax revenue on country's unemployment rate under the sample period of 1990 to 2019 G.C by using secondary time series data. By using different corresponding graphs, the descriptive analysis implied that both government expenditure and tax revenue shows an increasing trend while the country's unemployment rate shows a decreasing trend. Pre estimation test such as unit root, co-integration and multicollinearity tests are applied. Accordingly, all the variables that are under consideration become stationary at their level. The effect analysis using OLS regression resulted in the significance of all the explanatory variables in determining the dependent variable. Accordingly, both government expenditure and tax revenue have a negative significant effect on country's unemployment rate. In the regression analysis, the estimated model includes significant positive intercept. Consequently, the case has described by relating it to natural unemployment rate; a type of unemployment which don't offset in the long run even when the economy is at full employment. Therefore, in the strategy of controlling unemployment rate, care should be taken to the conditions and magnitude of government expenditure and tax revenue.

Key Words: *Ethiopian fiscal policy instruments-government expenditure and tax revenue, Ethiopian unemployment rate, correlation and significance of variables*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

In a given economy, either in the developed and/or developing countries following a developmental state model, the role of government varies throughout history and across different countries depending on their level of development. Developmental state model is neither socialist nor free market or it is simply the "plan-rational capitalist", which primarily emphasizes on economic growth and transformation (ECA, 2011). The Ethiopia's "developmental state" model adoption during 1990's was the result of a long journey in searching alternative path of growth that suits the strategic interest of the country. With the idea of the productive structure, a society was suboptimal and improved by active economic policies of government intervention. Fiscal policy conducts by changing government expenditures and revenues. Expansionary fiscal policy is a policy that many governments' used to encourage economic activities and fight unemployment (Bjornskov, 2005).

The Ethiopian fiscal policy measures have focused on strengthening domestic revenue mobilization and increasing spending on pro-poor societies. As a result, in the last three growth-and-transformation plan periods, total government expenditure increased to about 20% of GDP (Aschenke, 2014). Ethiopia has become one of the world's fastest growing economies that driven by public sector investments and government supported growth initiatives. The domestic revenue mobilized by the government were about 85.6 billion during 2010/11 particularly which tax revenue exhibited a good performance by accounting about 11.5% of the gross domestic product (GDP) (Osebo, 2017). Similarly, recurrent expenditure has increased by 29% while capital expenditure declined to 6% from 23%-mainly due to a decline in external assistance and slowdown in additional external loan of capital expenditure in 2016.

Unemployment is the proportion of labor force without job being ready for and seeking it while natural unemployment rate is usually the combination of frictional and structural type of unemployment that not offsets even when the economy is at its full employment. Ethiopia has a large endowment of labor relative to other factors of production therefore effective utilization of labor makes growth faster and more pro-poor (ILO, 2009). The total unemployment rate of Ethiopia was 20.4% in 2009, 18.9% in 2010, 18% in 2011 and 17.5% in 2012 showing a decreasing trend (World Bank, 2009). However, while the country's employment to adult population ratio shows nearly an increasing trend and recording a fastest growing economy, unemployment is still a challenging issue.

According to Muammil (2018), there is a causal relationship between the increase in government expenditure and the decrease in unemployment rate. However, the level and nature of unemployment of a given country may depend on its level of development and nature of economy. In Ethiopian context which follows a developmental state model since 1990s G.C, to control the level of unemployment by using fiscal policy instruments, investigating the effect of government expenditure and tax revenue on unemployment is important. Therefore, the study contributes more to the decision and strategy of controlling unemployment through ascertaining the correlation strength and significant effect of fiscal policy instruments.

1.2. Statement of the Problem

As the developmental state is "one that has the capacity to deploy its authority, credibility and legitimacy in a binding manner to design and implement development policies and programs for promoting transformation, economic growth and for expanding human capacities", guidance on the implementation of reforms provides by an in-depth political economic analysis that looks at structural, institutional, stakeholder and global drivers (AUC, 2011). Politicians have using economic policy in order to reach certain goals in the society primarily in the goal of reducing unemployment for most of 20th century (Bjornskov, 2005).

The pressures on financing public investment projects with correspondence to lower unemployment may lead the government to relax its fiscal policy stance (World Bank, 2017). However, because of the slow pace of tax reforms, the domestic revenue may be insufficient to finance the infrastructure investments contemplated in the national development plan and then potentially leads to large fiscal deficits. The correlation between the government policy instruments and the market as well needs consideration.

According to Phillips (1958), unemployment and inflation rate has inverse relationship. Similarly, government may attempts to lower unemployment by conducting expansionary fiscal policy, increasing government expenditure or decreasing tax in the market, which may leads to a decrease in unemployment since firms or the market motivates to employ more people. However, as in any other markets, the prices/wages in the labor market may increase costs to firms that in turn may leads to inflation, which in turn may leads to an increase in unemployment.

Government consumption and investment improve unemployment and the channel of reducing unemployment is mainly attributed to the traditional effect through an increase in aggregate demand. According to Matsumae and Hasumi (2016), the temporal effect of government investment to the productivity of private firms raises real wage but does not have much influence on unemployment variations. According to Linnemann and Schabert (2003), fiscal expansions create additional labor demand, which induces an increase in labor demand. But forward-looking households will decrease consumption because of anticipation of future tax increases (negative wealth effect). The decrease in private consumption lowers labor demand. Thus, the effect of increase in aggregate demand will be partly cancelled out by the negative wealth effect. However, such cases will happen in better performing and responsive markets. When the increase in labor demand dominates the increase in labor supply, fiscal stimulus may lower unemployment otherwise will increase it.

Despite the increase in the government spending over period the country is experiencing challenging unemployment. In addition to weak institutional developments in controlling the country's level of unemployment, there are no as such related studies undertaken about the effect of fiscal policy instruments on unemployment. Unemployment is a burning issue in Ethiopia that needs due attention. Ethiopia, as a country with high rate of poverty, population, labor force and unemployment, needs a strategic intervention policy to maneuver the linkage between economic growth, employment and poverty to insure that the growth is sharing to pro-poor and lowering unemployment.

1.3. Research Questions

Having such literatures and then inconsistent conceptual frameworks regarding the problem, the researcher intended the following research questions:

- ➢ Does the Ethiopian government expenditure and tax revenue have strong correlation with and significant effect on unemployment rate?
- ➢ If so, is the correlation and effect positively or negatively?

1.4. Objective of the Study

1.4.1. General objective of the study

The general objective of the study is ascertaining the effect of Ethiopian government expenditure and tax revenue on the country's unemployment and then suggesting some pointing and related recommendations under the sample period.

1.4.2. Specific objective of the study

The specific objectives of the study, which answers the intended research questions of the study, are to:

- ➢ Identify and analyze whether the Ethiopian government expenditure and tax revenue have strong correlation with the country's unemployment rate
- ➢ Identify whether the effect is positively or negatively

1.5. Significance of the Study

It is widely accepted that most macroeconomic variables are interrelated in their nature. Usually, in order to control the targeted macroeconomic variable, government depends on the characteristics and correlation strength among the variables that are under consideration. The intention of the study is ascertaining the effect of Ethiopian fiscal policy instruments- government expenditure and tax revenue on country's unemployment. Therefore, the study is important in contributing some recommendations to the decision and strategy of controlling the country's unemployment-challenging issue in the country through controlling government expenditure and tax revenue.

1.6. Scope and Limitation of the Study

Under the sample period of 1990 to 2019 G.C, this research paper bounded to ascertaining the effect of Ethiopian fiscal policy instruments on country's unemployment by using descriptive and econometric data analysis methods. In addition, it also considered some estimation techniques such as unit-root, co-integration tests and developing error-correction model. However, the study has described and strengthened with few related literatures since there are no as such related studies undertaken.

1.7. Organization of the Study

This research paper contains five chapters. The first chapter is an introduction that includes background, statement of the problem, general and specific objective, significance, and scope and limitation of the study. The second chapter discusses some related theoretical and empirical literature reviews and conceptual framework. The third chapter is the research design and methodology that includes type and source of data, model specification, data analysis methods and specific estimation techniques such as unit root, co-integration and multicollinearity. The forth chapter is about findings and interpretation of the study that includes descriptive and econometric regression analysis methods. The final chapter presents the summary, conclusions and recommendations of the study.

2. LITERATURE REVIEW

This section discusses different authors and institutions related studies and analysis that strengths the understanding of the researcher about the statement of the problem and for comparing and contrasting findings of this study. For simplicity, this chapter is organized in two sections of theoretical and empirical reviews including government expenditure and unemployment, and tax revenue and unemployment sub-titles under each sections.

2.1. Theoretical Literature Review

2.1.1. General government expenditure and unemployment

In a given economy, Government is supposed to perform development, protective, commercial (public sector undertakings) and infrastructure functions (Adams, 1898). Fiscal policy is the deliberate manipulation of government revenue and expenditure to achieve strategic economic, social and sustainable growth objectives of the country (Cristina and Michaela, 2009). Similarly, as stated by Muhammed (2012), economists tried to explain that government expenditure sustains the growth of the economy through accumulating capital and narrowing the free market failures like by producing public goods and services and controlling unemployment (Vu Le and Suruga, 2005).

Keynesian economics has reference to a set of theoretical explanations for persistent unemployment and to specific governmental employment policies. The general notion behind the Keynesian economics is that persistent unemployment derives from decrease in total private sector spending. Similarly, according to Keynesian economists, the government can alleviate unemployment by increasing the total spending in the economy (Douglas, 2008). Additionally, in terms of the

effect of economic growth on employment creation, the growth process is more important than the growth itself. However, not all government expenditures have equal economic effects and as well as there is no universal agreement on which composition of the government expenditure has direct effect on economic growth and then unemployment.

2.1.2. General tax revenue and unemployment

In a given economy, governments at all levels (national, regional and local) need to raise revenue from a variety of sources to finance public sector expenditures. The intent of tax levy may be fiscal; to raise revenue and defray the expenditures of politicians and officials, or it may be economic, to effect economic changes. Similarly, it may be to effect changes in consumption patterns, stimulate business spending, provide jobs for unemployed, redistribute income and wealth, or even reshape the economic system (Hoffman, 1986). Furthermore, no matter what the intent may be, all taxes have economic effects; there are no neutral taxes.

Under the influence of popular economic thought, governments now raise or lower taxes in order to prevent inflation, check business recessions and promote economic activity and growth. "Such things as defending the country and maintaining the institutions of good government are of general benefit to the public" (Smith, 1776). However, in labor-intensive industries in which labor costs comprise a large share of production cost, the impact of benefit mandates are likely to be painful and severe. Similarly, steeply progressive tax rates retard economic development and then produce unemployment by discouraging saving, investment in business expansion, and work effort, especially in the part of capitalists and entrepreneurs.

When economic output is approaching the limits of capacity and people want to spend more than is offered at stable prices, taxes are supposed to exert a powerful restraining force and narrow the "inflationary gap". In the opposite situation, when a recession is threatening to paralyze economic activity and unemployment is descending in many labor markets, the government supposes to lower taxes while maintaining or even increasing spending (Sennholz, 1982).

2.2. Empirical Literature Review

2.2.1. General government expenditure and unemployment

Ethiopia has aimed to reduce poverty in short period by implementing broad-based development policies that would not only enhance economic growth but also governed by the principles of ensuring equitable distribution of the benefits from the growth (MoFED, 2010/11). The Ethiopian domestic credit market has been dominated by public enterprises by crowd-outing the private sector because of the country's policy preference for financing state-owned enterprises (SOEs) at low cost. Despite significant improvements in the expansions of bank branches, penetration of formal financial institutions to the rural areas has been remained very limited (NBE, 2018).

As asserted in the plan for accelerated and sustainable development to end poverty (PASDEP), the Ethiopian government has given due emphasis to employment opportunities and then poverty reduction using labor force resource for growth as one of the most important resources the country endowed with. However, despite the salary increment initiated in 2016 and the support to drought-affected areas in 2017, the general government spending remained stable. Cutbacks in public expenditure, privatization of public enterprises and global forces have tended to reduce the employment creation role of public sector.

According to the Keynesian economists, the government can alleviate unemployment by increasing the total amount of spending in the economy. In 2012, Muhammed examined the effect of government spending on economic growth in the case of Ethiopia for the period 1960 to 2004 by using econometric analysis. Then the author found that expenditure on human capital has a long-run significant positive effect.

2.2.2. General tax revenue and unemployment

The ability of governments to pursue strategies and plans based on an identification of their country's comparative advantages was instrumental. Governments may lower revenue from taxes to which will increases activities in the economy through motivating entrepreneurs and investors to reinvest their capital in the economy. The trend of Ethiopian general tax revenue as percentage of GDP were ranged from 11.4% minimum to 12.5% maximum while the non-tax revenues ranged from 1.2% minimum to 2.7% maximum during 2010 to 2016 which shows the dominance of tax revenues (MOFED, 2018). However, Employment provides a link between growth and poverty reduction only when systematically guided through policies and strategies that influence the determinants of labor market characteristics.

The early empirical literatures on the employment effects of green tax reforms were pessimistic with regard to whether such reforms would boost employment (Bovenberg, 1994). According to NEPSE (2009), Ethiopian unemployment is challenging due to demographic dynamics (young population represents about 65% of the total population and increasing labor force participation rates), skills mismatch (results from an education system) and lack of job opportunities in labor-intensive sectors. However, taxation also may receive support from lobbyists who would use the instruments of government to promote their own interests by hampering and hurting others.

2.3. Conceptual Framework

Usually, government tries its best to control macroeconomic variables that are under consideration by using fiscal and/or monetary policy instruments. Consequently, knowing the effect of the variables that are under consideration, the relationship among them, how they can affect the market and in turn be affected by the market is important in achieving the intended objectives.

In better performing and responsive markets, contractionary fiscal policy-increasing revenue from tax may leads to inflation, which in turn may leads to unemployment. In contrast, because of the increase in government revenue, the same action may leads to the decrease in unemployment through creating job opportunities. In Ethiopia, with weak institutions of revenue mobilizing strategy, an increase in tax revenue may not cause an increase in unemployment. As a result, the researcher expects that the Ethiopian tax revenue will have a negative effect on unemployment.

In shortage of strong institutions that has direct connection with unemployment, the strategy of expansionary fiscal policy that intends in increasing the country's government expenditure may not affect it. However, the country has been a fastest growing state in the world by emphasizing on government supportive growth initiatives. As a result, the researcher expects that the Ethiopian government expenditure will have negative effect on country's unemployment.

The researcher also considers non-stationary, co-integration and multi-collinear tests that help in hindering spurious regression. Therefore, the study is important in identifying the effect of Ethiopian government expenditure and tax revenue on country's unemployment by using corresponding descriptive and econometric analysis methods.

The following flow chart summarizes the processes, relationships and the general concepts of the variables that are under consideration. Moreover, it also shows the trickle-down effect process of fiscal policy instruments on inflation and unemployment.

Fiscal Policy

Expansionary

Unemployment

Contractionary

Increase in Government Expenditure

Inflation

Increase in Tax Revenue

Employment Creation

Increase in Government Revenue
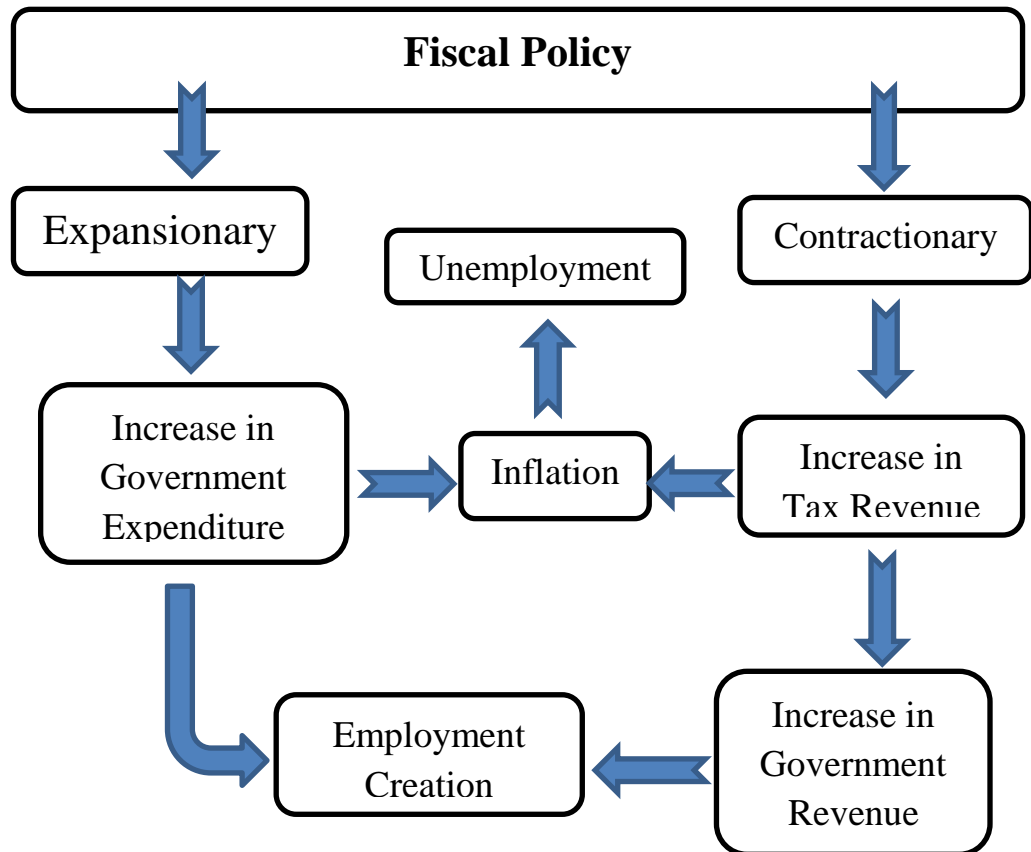
Source: Researcher Analysis

CHAPTER THREE
3. RESEARCH DESIGN AND METHODOLOGY
3.1. Research Design

In ascertaining the effect of Ethiopian government expenditure and tax revenue on country's unemployment, the study entirely uses secondary time series data. In dealing with the problem, the researcher considers descriptive analysis methods by using different ratios, graphical and tabulation descriptions. In the process of hindering spurious regression, the study considers some pre-estimation techniques such as identifying the problem of non-stationary, co-integration, and multi-collinear. Finally, by using corresponding econometric analysis methods, the study investigates the effect of government expenditure and tax revenue on the country's unemployment rate.

3.2. Type and source of data

The study uses time series secondary data of the variables that are under consideration. The intention of the study, which emphasizes on the effect of fiscal policy instruments for about 30 years sample period, encourages the researcher in using secondary data.

Accordingly, government expenditure collected from ministry of finance, tax revenue from ministry of revenues and unemployment rate from central statistical agency of Ethiopia. After comparing with CSA record, unemployment rate data is used from international labor organization (ILO) modeled annual estimate. In addition, all the variables that are under consideration are accessed and crosschecked with the record of national bank of Ethiopia, international monetary fund (IMF), world development indicators (WDI) and world bank (WB).

3.3. Data analysis methods

After the collection of data, the researcher has given due attention in dealing with and identifying the nature of the data. Both descriptive and econometric methods of data analyses were used in dealing with the overall of the study. The magnitude and trend of the variables that are under consideration has explained by descriptive analysis using ratios, tabulation and graphical descriptions. In addition, in the process of avoiding spurious regression, some pre estimation techniques such as unit root, co-integration and multicollinearity tests also deployed. In continuing, in dealing with the effect of the government expenditure and tax revenue on the country's unemployment rate, ordinary least square (OLS) regression methods deployed. Consequently, the overall goodness of fit of the model in general and the significance of the variables in particular also confirmed by corresponding distribution tests such as ANOVA test, t-test, F-test, R^2, Adj R^2 and so on.

3.3.1. Model specification

This section states about developing an econometric model that explains the relationship of the variables that are under consideration. A model encompasses the others model and it should be present by the investigators and parsimonious (Thomas, 1997). The relationship is described by considering unemployment rate as the function of the country's general government expenditure and tax revenue:

$(UR)_t = f(GE, TR)_t$……………………………………………………… (1)

Where $(UR)_t$ is unemployment rate,

$(GE)_t$ is government expenditure, and

$(TR)_t$ is tax revenue under the sample period

In continuing, as the intention of the study is investigating the effect of Ethiopian fiscal policy instruments on country's unemployment, the researcher organized the model by considering unemployment rate as the dependent variable while the general government expenditure and tax revenue as explanatory variables:

$$\ln(UR)t = \beta 0 + \beta 1 \ln(GE)t + \beta 2\ln(TR)t + Ut \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,   ln(UR)t is natural logarithm of uemployment rate,

ln(GE)t is natural logarithm of government expenditure,

ln(TR)t is natural logarithm of tax revenue,

Ut is the residual term under the sample period, and

β0 is the intercept, β1 and β2 are corresponding coefficients

Due to the problem of perfect-collinear, after trying corresponding remedial measures to minimize it, the researcher used simple regression model. Accordingly, the model is developed in linear-log functional form as follows:

$$(UR)t = \beta 0 + \beta 1\ln(GE)t + Ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$(UR)t = \beta 0 + \beta 1 \ln(TR)t + Ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where, all the variables and coefficients are defined the same as in the equation (2) above rather than the functional form

3.3.2. Specific Estimation Techniques

In the process of hindering spurious regression through identifying the problems of non-stationarity and multicollinearity, the researcher has applied the following pre estimation techniques.

Unit root test of stationary

This section identifies whether the variables has unit root(s) or not. A variable has unit root if the coefficient of the lag become one (1) when we regress a lag of the variable on itself. Furthermore, a time series data is stationary if its mean and variance at various lags remain constant no matter at what time we measure them (Gujarati, 1995). Specifically, dickey fuller (DF) and augmented dickey fuller (ADF) test are type of technique that helps to identify non-stationary problem.

Accordingly, it was applied as follows:

$$\Delta UR_t = \beta_1 UR_{t-1} + \beta_2 \Delta UR_{t-1} + e_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (1)}$$

$$\Delta UR_t = \beta_0 + \beta_1 UR_{t-1} + \beta_2 \Delta UR_{t-1} + e_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

$$\Delta UR_t = \beta_0 + \beta_1 UR_{t-1} + \beta_2 \Delta UR_{t-1} + \beta_3 T + e_t \dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(3)}$$

Where, ΔUR_t is change in unemployment rate at time "t",

UR_{t-1} and ΔUR_{t-1} are their respective lags,

T is the chronological sample period,

β_0 is a constant while β_1, β_2, β_3 are corresponding coefficients and

e_t is the residual term at time "t"

Table 3-1: Augmented dickey fuller test of stationary at zero order of integration

Variables	t-statistic	Level of significance
Unemployment rate	-2.273	5%
Government expenditure	2.541	5%
Tax revenue	2.388	5%
t-critical value with no intercept and no trend		
1%	5%	10%
-2.654	-1.950	-1.602

Source: Researcher computation

According to Stephen (2007), if the | t-statistic | of ADF exceeds the t-critical value at 1%/5%/10% level of significance then the variable is stationary. As a result, the researcher confirmed that all the variables that are under consideration become stationary at their level or zero order of integration at 5% level of significance with no constant and no trend.

Co-integration test

The symptom of the spurious regression due to co-integration can be expected if the R^2 value of the regression is greater than the Durbin-Watson statistic and if the residual series of the regression has unit root. If two variables have long-run equilibrium relationship, the linear combination of these variables may be stationary despite the individual series is being non-stationary. This means if the resulting residual series gained from regressing of two non-stationary variables become stationary, then the variables are co-integrated due to their long run relationship. If so, co-integration test techniques should be considered as a pre-test to avoid spurious regression (Gujarati, 1995). However, regarding this study, all the variables that are under consideration are stationary at their level; therefore, there is no need as such to deal with co-integration.

Error correction model

The error correction model helps to deal with the long run equilibrium of the variables by incorporating their short run response in the model and develops depending up on the result of co-integration test. However, regarding this study, there is no need as such to deal with it since co-integration among the variables can be a necessary condition for developing error correction model.

Multi-Collinearity test

Multicollinearity is the existence of perfect or exact linear relationship among some or all explanatory variables. If there is perfect collinear, the standard error become infinite and the corresponding coefficients indeterminate. As a result, the corresponding coefficients cannot be estimated accurately. The reason for multicollinearity especially in time series data may be that independent variables share a common trend i.e. they all simultaneously increase or decrease over time.

Perfect collinearity leads to large variances and covariance which in turn leads to wider confidence intervals (acceptance of zero null hypotheses) and statistically insignificance of the coefficients while the overall measure of goodness of fit R^2 is very high. The speed with which the variances and covariance increase can be estimated with variance inflating factor (VIF) which has a direct proportion with the variance of the coefficients. Tolerance (TOL) is the inverse of VIF that shows tolerance level of multicollinearity ranging from zero (0)-no tolerance for multicollinearity to one (1)-no collinearity.

$\text{VIF} = \dfrac{1}{(1 - r^2)}$, where r is the correlation coefficient

Tolerance (TOL) $= \dfrac{1}{VIF} = 1 - r^2$

If $r^2 = 0$, VIF = 1 = tolerance (TOL)

As r^2 closes 1, VIF increases. However, usually the upper limit of VIF cannot exceed 5 i.e. where r^2 ranges to 0.80.

Table 3-2: Multicollinearity test of regression

Variables	Coeff.	Std.error	t	p	[95% conf. interval]	VIF	1/VIF
constant	9.12	0.600	15.19	0.000	7.89 10.35	--	--
Government expenditure	-0.12	0.110	-1.10	0.283	-0.35 0.11	25.26	0.04
Tax revenue	-0.12	0.106	-1.11	0.276	-0.34 0.10	25.26	0.04
$R^2 = 0.8188$, Adj $R^2 = 0.8054$, F(2, 27) = 61.00, N = 30							

Source: Researcher computation using STATA 13

Note: The regression is in log-linear functional form

Let's also show the level of multicollinearity by using correlation coefficient (r) as follows:

	$(UR)_t$	$(GE)_t$	$(TR)_t$
Unemployment rate $(UR)_t$	1.00		
Government expenditure $(GE)_t$	-0.905	1.00	
Tax revenue $(TR)_t$	-0.901	0.980	1.00

The table 3-2 above tells that the coefficients are statistically insignificant while the value of R^2, Adj R^2 and F that shows the goodness of fit of the regression are moderately high. Very large value of VIF and minimum tolerance value can imply the symptom of spurious regression due to the problem of multicollinearity. As a result, after trying corresponding remedial measures such as transforming the variables and as well as changing the functional form of the model to minimize multicollinearity problem, the researcher decided to use simple regression models rather than multiple regression model.

CHAPTER FOUR

4. FINDINGS AND INTERPRETATION OF THE STUDY

4.1. Descriptive Analysis and Interpretation

The unemployment rate data used in this study is used from the modeled ILO annual estimate after comparing with the Ethiopian national labor force survey data. However, unemployment rate can be estimated as follows:

$$\text{Unemployment rate} = \frac{unemployed}{labor\ force} \ x\ 100\%,$$

Where, unemployed is the number of persons without work being ready and searching actively the available jobs in the economy while labor force-the number of economically active population or the sum of employed and unemployed persons.

To understand more the nature and trend of the Ethiopian unemployment rate under the sample period, let's use a graphical description that shows the trend of Ethiopian participation rate, employment to adult population ratio, and unemployment rate. Participation rate is the portion or percentage of total population that enters the labor force age group while employment to adult population ratio is the portion or percentage of total adult population that employed by the economy usually measured annually.
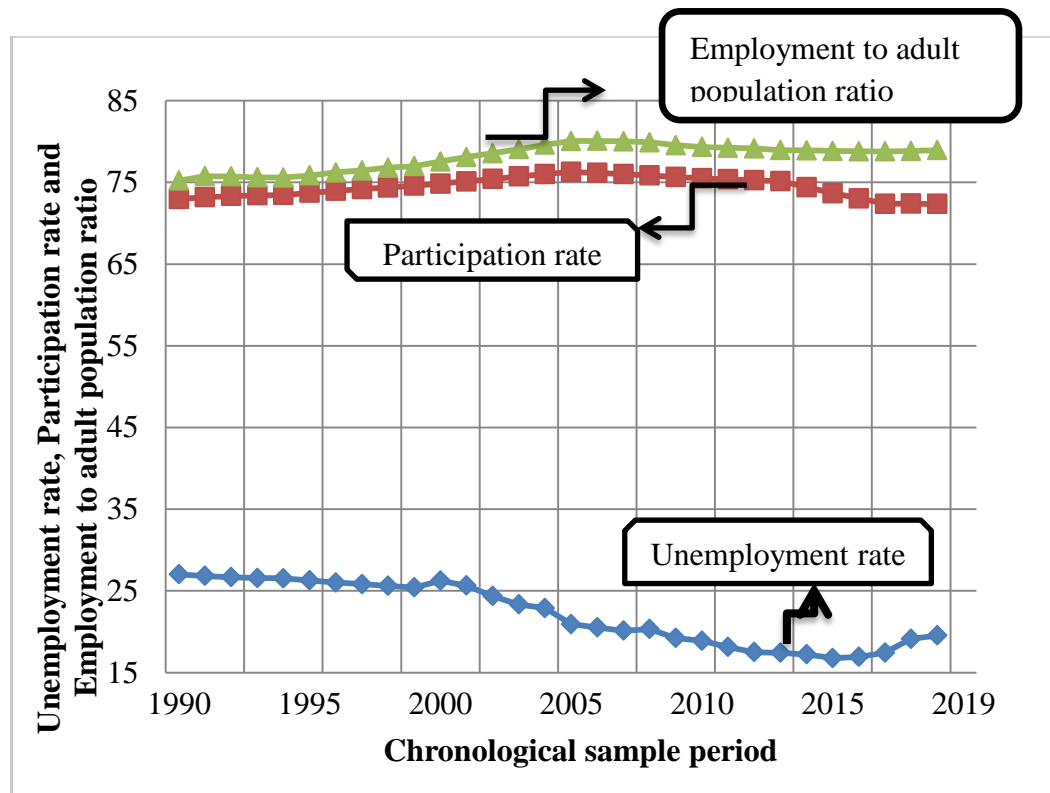
Figure 4-1: Nature and trend of unemployment rate, participation rate, and employment to adult population ratio under the sample period

Source: researcher computation and analysis

Note: All the variables are in percent

Under the sample period, the above Figure 4-1 tells that both participation rate and employment to adult population ratio shows nearly an increasing trend while unemployment rate shows a decreasing trend. Furthermore, we can say the economy is responding by creating job opportunities since employment to adult population ratio is increasing simultaneously while participation rate is increasing and unemployment rate is decreasing. If the economy is responding, there may be a symptom of a decrease in unemployment rate when there is an increase in employment to adult population ratio since unemployment rate is the percentage of economically active population that left from employed.

To understand the nature of general government expenditure, tax revenue and unemployment rate under the sample period, let's use descriptive analysis with simple tabulation. Moreover, the Ethiopian general government expenditure and tax revenue data used in this study are measured in local currency (ETB).

Table 4-1: Descriptive statistics of variables that are under consideration

Variables	Descriptive statistics				N
	Minimum	Maximum	Mean	Std. Deviation	
Unemployment rate (%)	16.78	27.02	22.18	3.8	30
Government expenditure	35.43 billion	346.38 billion	140 billion	87.48 billion	30
Tax revenue	13.94 billion	170.75 billion	63.04 billion	43.18 billion	30
Unemployment rate to government expenditure ratio	0.06	0.75	0.25	0.2	30
Unemployment rate to tax revenue ratio	0.11	1.91	0.59	0.46	30

Source: Researcher computation and analysis

Note: The ratio in both cases is calculated from the same numerator-unemployment rate and the corresponding variables as denominator

From Table 4-1 above, during the sample period, the ratio of unemployment rate to general government expenditure is averaged at about 0.25 while the ratio of unemployment rate to tax revenue is 0.59. The variable with small ratio implies that government expenditure dominates tax revenue in determining unemployment rate since the numerator is the same variable. Under the period, unemployment rate, government expenditure and tax revenue averaged at about 22.18%, 140 billion and 63.04 billion with a standard deviation of 3.8%, 87.48 billion and 43.18 billion respectively.

The above Table 4-1 also tells that from 1990 to 2019 G.C, the maximum of Ethiopian unemployment rate was at about 27.02% and the minimum were lowered at 16.78%. For about thirty consecutive years, the Ethiopian total tax revenue were not exceeded about 170.75 billion and the country's general government expenditure hasn't spent in excess of about 346.38 billion. The country's general government expenditure and total tax revenue hasn't been lowered below 35.43 billion and 13.94 billion respectively.

The researcher also interested in using graphical descriptions that helps in knowing the trend and direction of the variables under the sample period.
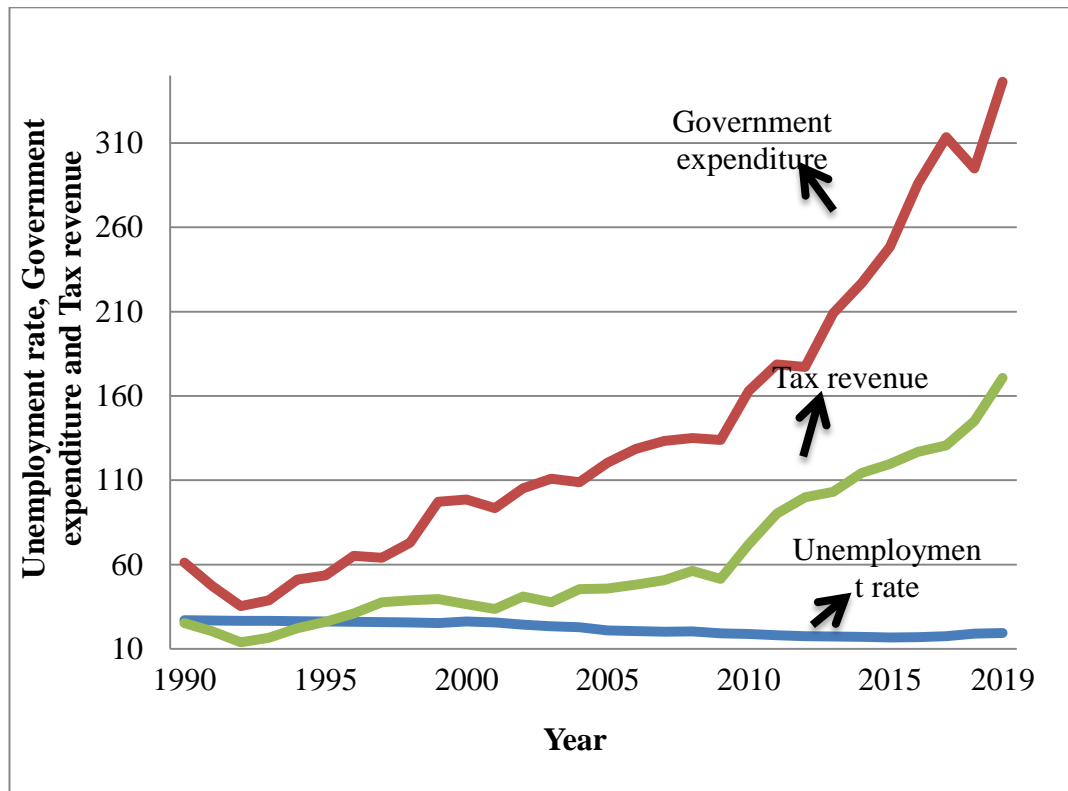
Figure 4-2: Trend and nature of general government expenditure, tax revenue and unemployment rate

Source: Researcher computation and analysis

Note*: Both general government expenditure and tax revenue are in billions of ETB*

Under the sample period, the above Figure 4-2 describes that both government expenditure and tax revenue shows an increasing trend while unemployment rate shows a decreasing trend. The magnitude of general government expenditure is greater than tax revenue at any corresponding period since the line of the former exists above the later and the lines doesn't cross even doesn't overlap each other. Both the Ethiopian general government expenditure and tax revenue shows a positive correlation with each other but shows a negative correlation with the country's unemployment rate i.e. as both the former increases unemployment rate decreases.

The above Figure 4-2 also tells that both the rate of increase in government expenditure and tax revenue is greater than the rate of decrease in unemployment rate as we conclude from the steepness and smoothness nature of their respective lines. The country's general government expenditure and tax revenue shows nearly similar nature and trend i.e. as one increases the other also nearly increases and vice versa. In general, in descriptive analysis, the general government expenditure is the dominant variable in determining unemployment rate compared to tax revenue under the sample period.

4.2. Econometric Regression Analysis and Interpretation

4.2.1. Regression analysis of unemployment rate on government expenditure

After deploying the above pre estimation techniques that help in strengthening the OLS regression assumptions, the researcher applied the OLS regression analysis methods.

Table 4-2: Regression of government expenditure on unemployment rate

Variables	coefficients	Std. errors	t-statistic	P > |t|
Constant	158.835	12.124	13.10	0.000
$\ln(GE)_t$	-5.365	0.476	-11.27	0.000
$R^2 = 0.8195$, Adj $R^2 = 0.8131$, F (1, 28) = 127.12, Prob > F = 0.0000, N = 30				

Source: Researcher computation using STATA 13

Note: The regression is in linear-log functional form

The above Table 4-2 regression can be represented and interpreted as follows:

$$(\text{UR})_t = \beta 0 + \beta 1 \ln(GE)t + Ut \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

$$(\text{UR})_t = 158.835 - 5.365\ln(GE)t$$

Where; $\beta 0$ is an intercept, $\beta 1$ is the slope, $(\text{UR})_t$ is unemployment rate, $\ln(GE)t$ is natural logarithm of government expenditure and Ut is the residual term

In interpretation, to deal with the effect of a unit change in the explanatory variable on the dependent variable, we have to change the coefficients by dividing them to their corresponding variables average. Moreover, a change in natural logarithm of a variable is nearly equal with its relative change.

The above Table 4-2 and equation (4) representation states that about 82% deviation in the dependent variable-unemployment rate is due to the deviation in the explanatory variable-natural logarithm of general government expenditure i.e. from the total; about 82% of unemployment rate is explained by the country's government expenditure. Similarly, the F distribution also confirms that the overall goodness of fit of the model since it is statistically significant having a minimum probability (Prob > F = 0.0000).

As expected by the researcher in the conceptual and hypothesis framework section, the sign of the slope confirms that the Ethiopian general government expenditure has a negative effect on the country's unemployment (i.e. as general government expenditure increases unemployment rate decreases or as it decreases the country's unemployment rate increases). Moreover, on average, the effect of one birr increase in general government expenditure causes about 0.21% decrease in country's unemployment rate.

In the regression analysis, the intercept of the model is also statistically significant. This means, on average, the country's unemployment rate becomes 7.16% even when the country's government expenditure becomes zero. This may imply that there may be other variable that determines unemployment rate other than government expenditure or there may be significant theories that supports there are conditions where government expenditure does not determine unemployment rate. Moreover, this may support the assumption of natural rate of unemployment. Natural rate of unemployment is the combination of frictional and structural unemployment that does not offset even when the economy is at full employment.

In continuing, let's confirm specifically and the overall goodness of fit of the model using post estimation techniques.

Table 4-3: Post estimation regression diagnostics of unemployment rate on government expenditure

Breusch-pagan test for heteroskedasticity	
Chi-square (1) =1.06	F(1, 28) = 1.87
Prob > chi2 = 0.3035	Prob > F = 0.1819
Ho: Constant variance	
Breusch-Godfrey LM test for autocorrelation	
Chi-square (13) = 24.678	F(13, 15) = 1.898
Prob > chi2 = 0.0254	Prob > F = 0.1176
H0: no serial correlation	

Source: Researcher computation

In both cases, by accepting the null hypothesis, the above Table 4-3 concludes that the regression model is measured with constant variance (homoscedasticity) and no serial autocorrelation. Moreover, the model also checked by using feasible generalized least square (FGLS) by applying Prais–Winsten transformation method that adjusts the regression model by taking into account the problem of serial autocorrelation, stationarity and so on. Accordingly, it resulted that the regression model is significant and as well as the corresponding intercepts and coefficients resulted in the same sign and almost the same slope.

4.2.2. Regression analysis of unemployment rate on tax revenue

Similarly, the regression estimation is applied after deploying corresponding pre estimation techniques.

Table 4-4: Regression of tax revenue on unemployment rate

Variables	coefficients	Std. errors	t-statistic	P > |t|
Constant	146.315	11.310	12.94	0.000
ln(TR)t	-5.037	0.459	-10.98	0.000
$R^2 = 0.8115$, Adj $R^2 = 0.8048$, F $(1, 28) = 120.57$, Prob $> F = 0.0000$, N = 30				

Source: Researcher computation using STATA 13

Note: The regression is in linear-log functional form

The above Table 4-4 regression can be represented and interpreted as follows:

$$(\text{UR})_t = \beta_0 + \beta_1 \ln(TR)t + Ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$(\text{UR})_t = 146.315 - 5.037\ln(TR)t$$

Where β_0 is an intercept, β_1 is the slope, $(\text{UR})_t$ is unemployment rate, $\ln(TR)t$ is natural logarithm of tax revenue and Ut is the residual term

In interpretation, to deal with the effect of a unit change in the explanatory variable on the dependent variable, we have to change the coefficients by dividing them to their corresponding mean or average of the variables.

The above Table 4-4 and equation (5) representation states that about 81% deviation in the dependent variable-unemployment rate is due to the deviation in the explanatory variable-natural logarithm of tax revenue i.e. from the total; about 81% of unemployment rate is explained by the country's tax revenue. Similarly, the F distribution also confirms that the overall goodness of fit of the model.

As expected by the researcher in the conceptual and hypothesis framework section, the sign of the slope confirms that the Ethiopian tax revenue has a negative effect on the country's unemployment. In addition, on average, the effects of one birr increase in tax revenue causes about 0.20% decrease in country's unemployment rate. Similarly, the significant intercept of the model also may support the assumption of natural rate of unemployment that cannot be zero even where the economy is at full employment i.e. on average, even when the country's tax revenue become zero the country may experience about 6.60% unemployment rate.

Table 4-5: Post estimation regression diagnostics of tax revenue on unemployment rate

Breusch-pagan test for hetroscedasticity	
Chi-square (1) =0.96	F(1, 28) = 0.92
Prob > chi2 = 0.3284	Prob > F = 0.3455
Ho: Constant variance	
Breusch-Godfrey LM test for autocorrelation	
Chi-square (13) = 22.949	F(13, 15) = 1.765
Prob > chi2 = 0.0423	Prob > F = 0.1458
H0: no serial correlation	

Source: Researcher computation

The above Table 4-5 post estimation test concludes that the regression is estimated with constant variance and no serial autocorrelation. Similarly, the model also checked using feasible generalized least square (FGLS) by applying Prais–Winsten transformation method and hence resulted in the same sign and almost the same magnitude of coefficients.

CHAPTER FIVE
5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

Mainly the study investigated the effect of Ethiopian fiscal policy instruments by emphasizing on the effect of general government expenditure and tax revenue on the country's unemployment rate under the sample period of 1990 to 2019 G.C and hence forwarded pointing recommendations.

To undertake the study, the researcher has used both descriptive and econometric analysis methods. Accordingly, descriptive analysis using different ratios, graphical and tabulation descriptions strengths that general government expenditure is the dominant determinant of unemployment rate as compared to tax revenue. Both the Ethiopian general government expenditure and tax revenue shows an increasing trend while the country's unemployment rate shows a decreasing trend. Similarly, under the sample period, the country's participation rate and employment to adult population ratio also shows relatively an increasing trend.

Unit root, co-integration and multi-collinearity tests are also applied. As a result, all the variables those are under consideration become stationary at their level having greater absolute value of t-statistic than t-critical at 5% significance level. The problem of multi-collinearity has dealt with and the correlation coefficient test resulted in perfect collinear. In addition, the value of VIF is very high which is greater than tolerable level. As a result, the study used simple regression model.

The OLS regression resulted that both government expenditure and tax revenue are significant determinant of unemployment rate. As expected by the researcher, both have a negative effect on the country's unemployment rate. The significant intercept with positive sign has described by relating to the assumption of natural unemployment rate.

5.2. Recommendations

After investigating the effect of government expenditure and tax revenue on the country's unemployment rate, the study forwards the following recommendations:

➢ Strategic expansion of general government expenditure can helps in controlling and minimizing the country's unemployment rate

➢ Mobilizing the country's tax revenue can minimizes the level unemployment rate since tax revenue has a significant negative effect on unemployment rate

➢ A significant positive intercept implies that care should be taken to the conditions and magnitude of government expenditure and tax revenue in the strategy of controlling unemployment rate

➢ In the strategy of controlling unemployment rate, both government expenditure and tax revenue can be used separately for a single effect and simultaneously for a double effect since both has the same sign and almost the same a unit effect

➢ Finally, the researcher suggests additional studies on area of the problem since there are no as such studies undertaken either using primary and/or secondary data

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APPENDIX A

Prais-Winsten regression of unemployment rate on government expenditure

prais unemployment rate (UR)$_t$ ln(government expenditure(GE))$_t$, rhotype(tscorr) twostep

Iteration 0: rho = 0.0000

Iteration 1: rho = 0.7604

Prais-Winsten AR(1) regression -- twostep estimates

```
    Source |    SS      df     MS              Number of obs =     30
------------+-----------------------------        F( 1,   28) =  215.12
     Model | 158.634965    1  158.634965        Prob > F     =  0.0000
  Residual | 20.6483206   28  .73744002         R-squared    =  0.8848
------------+-----------------------------        Adj R-squared =  0.8807
     Total | 179.283286   29  6.18218227         Root MSE      = .85874
```

```
--------------------------------------------------------------------------------
     (UR)t |    Coef.   Std. Err.      t      P>|t|   [95% Conf. Interval]
------------+-------------------------------------------------------------
  ln(GE)t |  -3.755958  .7263089    -5.17   0.000   -5.243735  -2.268182
     _cons |  118.1979   18.54067     6.38   0.000    80.21906   156.1767
------------+-------------------------------------------------------------
       rho |  .7603695
--------------------------------------------------------------------------------
```

Durbin-Watson statistic (original)   0.313358

Durbin-Watson statistic (transformed) 0.958546

APPENDIX B

Prais-Winsten regression of unemployment rate on tax revenue

prais unemployment rate (UR)$_t$ ln(tax revenue (TR))$_t$, rhotype(tscorr) twostep

Iteration 0: rho = 0.0000

Iteration 1: rho = 0.7260

Prais-Winsten AR (1) regression -- twostep estimates

```
   Source |    SS      df      MS              Number of obs =    30
------------+-----------------------------      F( 1,   28) =  189.43
    Model | 167.297271    1  167.297271        Prob > F    =  0.0000
 Residual | 24.7290155   28  .883179126        R-squared   =  0.8712
------------+-----------------------------      Adj R-squared = 0.8666
    Total | 192.026286   29  6.62159609        Root MSE    = .93978
```

```
------------------------------------------------------------------------------
   (UR)t |   Coef.  Std. Err.    t   P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
ln(TR)t | -3.453496  .6761242  -5.11  0.000  -4.838474  -2.068519
   _cons | 107.5949  16.70095   6.44  0.000   73.38451   141.8052
------------+-----------------------------------------------------------------
     rho |  .726029
------------------------------------------------------------------------------
```

Durbin-Watson statistic (original)   0.370764

Durbin-Watson statistic (transformed) 1.132684