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The unemployment and Economic Growth in Ethiopia

Wondimu Woldemichael Woldegiorgis
Department of Economics, Bonga University, Ethiopia
* E-mail: Wonde12abeba@gmail.com

Abstract

Ethiopia's economic progress is impeded by unemployment as a serious issue. Applying the Johansson co integration and vector error correlation methods, as well as 40-year(1983-2022) yearly time series data, this study experimentally investigates the correlation between unemployment and economic growth. As a result, a 1% rise in unemployment causes the real GDP to fall by roughly 0.03%, indicating that unemployment has a statistically significant negative influence on economic growth. In order to mitigate the adverse effects of unemployment and broaden the pool of employment-generating mechanisms by augmenting investments in sectors other than agriculture that employ a greater labor force the study advocates for the adoption of additional mechanisms for creating jobs, addressing the shortcomings of the labor market, and enhancing labor force productivity through improved policies and increased sectoral linkages.

Keywords: Unemployment, Economic growth, Ethiopia, Vector error correlation Model

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1. INTRODUCTION

Unemployment and economic growth are two crucial indicators that reflect the overall health of an economy. In the case of Ethiopia, understanding the relationship between these two factors is essential for policymakers to implement effective strategies to promote sustainable development and improve living standards for its citizens.

Ethiopia has been facing significant challenges in addressing unemployment. According to the World Bank, the unemployment rate in Ethiopia was estimated at 19.1% in 2020 (World Bank, 2021). The high unemployment rate is a concern as it not only affects individuals' livelihoods but also hinders overall economic progress.

On the other hand, Ethiopia has experienced notable economic growth over the past decade. The country has been one of the fastest-growing economies in Africa, with an average annual GDP growth rate of around 9% from 2010 to 2019 (World Bank, 2021). This economic growth has been driven by various factors such as investments in infrastructure, agriculture, and manufacturing.

There is a complex relationship between unemployment and economic growth. High levels of unemployment can be detrimental to economic growth as it leads to lower consumer spending, reduced productivity, and social unrest. Conversely, strong economic growth can create job opportunities and reduce unemployment rates.

Several studies have explored the correlation between unemployment and economic growth in Ethiopia. Abebe et al. (2018) found a negative relationship between unemployment and economic growth in Ethiopia. The authors highlighted the need for targeted policies to address unemployment challenges while fostering sustainable economic growth. Generally, understanding the correlation between unemployment and economic growth is essential for policymakers in Ethiopia to design effective strategies that promote job creation and sustainable development.

2. REVIEW OF RELATED LITERATURES

According to Keynes (1936), a deficiency of expenditures in an economy results in a fall in aggregate demand, which in turn causes unemployment, economics, economies grow when there is a healthy level of output supported by an adequate level of economic expenditures.

According to the perspectives of classical economics, the need for labor is a derived need that results from the shrinking share of the labor marginal product. Because the amount demanded of labor will decrease as wages rise, the demand curve is a negative function of real pay. Conventional wisdom dictates that employment should rise and the unemployment rate should fall in a nation where economic growth is more rapid. The Viewpoints of Classical Economics: It is not possible to sustain an economic growth model that is dependent on foreign capital

movements driven by consumption rather than employment. All unemployment whether in the labor market or other resource markets, ought to be regarded as voluntary, according to classical economists. Because they won't settle for less pay, workers who are unemployed voluntarily are unemployed. According to classical economics, boosting aggregate demand can quickly bring unemployment down below the natural rate. But, once wages eventually stabilize and unemployment returns to its historical level, inflation will rise (Adam Smith, 1776).

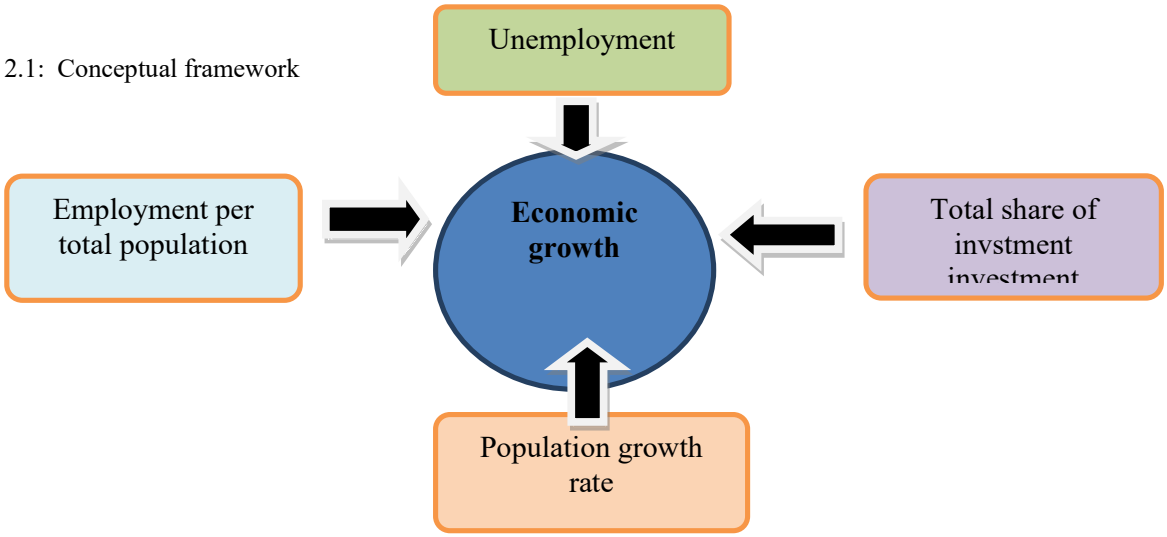
Arthur Okun (1962) looked into how unemployment affected the US economy's growth. Improvements in output level were suggested by the outcome, which showed a substantial negative correlation (Prachowney, 1993). In ten carefully chosen industrialized nations, Seyfried (2005) examined the relationship between employment and economic growth from 1990 to 2003. Based on a one percent rise in economic growth, unemployment decreases to 0.61 percent, indicating a negative relationship between economic growth and unemployment.

Husain et al. (2010) used VECM and Johansen co integration to investigate the relationship between unemployment and economic growth in Pakistan from 1972 to 2006. The outcome confirms the presence of the negative relationship between unemployment and economic growth in the short and long terms.

Using yearly time series data (1970-2000) using a three-stage least square (3SLS) estimation, Osinubi (2005) also looked into the effects of economic growth on unemployment and poverty in Nigeria. The research employed a selection of variables, including changes in real GDP, savings, labor stoppages, trade disputes, money supply, exchange rate, inflation, and the index of petroleum and agricultural production. The findings demonstrated a negative relationship between poverty and growth and a positive relationship between unemployment and growth.

Using ordinary least squares, Noor et al.(2007) looked into how Bangladesh's unemployment rate was affected by economic growth between 1970 and 2004. The outcome suggests that economic expansion has a detrimental effect on unemployment. In this research, the dependent variable is Real GDP (RGDP), which serves as a stand-in for economic growth. The independent variables are Population Growth Rate (POPGR), Employment per Total Population (EPTP), Total Investment (SINV), and Unemployment (UEMP).

Figure 2.1: Conceptual framework



Source: Adapted from Mundi (2014)

3. RESEARCH METHODOLOGY

Time series study design was employed by the investigator. to investigate how Ethiopia's economic growth is affected by unemployment. Secondary data sources are used by us. Secondary data is gathered using this technique of data collection from secondary sources. For our research, we use a variety of secondary data collection methods, including the internet, CSA annual reports, published books, and journals. The National Bank of Ethiopia, The Next Generation Pen World Table, and the World Bank's WDI databases provided annual time series data for the fiscal years 1974–2013. These data were used to investigate the connection between Ethiopia's economic growth and unemployment.

Applying the Johansen co integration and Vector Error Correction methods, this study uses 40 years' worth of annual time series data (1983to 2022) to experimentally analyze the relationship between unemployment and economic growth.3.4. Estimation Technique

The estimation method consists of three primary steps after the model is specified. To verify that variables are stationary, the first method is the Augmented Dickey-Fuller (ADF) approach. The second is the Johansen strategy using Vector Auto Regression (VAR) and Co integration for the long run dynamics. Lastly, to capture the short run dynamics, the Vector Error Correction (VECM) analysis is used.

Model one: - RGDP = f (UEMP) ---------- (1)
Where: UEMP = f (SINV, EPTP, POPGR).

Model two: - RGDP = f (SINV, EPTP, POPGR) ---------- (2)
RGDPt= βUEMPt + μt ---------- (1.1)
RGDPt = $\beta 1$SINVt + $\beta 2$EPTPt + $\beta 3$POPGRt + μt ---------- (2.1)

When every variable is converted to log form, the model shown above (1a and 2a) written as:
LnRGDPt= β1lnUEMPt +εt ---------- (1.2)
$LnRGDPt$ = β1lnSINVt + β2lnEPTPt + β3lnPOPGRt +εt---------- (2.1)
Where: μ: is the error term (white noise), andα & β's: are parameters that measure coefficient of explanatory variables that measures the extent of which economic growth changes as a result of a unit change in the respective explanatory variables.
RGDP or GDP =is dependent variable represent economic growth.
UNEMP= unemployment.
SINV= total share investment.
EPTP= employment per total population.
POPGR= population growth rate.

Table 3.1 Summary of variable description

Variable	Proxy	Expected sign	Measurement
Economic growth	GDP(RGDP)		Per capital income
Unemployment	UNEMP	_	Unemployment rate
Total share investment	SINV	+	Gross capital formation percentage of GDP
Population growth rate	POPGR	-	% change in size of population in a year (Natural increase Net in migration/population size)
Employment per total population	EPTP	+	Employment-population ratio

Hypothesis and Testing

Stationary test

To determine if each variable is stationary and what the order of integration (lag length) is, the Augmented Dickey-Fuller (ADF) test is used. The right lag duration is determined by either the Akanke Information Criterion (AIC) or the Schwartz Criterion (SC).The updated version of DF is called ADF. The first order autoregressive model for the simplest DF test is as follows:

$$Yt = \beta Yt\text{-}1 + \mu t \quad \text{---------- (3)}$$

An auto-correlated error term will result from the variable following a higher order [>I (1)] auto-regressive process. usage of DF was thus broken. The error terms will not be white noise, making it difficult to employ DF when auto-correlated errors are present. More lags in the dependent variable's first differences were added to the DF model in order to address this shortcoming. Augmented Dickey Fuller (ADF) is the term for this. Consequently, the aforementioned equation was rewritten by deducting the lag value from each side. Therefore, deducting Yt-1 from both sides results in:

$Yt - Yt\text{-}1 = \beta Yt\text{-}1 - Yt\text{-}1 + \mu t$ or simply written as
$\Delta Yt = (\beta\text{-}1)\, Yt\text{-}1 + \mu t$ which can further be simplified as
$\Delta Yt = \gamma\, Yt\text{-}1 + \mu t$ where $\gamma = (\beta\text{-}1)$ ---------- (3.1)

The parameter γ is the subject of the stationary test. It is implied that the variable Yt is not stationary if $\gamma = 0$ or ($\beta = 1$). The following is the formulation of the hypothesis:

H0: $\gamma = 0$ or ($\beta = 1$)
H1: $\gamma < 0$ or ($\beta < 1$)

It suggests using the regression model to test for the presence of a unit root by include both an intercept and a time trend. The variable is non-stationary against the alternative stationary in both tests, according to the null hypothesis. Only when there is substantial evidence against the null hypothesis at the traditional significance thresholds is it rejected. When only an intercept is included, the usual form of the ADF equation is as follows:

$$\Delta Yt = \alpha + \gamma Yt\text{-}1 + \varepsilon t \quad \text{---------- (3.2)}$$

Long Run Dynamics

One can pursue what is referred to as co integration in order to acquire both the short- and long-term connection. The existence of long-term relationships in the system is shown by co-integration between the variables. Multiple co-integration relationships can be estimated and tested for in a single step using the Johansen (1988) approach. Furthermore, it permits model estimation without requiring the variables to be classified as endogenous or exogenous beforehand. The variables in the model are represented by a vector of possibly endogenous variables under this procedure. This process begins with the following formulation of the unconstrained vector autoregressive (VAR) model, taking into account the 'p' delays of Yt: One can pursue what is referred to as co integration in order to acquire both the short- and long-term connection. The existence of long-term relationships in the system is shown by co-integration between the variables. Multiple co-integration relationships can be estimated and tested for in a single step using the Johansen (1988) approach. Furthermore, it permits model estimation without requiring the variables to be classified as endogenous or exogenous beforehand. The variables in the model are represented by a vector of possibly endogenous variables under this procedure. This process begins with the following formulation of the unconstrained vector autoregressive (VAR) model, taking into account the 'p' delays of Yt:

$$Yt = A1Yt\text{-}1 + A2Yt\text{-}2 + \ldots + ApYt\text{-}p + BXt + \varepsilon t \quad \text{----------} \qquad (3.3)$$

Where Ytis a k-vector of the I(1)endogenous variables, that is, the differenced or integrated of order one.
A d-vector of exogenous deterministic variables is represented by Xt.
A1... Ap and B are matrices of coefficients that need to be estimated. It's a vector of innovations that might be contemporaneously associated, but it's also uncorrelated with all of the variables on the right side and with its own lagged values. Given that the majority of economic time series are non-stationary, the VAR model mentioned above is typically estimated in its first-difference form as follows:

$$\Delta Yt = \Gamma 1 \Delta Yt\text{-}1 + \Gamma 2 \Delta Yt\text{-}2 + \ldots + \Gamma p\text{-}1 \Delta Yt\text{-}p + BXt + \varepsilon t \quad \text{----------} \qquad (3.4)$$

Then, simplifying the above equation gives:
□Y t□□□Y t-1 □□□□i□□Y t-1□□BXt□□□□□ ---------- (3.4.1)
□□□□□□□□□□□

Short Run Dynamics

The VECM will represent two time series in assessing their short run qualities if they are co-integrated, or if a long-run relationship exists between them (Engle-Granger, 1987). For both bivariate and multivariate models, the vector error correction model (VECM) general form is as follows:

$$\Delta ln\text{RGDPt} = \alpha 0 + \Sigma\, ki{=}1\ \beta 0 \Delta ln\text{UEMPt} + \Sigma\, ki{=}1\ \beta 1 \Delta ln\text{UEMPt-1} + \Sigma\, ki{=}1\ \alpha 1 \Delta ln\text{RGDPt-1} + ECTt\text{-}1 + vt \text{---- (3.5)}$$

$\Delta lnRGDPt = \beta 0 + \Sigma\ ki=1\ \alpha 1 \Delta lnRGDPt\text{-}1 + \Sigma\ ki=1\ \beta 1 \Delta lnPOPGRt + \Sigma\ ki=1\ \beta 2 \Delta lnSINVt + \Sigma\ ki=1\ \beta 3 \Delta lnEPRt + ECTt\text{-}1 + vt$---------- (3.5.1)

In this case, Δ represents the initial difference operator, is the error correction term lag by one period, is the error correction term's short-run coefficient (-1<γ<0), and vt stands for the corresponding model's white noise terms. For the system to converge to equilibrium, the coefficient of vt needs to have a negative sign. The magnitude of the error correction term, which signifies the rate of adaptation towards the equilibrium state, in that Little values that approach zero suggest that the economic agents eliminate a significant portion of the disequilibrium during each period. Greater values that approach 0 signify a sluggish adjustment. Less than negative two, or extremely small values, signify an overshooting of the economic equilibrium. Positive numbers would suggest that the system deviates from the path of long-term equilibrium.

4. Major Findings

4.1 Stationary Result

Since log variables offer elasticity, mitigate the impact of outliers, and smooth out time series, Maddala (1992) states that the logarithm (ln) of each variable was computed prior to the stationary or unit root tests. This means that before executing the long run estimation among the variables, the time series features of the data are examined using the "ADF" and "PP" tests to all the variables in levels and in first difference; initially, "without trend (intercept only)" and later, "with trend (intercept and trend)". The series has a unit root (is non-stationary), which is the null hypothesis. The alternative hypothesis is that the series is stationary (has no unit root). An overview of the result is given in the table below.

ADF Test Result				
At Level			At 1st Difference	
Without trend		With trend	Without trend	With trend
LRGDP	-3.615588	-4.226815	-3.639407	-4.252879
LUEMP	-3.615588	-4.219126	-3.615588	-4.219126
LSINV	-3.610453	-4.243644	-3.621023	-4.226815
LPGR	-3.670170	-4.296729	-3.639407	-4.309824
LEPTP	-3.615588	-4.219126	-3.615588	-4.219126

PP TEST

PPTest Result				
	At Level		At 1st Difference	
Without trend		With trend	Without trend	With trend
LRGDP	-3.610453	-4.211868	-3.615588	-4.219126
LUEMP	-3.610453	-4.211868	-3.615588	-4.219126
LSINV	-3.610453	-4.211868	-2.941145*	-3.533083*
LPGR	-2.938987*	-3.529758*	-3.615588	-4.219126
LEPTP	-3.610453	-4.211868	-2.941145*	-4.219126

Source: - EVIew for version 10
(coefficient is significant at 1% significance level * 5%)

As shown by the outcomes of the previously described "ADF" and "PP" tests of unit root, every variable is stationary at first difference. The next stage, then, is to examine the long-term relationship between the variables. The Johansen technique can be applied with confidence because all of the variables selected for this investigation have mutual orders of integration.

4.2. The Long Run Dynamics

The first stage in the co integration analysis of the Johansson maximum likelihood approach is to choose an appropriate length to be used in the VAR and VECM estimate. "Lag 3" was selected for model one and "lag 2" for model two, according to the Akaike Information Criterion (AIC) result. Based on the findings of the Johansen test of co-integration, the following table displays the long-term associations of the variables under both Botsh models one and two:

Table 2: Johansen co integration test result
a. Co integration result for model one test

Hypotheses		Eigen value	Johannes test statics			
Ho	H1		(λ *max*)	critical value 5%	(λ *trace*)	critical value 5%
r=0	r≥1	0.450288	21.54096	14.26460	21.55923	15. 9471
r≤1	r≥2	0.000507	0.018267	3.841466	0.018267	3.841466

b. co intrgration test result for model two

r=0	**r≥1**	**0.858539**	**72.36205**	**27.58434**	**110.5218**	**47.85613**
r≤1	r≥2	0.493128	25.14141	21.13162	38.15971	29.79707
r≤2	r≥3	0.290431	12.69460	14.26460	13.01830	15.49471
r≤3	r≥4	0.008711	0.323707	3.841466	0.3270	3.841466

Source: - E Views version 10.
Note: - indicates the number of co-integrating relationships; r Number of lags used in the analysis: 3 for table 2(a), and 2 for table 2(b);
Ascending to the co integration analysis in the Johansson maximum likelihood technique begins with figuring out what length is appropriate to use in the VAR and VECM calculation. The results of the Akaike Information Criterion (AIC) indicated that "lag 2" was selected for model two and "lag 3" for model one. Drawing on the findings of the Johansen test of co-integration, the following table presents an overview of the long-term correlations between the variables under both Botsh models one and two:

Table 3: Normalized cointegrating coefficents

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	LUEMP
1.000000	-0.036230
	(0.41618)

Adjustment coefficients (standard error in parentheses)	
D(LRGDP)	-1.393460
	(0.34898)
D(LUEMP)	-0.165019
	(0.04811)

Source: - E Views version 10.
The first stage in the co integration analysis of the Johansson maximum likelihood approach is to choose an appropriate length to be used in the VAR and VECM estimate. "Lag 3" was selected for model one and "lag 2" for model two, according to the Akaike Information Criterion (AIC) result. Based on the findings of the Johansen test of co-integration, the following table displays the long-term associations of the variables under both Botsh models one and two:

Table 4:- VAR estimation for model one

LRGDP	Coefficient	Standard error	t-statistics
LRGDP(-1)	0.475090	0.18111	2.62321
LUEMP(-1)	-1.510123	1.31756	-1.14615
LRGDP(-2)	-0.226670	0.20914	-1.08384
LUEMP(-2)	1.756614	2.10742	0.83354
LRGDP(-3)	-0.186405	0.19099	-0.97600
LUEMP(-3)		1.30694	-0.58280
	-0.761678		
constant	2.416926	0.72202	3.34744

R-squared	0.313336	0.967774
Adj. R-squared	0.176003	0.961328
Sum sq. resides	14.85283	0.269651
S.E. equation	0.703629	0.094807
F-statistic	2.281580	150.1523
Log likelihood	-35.61527	38.54783
Akaike AIC	2.303528	-1.705288
Schwarz SC	2.608296	-1.400520
Mean dependent	1.772754	1.480894
S.D. dependent	0.775142	0.482108

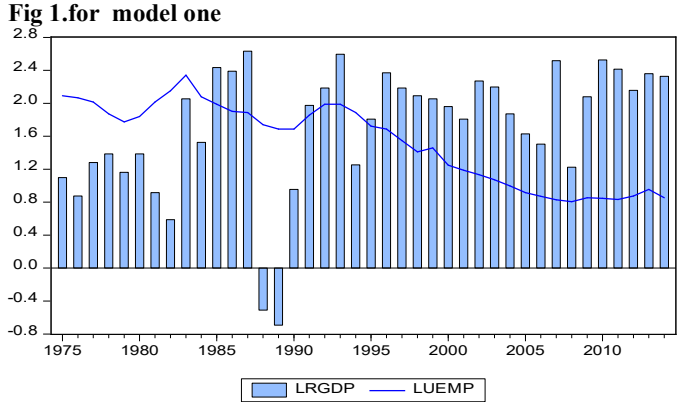
Determinant reside covariance (dof adj.)	0.004378
Determinant reside covariance	0.002878
Log likelihood	3.232784
Akaike information criterion	0.582012
Schwarz criterion	1.191548

Source: - E VIews version 10.

The result shows that for all three of the given delays, real GDP and unemployment are both statistically significant. Therefore, the elasticity idea may also be used to explain the coefficients of this value, as they would appear to have an effect on the current period. Real GDP and unemployment have a major effect on the current period in each of the three lag periods. According to the above result, real GDP of the previous one and three lag period shows a positive influence to the current period while the second lag period have a negative sign. Regarding unemployment, there is a positive sign in the third lag period compared to a negative sign in the first and second lag periods. This might be explained by the idea that people who are unemployed for extended periods of time grow weary of waiting for employers to hire them and start looking for other sources of income, such as traveling abroad. As suggested by the Economist (2011), or involving themselves in alternative sources like the unorganized sectors. Mulu (2007) suggested that the informal sector is a significant source of employment and means of subsistence in support of this claim. Similarly, wage employment (that is, work

without guaranteed contracts, worker benefits, or social protection) and employment in small, unregistered informal businesses were included in the figures provided by the ILO (2002) for informal employment outside of agriculture. constitutes half or more of the non-agricultural jobs in developing nations. Notwithstanding this, they start making money from the activity they were involved in, which could improve their standard of living.

Fig 1.for model one



Source: - own computation using E Views for Windows package version 10

Table 5: Normalized co integrating coefficient for model two

Normalized cointegrating coefficients (standard error in parentheses)

LRGDP	LEPTP	LPGRTP	LNINV
1.000000	302.2309	22.85430	0.755372
	(85.8181)	(2.22593)	(0.14670)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-0.022591
	(0.03238)
D(LEPTP)	-0.000505
	(0.00014)
D(LPGRATE)	-0.005023
	(0.00062)
D(LSINV)	0.015427
	(0.03728)

2 Co integrating Equation(s): Log likelihood 193.7103

Normalized co integrating coefficients (standard error in parentheses)

LRGDP	LEPTP	LPGRATE	LSINV
1.000000	0.000000	1.172065	-0.048112
		(0.43137)	(0.03335)
0.000000	1.000000	0.071741	0.002659
		(0.00582)	(0.00045)

Adjustment coefficients (standard error in parentheses)

D(LRGDP)	-1.192038	27.67614
	(0.26770)	(10.8523)
D(LEPTP)	0.001154	-0.201579
	(0.00153)	(0.06210)
D(LPGRATE)	-0.009265	-1.392841
	(0.00666)	(0.27002)
D(LSINV)	0.680317	-14.95466
	(0.38236)	(15.5002)

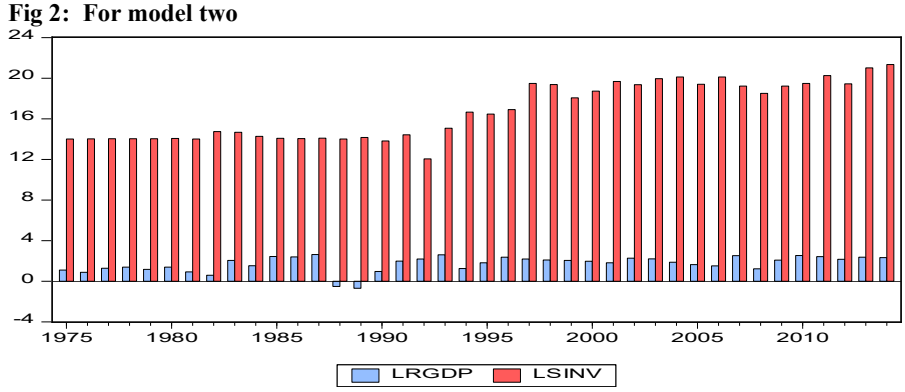
3 Co integrating Equation(s):	Log likelihood	200.0576	
Normalized co integrating coefficients (standard error in parentheses)			
LRGDP	LEPTP	LPTPOP	LSINV
1.000000	0.000000	0.000000	-0.113265
			(0.03412)
0.000000	1.000000	0.000000	-0.001329
			(0.00064)
0.000000	0.000000	1.000000	0.055588
			(0.01141)
Adjustment coefficients (standard error in parentheses)			
D(LRGDP)	-1.191270	28.70617	0.598587
	(0.26835)	(27.3563)	(0.66734)
D(LEPTP)	0.000873	-0.577323	-0.016841
	(0.00133)	(0.13529)	(0.00330)
D(LPTPOP	-0.008303	-0.102602	-0.097968
	(0.00613)	(0.62462)	(0.01524)
D(LSINV)	0.691070	-0.532838	-0.132243
	(0.38214)	(38.9568)	(0.95032)

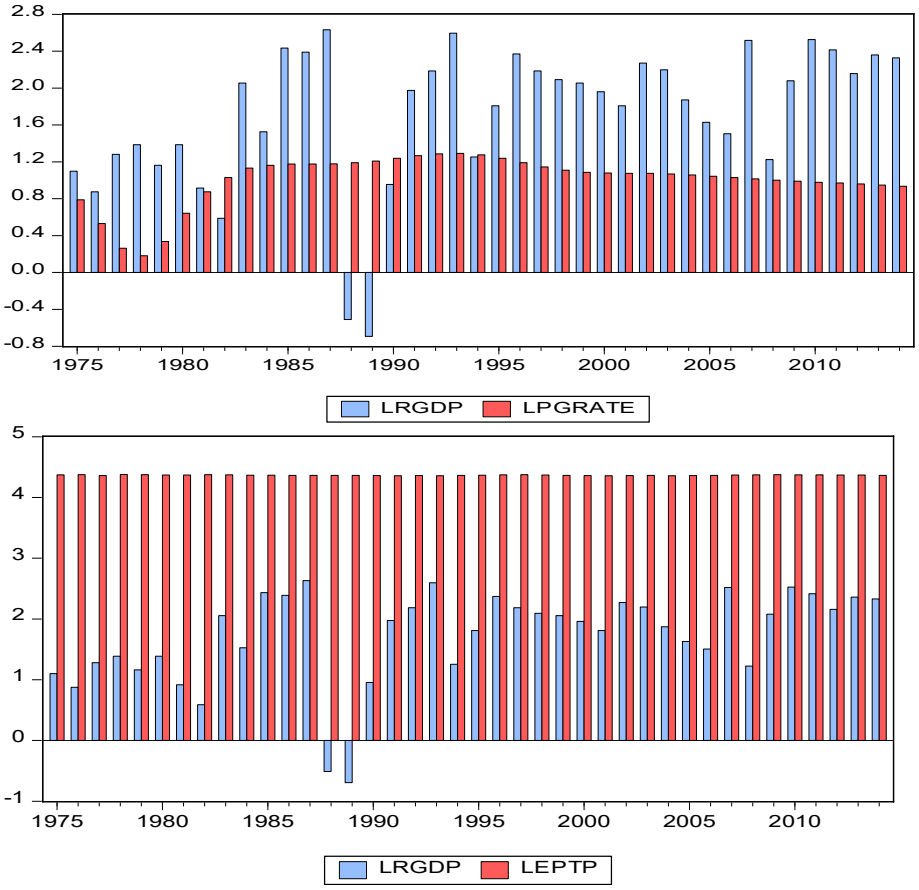
Source: - E Views version 10

As a result, model two's long run coefficients are shown in the table above. The elasticity notion states that real GDP rises by 0.755% and 22.85%, respectively, for every 1% increase in total investment (public and private). Similarly, an increase of 1% in the percentage of working-age people relative to the total population leads to a real GDP increase of 302.2309%.

Consequently, higher employment rates and national investment are essential over the long term because they enable the country's engaged and productive workforce to offset the rising unemployment rate. In order to sustain the aforesaid positive effect on the country's economic growth, productivity improvements are also required. This will also make the industry more approachable for the working class by creating more job opportunities. Additional evidence for this may come from other past studies. Denu et al. (2005), for example, claimed that low productivity was the outcome of many people filling few positions, leading to "disguised unemployment" in Ethiopia's labor market. Furthermore, Photious (2004) found that unpaid family laborers made almost half of the working population in rural Ethiopia.

Fig 2: For model two





Source: - own computation using E Views for Windows package version 10

Table 6:- VAR estimation for the multivariate system

LRGDP	Coefficients	Standard Error
LRGDP(-1)	0.411838	0.17325
LPTPOP(-1)	0.013552	0.014890
LEPTP(-1)	26.15526	26.0637
LSINV(-1)	0.005638	0.12255
LRGDP(-2)	-0.310027	0.17482
LPTPOP(-2)	-0.070911	0.028193
LEPTP(-2)	0.972793	1.22903
LSINV(-2)	0.0084570	0.12190
CONSTANT	-98.62900	105.587

R-squared	0.367278	0.465720	0.981563	0.897961
Adj. R-squared	0.192734	0.318333	0.976477	0.869813
Sum sq. resides	13.83506	0.000692	0.046762	28.79482
S.E. equation	0.690703	0.004886	0.040156	0.996456
F-statistic	2.104213	3.159838	192.9889	31.90073
Log likelihood	-34.72245	153.4281	73.38535	-48.64924
Akaike AIC	2.301181	-7.601477	-3.388702	3.034170
Schwarz SC	2.689031	-7.213627	-3.000853	3.422020

Mean dependent	1.759811	4.366027	1.023795	16.90372
S.D. dependent	0.768747	0.005918	0.261818	2.761683

Determinant reside covariance (df adj.)	1.75E-08
Determinant reside covariance	5.94E-09
Log likelihood	144.1966
Akaike information criterion	-5.694560
Schwarz criterion	-4.143162
Number of coefficients	36

Source: - E Views version 10

Based on the results above, it can be concluded that only the population and real GDP results were statistically significant at the one percent significance level. Real GDP at lags one and two, therefore, has a statistically significant positive impact on the current period of 41% and 31%, respectively. Conversely, the outcome shows a 3% negative impact from the population at lag two on the current era. The residual variables do not exhibit statistical significance, indicating that their past or lag-related values do not exert a substantial influence on the present period.

4.3. Short Run Dynamics

As the Johansen co integration result indicated existence of long run relation among the variables, VECM can be applied in order to evaluate the short run properties of both model one and two respectively

Table 7:- VECM estimation for the bi-variant system

D(LRGDP)	Coefficient	Standard Error
C(1)	-1.061912	0.32502
D(LRGDP(-1))	0.498315	0.28565
D(LUEMP(-1))	-1.049257	1.32398
D(LRGDP(-2))	0.284151	0.23871
D(LUEMP(-2))	0.232879	1.38269
D(LRGDP(-3))	0.051276	0.20799
D(LUEMP(-3))	1.382981	1.30960
c	0.024444	0.13699

R-squared	0.419558	0.456794
Adj. R-squared	0.274447	0.320992
Sum sq. reside	14.07630	0.215034
S.E. equation	0.709031	0.087634
F-statistic	2.891298	3.363688
Log likelihood	-34.17931	41.08683
Akaike AIC	2.343295	-1.838157
Schwarz SC	2.695188	-1.486264
Mean dependent	0.026166	-0.028261

Determinant reside covariance (dof adj.)	0.003778
Determinant reside covariance	0.002285

Log likelihood	7.297688
Akaike information criterion	0.594573
Schwarz criterion	1.386332

The outcome shows that the real GDP's one- and three-year lagged values have a one percent statistically significant impact on the current real GDP. According to the elasticity idea, the present real GDP is positively impacted by a 1% increase in the real GDP of the lagged one, two, and three years by 0.49% and 0.28%, respectively. In contrast, the lag period's unemployment rate of 1% is statistically significant.

Table 8:- VECM estimation for the multivariate system

D(LRGDP)	Coefficients	Standard Error
C(1)	-0.022591	0.03238
D(LRGDP(-1)	-0.152821	0.18640
D(LPTPOP(-1)	-3.195771	3.47939
D(LEPTP(-1)	28.50375	32.4685
D(LSINV(-1)	0.171748	0.034752
D(LRGDP(-2)	-0.208538	0.18388
D(LPTPOP(-2)	3.502258	3.38019
D(LEPTP(-2)	10.57181	31.7025
D(LSINV(-2)	0.052203	0.16548
C	0.071247	0.15593

R-squared	0.125882	0.963515	0.428837	0.182494
Adj. R-squared	-0.165491	0.951354	0.238449	-0.090007
Sum sq. reside	21.20358	0.007780	0.000423	28.10576
S.E. equation	0.886181	0.016974	0.003959	1.020272
F-statistic	0.432029	79.22653	2.252441	0.669700
Log likelihood	-42.20089	104.1419	158.0061	-47.41427
Akaike AIC	2.821670	-5.088753	-8.000332	3.103474
Schwarz SC	3.257053	-4.653370	-7.564949	3.538857
Mean dependent	0.028306	0.018209	0.000103	0.197656
S.D. dependent	0.820858	0.076961	0.004536	0.977240

Determinant reside covariance (dof adj.)	2.32E-09
Determinant reside covariance	6.57E-10
Log likelihood	181.1395
Akaike information criterion	-7.412949
Schwarz criterion	-5.497262
Number of coefficients	44

As the above table shows, almost all of the variables with the stated lag time have a major short-term impact on the current period. Because the number of employed people per total population in lag period one was not statistically significant, it appears that employment in the year prior had no effect on the present period.

5. Conclusions and Recommendations

Unemployment is a serious issue in every economy. It has detrimental consequences for the jobless, who are less likely to secure new jobs and are less confident in their ability to maintain their current roles in the long run. One of the primary barriers to economic expansion in Ethiopia is joblessness. This study experimentally examines the impact of unemployment on the country's economic growth utilizing a 40-year (1983–2022) yearly time series of data using the Johansen co integration and vector error correction methods. The results show that unemployment has a statistically significant negative influence on Ethiopia's economic growth, with a 1% increase in unemployment translating into an approximately 0.03% decline in real GDP. One of the most costly issues that Ethiopia and the rest of the world are currently dealing with is unemployment. Other variables including a rapid

rate of population rise, low employment to population ratio, low income, and low investment exacerbate its detrimental consequences on the country's economic growth. High unemployment is a symptom of underinvestment in human capital, which is a vital resource for economic growth. The provision of job opportunities can minimize the impact of unemployment in Ethiopia, even though it is not currently done generally for the reasons outlined in the advice below. And lastly, the primary contribution of the government. The study recommends improving labor force productivity through increased levels of education and training, skills, and access to capital and productive assets that will enable the underprivileged to take advantage of employment opportunities in order to reduce unemployment. It also suggests addressing the shortcomings of the labor market. Since agriculture employs the majority of the labor force in the country, creating value chains and other policies that promote increased employment and investment will enhance agricultural output and fortify its links with other sectors of the economy. More job-creation strategies are needed since the extent to which economic growth reduces poverty depends on how much it increases employment opportunities and the extent to which it permits the poor to engage in the economy and gain from better employment opportunities.

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