



Macroeconomic Determinants of Unemployment in Ethiopia

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Abstract

Unemployment is one of the challenge facing today's world. The impartial of the study was to examine the long-run and short-run relationships between unemployment and its macroeconomic determinants over 1984/85-2018/19, comprising external debt, inflation rate, foreign direct investment (FDI), population growth, and real gross domestic product (RGDP). Subsequent to using the Augmented Dickey-Fuller (ADF) to test for unit root, this study employed Auto-Regressive Distributed Lag (ARDL) bounds testing approach. Regression result proposes that external debt, inflation, FDI, population growth, and RGDP have together been imperative in explaining the long-run unemployment rate. Except population growth these also persist in the short-run. The significant and negative coefficient of error correction term indicate to high speed of adjustment to achieve the long-run equilibrium. Finally the study suggests the government should increase the supply of external direct investment, address the appropriateness of each economic sector for their attractiveness of unemployed groups, safe it self from external debt overhang, increase aggregate supply and consolidate the existing entrepreneurship.

Keywords: ARDL, Determinants, Ethiopia, Unemployment

Introduction

In order to test the strength and growth of a given country's economy, unemployment is a foremost macroeconomic indicator conferred by Aurangzeb (2013a). According to Hamza & kaushik (2015), unemployment deprives the obligatory resources of government that desired to develop the economy. It also affects the rank of a nation in contrast to other nations. Unemployment is a obstacle for both developing and developed countries. Nevertheless, the impact and intensity might differ. According to Refik et al. (2010), unemployment has been the most steady problem in both developed and developing countries. In 2016 and 2017 for example, as indicated in the According to World Bank (2018), the general unemployment rate (as a % of total labor force) raised at 11.16% in Djibuti, 6.49 % in Eritrea, 13.9% in Somalia, 39.39% in Bosnia and Herzegovina, 12.80% in Egypt, 12.6% in South Sudan, 17.22% in Spain, 11.20% in Algeria, 7.50% in Argentina and specifically in 2016 mounted at 17.06 % in Ethiopia. This high unemployment rate problem of each respective country, indicate us to investigate macroeconomic determinants of

unemployment in Ethiopia. Because of the young dominated demographic profile, the labor force is growing much more rapidly than the population as a whole in Ethiopia. Hence studying macroeconomic determinants of unemployment has been given much importance in the policy formulation of many LDCs, viewing it as a vehicle to transform the economic performance of these countries.

Many studies have been conducted on LDCs to see whether macroeconomic variables do contribute to reducing unemployment or not. The outcomes of these studies are substantial and significant and to forward relevant policy recommendations that would enable these countries enjoy the benefits of knowing foremost macroeconomic determinants of unemployment.

It is, therefore, required for Ethiopia government to address the issue and a closer look into the policies that were once followed by these governments towards lessening unemployment and an empirical examination to find out the macroeconomic determinants of unemployment is crucial in order to support the country practice for sustainable economic growth.

Theoretical Review

According to Keynes (1936), unemployment occurs if there is not enough aggregate demand in the economy to provide jobs for everybody who desires to work. With regard to cyclical unemployment, when the number of unemployed workers is above the number of job vacancies, even if full employment was attained and all open jobs were filled, some workers would still remain unemployed.

Marx (1863) present his unemployment theory and explain the, the nature of the capitalist mode of production to over burden some workers while custody the rest as a reserve army of unemployed paupers. Marxists share the Keynesian idea about relationship between economic demand and employment, but with the caution that the market system's propensity to cut wages and decrease labor participation which on an enterprise-level causes a requisite decrease in aggregate demand in the economy as a whole, causing crises of unemployment and periods of low economic activity before the capital accumulation phase of economic growth can continue. Inherent within the unstable capitalist system and periodic crises of mass unemployment are to be expected. The function of the working class within the capitalist system is to provide a "reserve army of labor" that creates downward pressure on wages. Marx (2008), this reserve army of labor fights among themselves for scarce jobs at lower and lower wages.

Okun (1962) examined the relationship between the employment rate and the economic growth for the post war years. In his estimation, he showed that a 3% increase in RGDP was associated with a 1% point decrease in the rate of unemployment.

It is possible to abolish cyclical unemployment by increasing the aggregate demand for products and workers in demand-based theory (Keynes, 1936). However, eventually the economy hits an inflation barrier imposed by the other kinds of unemployment to the extent that they exist. With historical experience, low unemployment affects inflation in the short term but not the long term. The success of the Phillips curve did not last long and new data measured in the late 1960s and early 1970s challenged the original version. In the long term, the velocity of money supply measures such as the money zero maturity representing money and equivalent demand deposits, velocity is far more prognostic of inflation than low unemployment explained by Hossfeld (2010). According to Malthus (1803) the increase in total output causes higher population through higher fertility and lower mortality. In the presence of a fixed input as land, this higher population leads to lower marginal productivities. Malthus' model is quite successful at accounting for the main facts that prevailed until the 19th century, but it fails to explain the co-existence of growth in per capita income and low fertility.

Empirical Literature Review

The study with Muhammad, Tahir Mahmood, & Bhalli (2013) revealed that unemployment was positively related to population and external debt. But it has a negative relation from gross domestic product and foreign direct investment and the research also proved the inverse and significant relationship between unemployment and inflation both in short- and long-run. An empirical study made by Eita & Ashipala (2010), investigated the causes of unemployment in Namibia for the period 1971 to 2007. The aim of the study was to investigate the determinants of unemployment and used productivity, real wage, consumer price index, total investment, and output gap (Y^a and Y^p are actual and potential output) as independent variables. The unemployment model (with macroeconomic variables) was estimated using the Engle-Granger two-step econometric procedure. The results revealed that there was a negative relationship between unemployment and inflation. Unemployment responds absolutely if real output is below potential output, and if wages add to. Intensify in investment causes unemployment to reduce significantly. The results provide verification that the Phillips curve holds for Namibia and unemployment can be condensed by increasing aggregate demand.

Referring to Folawewo & Adeboje (2017) investigated macroeconomic determinants of unemployment: empirical evidence from the economic community of West African states, using fixed and random effects, as well as fully modified ordinary least squares panel data estimation techniques for annual data covering 1991 to 2014. An empirical analysis was performed at both aggregate ECOWAS data level and sub-regional levels, that is Francophone and Anglophone country levels. The outcome demonstrates that gross domestic product growth has a falling but irrelevant effect on unemployment rate, which indicates low employment elasticity of growth in the region. Inflation has an irresistible positive impact on unemployment, indicating invalidity of the Phillips curve hypothesis. Another important finding of the paper was the positive impact of labor productivity on unemployment rate, reflecting a trade-off between labor productivity and employment. Additional, FDI and external debt exert a weak negative impact on unemployment, while population growth has an increasing effect.

Xuen, Bee, Hsien, Yen, & Yee (2017) conducted an investigation to study macroeconomic factors affecting the unemployment rate in China. This study focused macroeconomic factors affecting unemployment rate in China by studying the long-run relationship from year 1982 to 2014. The proposed independent variables were Inflation, GDP growth, population and foreign direct investment that affects unemployment rate in china. To study those macroeconomic variables with that of unemployment rate, Methodologies like Augmented Dickey-Fuller (ADF) unit root test and Auto-regressive Distributed Lag (ARDL) approach. Their result indicates GDP growth and Population are significant to unemployment rate which proven that long-run relationship exists between them whereas inflation and foreign direct investment show insignificant relationship towards unemployment rate.

Significance of the study

The findings of this study are believed to provide a useful contribution to the empirical basis needed for the proper understanding of the previous routes as well as give emphasis for future process on unemployment issue. The study also adds value to the stock of knowledge by showing the relationship between unemployment and INF, RGDP, FDI, EXD, POP in the Ethiopian economy. Only few researchers did research particularly towards it, yet it may only consider as an introduction towards the real unemployment rate of Ethiopia. A lot has been done regarding macroeconomic determinants of unemployment throughout the world, but Ethiopia's share in the literature is low. So, this study may provide elaborated ideas and important guidance for policymakers, economists and researches those who are a great deal of interest in unemployment. Moreover, Ethiopia's government has aims to reach

lower-middle income status by 2025. To continue Ethiopia's successful path towards becoming a middle-income country, the result of the research may be used as input to achieve this objective. Even, bearing in mind the result of this research output also very important in order to achieve the second Growth and Transformation Plan (GTP II) aims. Based on this, future researches may obtain variables that affect greatly unemployment to predict unemployment rate somehow.

Statement of the problem

According to Eita & Ashipala (2010), unemployment has a great impact on growth and development at large and it causes a waste of economic resources, the productive labor force and affects the long-run growth potential of an economy. If peoples cannot find jobs in their home country, they may be invited to relocate to another country for getting jobs. This can be harmful to the future of a nation, particularly if other nations are attracting its brain drain. Therefore, if this problem uninterrupted in any economy, it could be a major factor in deteriorating economic growth. Moreover, these lead to the erosion of a healthy society Muhammad et al. (2013).

Another explanation may be that if people are left with no alternative, they are more liable to join an uprising as an alternative way of generating earnings Urdal (2006). For instance, the recent uprising in Ethiopia principally 2016 onward in Amhara, Oromia region and other some parts of the country which toppled the respective regime is motivated for many reasons, among those the major socioeconomic problem was the rising of unemployment. It also has a vital contribution to the reduction of productivity Abbink (2016). And the researcher's knowledge is concerned; no previous work has been done in current spirit in the country.

Furthermore, previous studies in Ethiopia have been conducted on the determinant of unemployment. Few studies tend to concentrate on the incidence of unemployment in specific categories and the policy aspect of labor market is found to be more explored in the microeconomic context but less explored in the literature at least in the context of macroeconomic determinants of unemployment in Ethiopia.

The current study differs from prior once on a number of grounds. First, both the size of observations and variables are extended to macro-level as appropriate as the econometric models employed. Second, there are many literature reviews on unemployment conducted in different countries but most of the studies conducted on unemployment in Ethiopia focused on the urban areas and additionally limited to the youth, causes, and determinants of unemployment in that area. This evidence provides for the researcher, as a study on macroeconomic determinants of unemployment at national level is very uncommon in Ethiopia. Thus, this study differs by investigating the impact of macroeconomic variables on unemployment at a national level using a 35 years annual time series data (1984/85-2018/19). Hence, this study was extended to a more current period to examine long and short-run impacts of macroeconomic variables.

Objectives of the study

The general objective of this study is to examine the macroeconomic determinants of unemployment in Ethiopia for 1984/85-2018/19 years. In view of the general objective this paper attempts to achieve the following specific objectives:

- To identify the long-run relationship between macroeconomic determinants and unemployment.
- To identify the short-run relationship between macroeconomic determinants and unemployment.

Research hypothesis

- *Null hypothesis:* Macroeconomic variables have no relationship with unemployment in the short-run and long run.

- *Alternative hypothesis:* Macroeconomic variables have a relationship with unemployment in the short-run and long run.

Methodology

a) Source of data

The data were sourced from both organizations. Those two main source include; World Development Indicators (World Bank) and United Nations Conference on Trade and Development (UNCTAD) as well as annual reports and published studies. The data from WDI and UNCTAD can be reliable because many studies have employed the data published by this institution. The reason for the use of 1984/85 as a cutoff point is because it is only starting from this year that consistent data could be found in the data source for most variables used in this particular study. For real RGDP, INFR, EXD, POP and UNR, the researcher used the same data source for consistence purpose, i.e. WDI. Other researchers used this reliable data source, for instance Muhammad et al. (2013), Aurangzeb (2013), Folawewo & Adeboje (2017) and Xuen et al. (2017). The data for FDI was collected from UNCTAD website. Moreover, the reason for the use of UNCTAD data for FDI variable was because of the absence of well-organized data from domestic and other foreign data source. Other researchers also used this resource, e.g. Pavlos and Nikolaos (2014); Megbowon et al. (2016); Yusuf (2013).

b) Lag length determination

The maximum lag length of the model is found by means of using Vector Auto-regressive (VAR) lag order selection criteria. ADF is contained an extra lagged term of the dependent variable in order to eliminate autocorrelation among residuals. The lag length criterion is selected on the basis of the minimum value of each criterion with majority vote and by considering the familiar one which used for economics research.

c) Unit root test

According to Gujarati (2004), the Dickey-Fuller test has become extremely popular for the unit root test. In conducting the Dickey-Fuller test, the error term is assumed to be uncorrelated. If the error terms are correlated, a DF test is useless. However, in time-series data, error terms are likely to be correlated. If the error term is correlated, the Augmented Dickey-Fuller (ADF) test should be employed. Moreover, According to Alrabba (2017), justify for the same research, one of the most common tests for time series stationary is Augmented Dickey-Fuller test that examines the existence of unit root hypothesis as a null hypothesis.

$H_0: Y=0$, Non-stationary time series; so it has unit root problem.

$H_a: Y<0$, Stationary time series; so it has no unit root problem.

d) An autoregressive distributed lag model

With regard to Omoniyi and Olawale (2015), the ARDL bounds test is relatively more efficient in small sample data sizes as is the case in this study. This approach provides unbiased estimates of the long-run model. The Wald test or F-statistic in ARDL bounds test approach is used to test the existence of long-run relationships. To decide whether the variables have co-integration or no co-integration or inconclusive, researcher has to compare the calculate F-statistics (Wald test) value with critical values reported in the paper (Pesaran et al., 1999).

The ARDL model was introduced by Pesaran et al. (1999) and further explained by Pesaran et al. (2001). The general form of ARDL (p, q) is as:

$$Y_t = \gamma_0 + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{j=0}^q \beta_j X_{t-j} + \epsilon_{it} \dots \dots \dots (1)$$

Where Y_t is a vector, X_t are allowed purely I(0) or I(1) pr cointegrated; δ and β are coefficients; γ is the constant; $i=1,2, \dots, K$; p is optimal lag order used for dependent variables; q is optimal lag orders used for independent variable; ϵ_{it} is a vector of error terms-

unobservable zero-mean white noise vector process. The following are the bound test co-integration models. So, the model can be framed as an equation, (2).

$$D(\ln(UNR_t)) = \beta_1 + \alpha_{11} \ln(UNR_{t-1}) + \alpha_{21} \ln(RGDP_{t-1}) + \alpha_{31} \ln(INFR_{t-1}) + \alpha_{41} \ln(ED_{t-1}) + \alpha_{51} \ln(FDI_{t-1}) + \alpha_{61} \ln(POP_{t-1}) + \sum_{i=1}^p \theta_{1i} D(\ln(UNR_{t-1})) + \sum_{i=1}^q \theta_{2i} D(\ln(RGDP_{t-1})) + \sum_{i=1}^q \theta_{3i} D(\ln(INFR_{t-1})) + \sum_{i=1}^q \theta_{4i} D(\ln(EXD_{t-1})) + \sum_{i=1}^q \theta_{5i} D(\ln(FDI_{t-1})) + \sum_{i=1}^q \theta_{6i} D(\ln(POP_{t-1})) + \epsilon_{1t} \dots \dots \dots (2)$$

Where, $\ln UNR_t$ is log of unemployment rate, $\ln RGDP_t$ is the log of real gross domestic product, $\ln INFR_t$ is the log of inflation rate, $\ln FDI_t$ is the log of foreign direct investment, $\ln EXD_t$ is the log of external debt, $\ln POP_t$ is log of population growth rate 'D' is difference operator; β_j ($j=1, \dots, 6$) denotes intercept; q is the maximum lag length; i is number of lags; θ_{jk} ($j,k=1, \dots, 6$) denotes the short-run coefficients of the variables; α_{jk} ($j,k=1, \dots, 6$); denotes the long-run coefficients of the variables, and ϵ_{jt} ($j=1, \dots, 6$) presents the serial independent random error with mean zero a finite covariance matrix. The null hypothesis of co-integration states that there is no co-integration against the alternative hypothesis of there exist co-integration between variables (Daniel, 2011). Hypothesis for testing long run existence among variables could be formulated:

$$H_0: \alpha_{jk}=0, \text{ No-cointegration, } k,k=1, \dots, 6$$

$$H_a: \alpha_{jk} \neq 0, \text{ There is cointegration, } k,k=1, \dots, 6$$

If there is evidence of the long-run relationship of the variables, the following long-run ARDL (p_1, p_2, p_3, p_4, p_5) model was estimated (Abdulbaset et al., 2013). All variables are as previously defined.

$$D(\ln(UNR_t)) = \theta_1 + \sum_{i=1}^p \theta_{1i} D(\ln(UNR_{t-1})) + \sum_{i=1}^q \theta_{2i} D(\ln(RGDP_{t-1})) + \sum_{i=1}^q \theta_{3i} D(\ln(INFR_{t-1})) + \sum_{i=1}^q \theta_{4i} D(\ln(EXD_{t-1})) + \sum_{i=1}^q \theta_{5i} D(\ln(FDI_{t-1})) + \sum_{i=1}^q \theta_{6i} D(\ln(POP_{t-1})) + \epsilon_{1t} \dots \dots \dots (3)$$

After a confirmation of long-run co-integration between UNR_t , $RGDP_t$, $INFR_t$, EXD_t , FDI_t and POP_t the researcher uses error correction model to obtain the short-run dynamic coefficients and estimate the adjustment speed associated with the short-run estimates. The adjustment speed shows the adjustment speed from the short-run to the long-run equilibrium among variables (Bekhet and Al-Smadi, 2015). On this study error correction model approach is used to identify short run co-integration.

The general form of ECM is as:

$$\Delta Y_t = \alpha_0 + b_1 \Delta X_t - \eta \mu_{t-1} + \epsilon_t \dots \dots \dots (4)$$

b_1 = impact multiplier

η = adjustment effect

Impact multiplier measures the instant impact that change in X_t will have on change in Y_t and adjustment effect shows how much of disequilibrium is being corrected.

$$\mu_{t-1} = Y_{t-1} - \beta_1 - \beta_2 X_{t-1} \dots \dots \dots (5)$$

In this equation β_2 being the long run response (Asteriou and Hall, 2006).

$$D(\ln(UNR_t)) = \theta_0 + \sum_{i=1}^p \theta_{1i} D(\ln(UNR_{t-1})) + \sum_{i=1}^q \theta_{2i} D(\ln(RGDP_{t-1})) + \sum_{i=1}^q \theta_{3i} D(\ln(INFR_{t-1})) + \sum_{i=1}^q \theta_{4i} D(\ln(EXD_{t-1})) + \sum_{i=1}^q \theta_{5i} D(\ln(FDI_{t-1})) + \sum_{i=1}^q \theta_{6i} D(\ln(POP_{t-1})) + \eta ECT_{t-1} + \epsilon_t \dots \dots \dots (6)$$

Here D is the difference operator; θ_t 's the coefficients relating to the short -run dynamics of the model's convergence to equilibrium, η measures the speed of adjustment, where ECT_{t-1} is the error correction term (Pesaran et al., 2001). This is defined as:

$$ECT_{t-1} = D(\ln(UNR_{t-1})) - [\theta_0 + \sum_{i=1}^p \theta_{1i} D(\ln(UNR_{t-1})) + \sum_{i=1}^q \theta_{2i} D(\ln(RGDP_{t-1})) + \sum_{i=1}^q \theta_{3i} D(\ln(INFR_{t-1})) + \sum_{i=1}^q \theta_{4i} D(\ln(EXD_{t-1})) + \sum_{i=1}^q \theta_{5i} D(\ln(FDI_{t-1})) + \sum_{i=1}^q \theta_{6i} D(\ln(POP_{t-1}))]$$

Result and discussion

a. Lag Length Determination

Before applying ARDL model it is necessary to determine the optimal lag length of variables of the study. There is no quick rule on what optimum lags size to use; but, given the respective practical limitations of all the lag length selection criteria, researchers would take pleasure in some degree of freedom to arbitrarily determine the number of lags, conceptually geared to be reasonable. Limiting the lags to a reasonably minimum size has been considered important.

Table1. 1: Lags Order Suggested by each Criterion

L	LogL	Lr	Fpe	Aic	Sc	Hq
0	-194.7781	NA	0.182108	12.48613	12.71515	12.56204
1	-136.5185	94.67171	0.023295	10.40741	11.78154 ^a	10.86289
2	-98.80853	49.49440 ^a	0.011909	9.613033	12.13227	10.44809
3	-66.67363	32.13490	0.010789 ^a	9.167102 ^a	12.83144	10.38173 ^a

^ashows orders of lag selected by the criterion. L represents lag length

Source: e-views-v-10

Referring to most of the studies in economics, the most popular candidate in lags size determination, which has been revealed to be optimum and relatively efficient, is where the AIC is minimized; which has also been satisfied at an optimum lag order of three in this study. Thereafter, the ARDL bounds test was performed using maximum 3 lag.

b. ADF unit root test of variables at level and first difference

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. Despite the fact that the ARDL framework does not require per-testing variables to be done, the unit root test could convenience a researcher whether or not the ARDL model should be used. The result in Table 2.2 shows that there is a mixture of I (0) and I (1).

Table2.2: ADF unit root tests results for stationary of the variables at levels and first difference.

Variables	Levels		First difference		
	Constant	Constant and trend	Constant	Constant and trend	Order of integration
LnUNR	(2.751582)	(2.734954)	(7.697294)*	(7.609472)*	Stationary at I(1)
	[0.0761]	[0.2299]	[0.0000]	[0.0000]	
LnRGDP	(4.201534)*	(6.038616)*	(5.014189)*	(4.907468)*	Stationary at I(0) and I(1)
	[0.0023]	[0.0001]	[0.0003]	(0.0024)	
LnFDI	(1.382028)	(3.516594)	(5.883800)*	(5.803385)*	Stationary I(1)
	[0.5786]	[0.0481]	[0.0000]	[0.0002]	
LnINF	(4.168996)*	(7.536394)*	(7.691951)*	(7.536394)*	Stationary at I(0) and I(1)
	[0.0026]	[0.0000]	[0.0000]	[0.0000]	
LnPOP	(0.263257)	(4.212254)	(4.323737)*	(4.332646)*	Stationary at I(1)
	[0.9198]	[0.2116]	[0.0018]	[0.0087]	

<i>LnEXD</i>	<i>(1.472761)</i>	<i>(2.574466)</i>	<i>(4.247948)*</i>	<i>(4.191843)*</i>	Stationary I(1)
	<i>[0.5347]</i>	<i>[0.2934]</i>	<i>[0.0021]</i>	<i>[0.0118]</i>	
<i>MacKinnon (1996) with constant, no trend, () Indicates t-statistics with absolute value, [] Indicates p-value.</i>			<i>Null Hypothesis: Each variable has a unit root at level and first difference. * Indicates rejection of the null hypotheses at 1% and 5% level of significant in level and first difference.</i>		

Source: e-views-v-10

c. ARDL Bounds Test Result for Co-integration

The estimation of equation tests for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables, against the alternative one.

The calculated F-statistics are reported in Table 3.3, when LnUNR variable is considered as a dependent variable in the ARDL regressions. From the above results, it is clear that there is a long run relationship amongst the variables. This implies that the null hypothesis of no co-integration among the variables is rejected.

Table3.3: ARDL Bound Testing to Co integration Results

Model						F-statistic				Inference			
F _{LnUNR} (LnUNR/LnRGDP, LnPOP, LnFDI, LnEXD, LnINFR)						7.276699*				YES			
Critical value bounds of the F-statistic and T-statistic: unrestricted intercept and no trend													
		F-statistic						T-statistic					
K=5	SIGN-LEVEL	99%		95%		90%		99%		95%		90%	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
		3.41	4.68	2.62	3.79	2.26	3.35	3.43	4.79	2.86	4.19	2.57	3.86
Note: 1) K is the number of regressors 2) * denote statistically significance at one percent levels of significance.													

Source: e-views-v-10

d. Long run Relationship of Variables

The long run impact of explanatory variables (LnRGDP, LnPOP, LnFDI, LnEXD, LnINFR)) on unemployment in an equation form as follows:

$$\text{LnUNR} = (-2.65) \text{LnRGDP} - (-4.00) \text{LnPOP} - (-2.22) \text{LnFDI} - (-3.65) \text{LnEXD} - (-2.21) \text{LnINFR}$$

Where () are the t-values.

It can be understood as, other things being constant; a percentage change in real gross domestic product causes the long run unemployment reduction to change by about 44% and this is significant at five percent significance level. As increase in GDP is an indicator of economic growth, resulting in job creation in the country, reducing unemployment rate. This sign also strength the result of (Eita et al., 2010; Xuen et al., 2017; Muhammad et al., 2013). The result demonstrates that one percent increase in inflation rate leads to 62 % decrease in unemployment rate. This result supported the traditional Philip's curve which indicates a trade-off between inflation and the level of unemployment. According to Philip (1958), "the low unemployment rates were associated with high inflation rate and that those periods with high unemployment were associated with low inflation rate".

Result show that one percent increase in foreign direct investment leads to 43 % decrease in unemployment rate. As the FDI inflows increases in a country then

unemployment reduces because FDI provides new opportunities and thus helping in falling the unemployment. The study support the work of (Xuen et al., 2017). Population also has been significantly explaining long run unemployment in Ethiopia. It can be understood as, other things being constant; a percentage change in population growth causes the long run unemployment reduction to change by about 964% and this is significant at one percent significance level. The result of this study also consist from (Xuen et al., 2017. Suggesting with all other factors held constant, the results show that increase in the external debt by one percent leads to 161% decrease in unemployment and this is significant at one percent significance level. So, external debt is reducing unemployment in the long run. Moreover, it is consistent with the study of (Muhammad et al., 2013).

e. Short Run Relationship of Variables

Table.4.4: Estimated short-run coefficients using the ARDL approach

Dependent variable: D(UNR)				
Ecm(-1)	Coefficient	Std. Error	T-Statistic	Probability
	-1.266859	0.162937	-7.775125	0.0000
CON	29.08011	3.742687	7.769849	0.0000
Independent Variables	Short run elasticity's at various lag length			
	y_{t-1}	y_{t-2}	y_{t-3}	
$D(LNRGDP)$	-0.002869 (-0.036764) [0.9712]	0.345512 (4.296093) [0.0009]	0.096334 (2.223470) [0.0445]	
$D(LNINFR)$	-0.252623 (-5.068415) [0.0002]	0.365498 (5.060667) [0.0002]	0.160502 (2.208464) [0.0458]	
$D(LNFDI)$	0.234874 (3.464443) [0.0042]	0.706686 (5.315750) [0.0001]	0.396568 (3.843945) [0.0020]	
$D(LNEXD)$	-1.582973 (-4.512200) [0.0006]	0.659407 (2.251487) [0.0423]	1.127665 (3.488448) [0.0040]	
R-Squared	0.862768	MDV ¹	-0.071713	
Adjusted R-Squared	0.763656	S.D. DV ²	0.808158	
S.E. of Regression	0.392887	AIC ³	1.269049	
Sum Squared RESID	2.778489	SC ⁴	1.910308	
Log Likelihood	-6.304777	HQC ⁵	1.481608	
F-Statistic	8.704993	DW ⁶	2.618272	

¹ Mean dependent variable

² Standard deviation dependent variable

³ Akaike information criterion

⁴ Schwarz criterion

⁵ Hannan- Quinn criter.

⁶ Durbin-Watson stat

Prob(F-Statistic)	0.000027
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Source: e-views-v-10

Note: Numbers without brackets are the short run elasticity of corresponding series; () are t-values and; [] are the P-Values; and D, represents the Difference Term: y_{t-i} , represents the lag length.

At first lag of real gross domestic product has a negative and insignificant impact on unemployment level in Ethiopia. But, there is a statistically positive relationship between GDP and the unemployment rate at lag two and three. The results show that increase in the lag two and lag three of GDP by one percent leads to 34% and 9% increase in unemployment respectively, in the short run. This finding suggests that growth in Ethiopia is not pro-employment generation for short run. The difference in the nature of the growth achieved and its impact on unemployment is what makes economical policies in Ethiopia fail to reduce unemployment rates although growth rates were fairly high. The result support the work of Jonathan et al., 2015; Arslan and Zaman, 2014).

The result indicates that inflation is statistically significant under all specified lags. therefore, the coefficients of this value could also be explained in elasticity concept as if they have an impact on the current period. It is consistent with work of (Jonathan et al., 2015; Arslan and Zaman, 2014). The first lag, lag two and lag three periods, inflation has significant impact on the current period of unemployment. According to the above result, inflation of the lag two and lag three period shows a positive influence to the current period while the first lag has a negative sign. Hence by considering *ceteris paribus* when inflation at first lag increased by one percent, unemployment decreased by 25%. Concerning lag two and lag three, inflation rate have positive effect on unemployment. Result show that a 1% increase in lags two and lag three, unemployment level increased by 36% and 16%. Implying that inflation in the previous year is significant in affecting the unemployment rate positively.

The short run elasticity of foreign direct investment has positive effect on unemployment at all lag. Empirical research does not always confirm the inverse relationship of unemployment and foreign direct investment. Therefore, we can confidently assume that FDI show short run positive influence on the unemployment. The study result similar from Jaouadi (2014). The external debt was important in the short run. In the first lag of external debt, it has negative impact on unemployment. The result above shows that, first lag of EXD has a coefficient of -1.58. This indicates that there is immediate high response of unemployment rate to changes in external debt in the negative direction, and this is statistically significant at 5% level. The second and third lag of external debt has positive impact on unemployment in the short run. This may be due to poor management of external debt. At last, there is no short run relationship between unemployment and population.

The coefficient of error correction is significant at one percent significance level with negative sign. The coefficient of ECM is (-1.27) which shows high speed of adjustment from short run fluctuations to long run equilibrium approximately 127 percent of disequilibrium from the previous year's shock convergence back to the long run equilibrium in the current year. According to Kidanemarim (2014), Ahmed and Ambreen (2014), the highly significant error correction term further confirms the existence of a stable long-run relationship.

Conclusion and recommendation

Unemployment is a socio-economic phenomenon, in which part of the labor force is not engaged in the production of goods and services. In actual economic life, unemployment appears as an excess of supply of labor over demand on it (Malika et al., 2017). The bounds testing approach demonstrates that there is a long run relationship between the unemployment rate and real gross domestic product, foreign direct investment, population

growth, inflation rate and external debt. This study performed diagnostic checks, the results show that there is no serial correlation, no conditional heteroscedasticity, and no specification error and there is a normal distribution in the ARDL model. The CUSUM and CUSUMSQ² statistics are well within the 5% critical bounds.

At the bottom line the researcher recommend the folloing points;

- ✓ the study suggests the government should increase the supply of external direct investment properly to take them more job searchers in short and long run, and create a conducive environment that entice many foreign direct investment.
- ✓ The study prove that economic growth is not good to capture more joblessness group, so the government should address the appropriateness of each economic sector for their attractiveness of unemployed peoples.
- ✓ Even if the result shows that external debt has a good contribution for unemployment reduction, but as much as possible the government should safe it self from external debt overhang.
- ✓ Due to trade off between inflation and unemployment, the government should increase aggregate supply.
- ✓ Creation of labor-intensive projects and consolidate the existing entrepreneurship activity with new entrepreneurial entrants so as to create more employment and absorb a large pool of unemployed population.

Insight for researchers;

Other interesting resercher can improve this study with many ways:-

- Increase the time period.
- Trend of each variable, their short and long run causality.
- Look the influence of political instability, corruption and climate change by considering them as dummy variable.
- Alternatively looking this study by including other African countries.

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