
| RESEARCH ARTICLE

The Effects of Unemployment on Economic Growth in Saudia Arabia in the period 1995-2023

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| ABSTRACT

This study examined the relationship between unemployment and economic growth in Saudia Arabia for the period 1995 to 2023. The study utilized co-integration and error correction model approach. Although the unit root tests showed that the variables were integrated of different orders, the Johansen co-integration result showed that the variables were co-integrated. This study has revealed that unemployment, growth in government expenditure and gross fixed capital formation, population growth and education among others are significant explanatory variables of economic growth in Saudia Arabia under the period of study. Also, the result of the Error Correction Model analysis (ECM) shows that the unemployment has a negative and insignificant impact on economic growth over the period under study. Suggesting that higher unemployment leads to decreased GDP growth, indicating that unemployment rate increases economic growth becomes decline. The results of the study, show that, there is no causality relationship between unemployment and economic growth over the period under study. In addition, the results of causality test show that there is evidence of unidirectional causality running from growth government expenditure, the gross fixed capital formation, education (literacy rate) and population growth to economic growth (GDP) at different confidence and level of significance in Saudi Arabia. Moreover, this study present evidence that, bidirectional causation between unemployment and growth of population was found in Saudia Arabia. To increase economic growth, Saudi Arabian government should identify measures to reduce the unemployment rate and improve country's economic growth. For example, improving the quality of education, skills training, and implementing employment policies. The contribution of the study is the confirmation of the existence of the correlation of unemployment with the mentioned development indicators, and the validity of Okun's Law also hold on Sudia Arabian economy.

| KEYWORDS

Unemployment, Economic Growth, Saudia Arabia

| ARTICLE INFORMATION

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1. Introduction

Unemployment is generally seen as a macro-economic problem as well as socio-economic problem. Unemployment is a phenomenon that has held interest within the economic and scientific community long enough to have been studied by several fields and from different points of view. It arises as a result of insufficient and non-availability of jobs to correspond with the growing population, even those who are employed sometimes live with the fear of being unemployed due to job insecurity and retrenchment of workers (Ndukwu & Chinaka (2024). Unemployment or joblessness is defined as the lack of job opportunities for those who are able to work. The term unemployment could be used in relation to any of the factors of production which is idle and not being utilized properly for production. The international labour force organization (ILO) defines unemployment as the proportion of the labour force which was available for but did not work for at least one hour in the week preceding the survey period (National Bureau of Statistics (N.B.S). According to Seth, et al (2018), unemployment is a serious predicament confronted by most developed and developing nations which leads to economic and social issues. The nature of unemployment is dependent

on the structures of the country and the category of which the country falls under whether it is developed, developing or undeveloped (Soylu, et al. 2017).

In general, unemployment is the most crucial issue faced by Saudi Arabia. And it has been an issue of concern, most especially in developing country like KSA, to policymakers and researchers a like. This is because unemployment is one of the key macroeconomics indicator and determinant of economic growth and development which is the priority of any economy. The General Authority for Statistics (Ga Stat) indicated that the rate of unemployment in Saudi nationals was 12.2% in 2016 (GaStat, 2016). In fact, nearly 34.5% of all Saudi Arabian adult females and 5.5 % of Saudi Arabian adult males are unemployed. However, the highest levels of unemployment are found in youth populations where 40% of all citizens under the age of 35 have no stable form of employment. These drastic figures reflect unemployment among university graduates and school leavers (Hjazeen, et al. (2021). Moreover, with over 35% of the population being under the age of 19, and with increasing labour force participation of women, the rising number of Saudi citizens entering the workforce will exacerbate the problem of unemployment unless more jobs are created, or expatriates are reduced.

For the sake of identifying the root causes of unemployment, economists have found it necessary to distinguish the unique forms of unemployment. There are many types of unemployment, such as structural, frictional, disguised, cyclical, seasonal, elective and mandatory. Structural unemployment is the result of a change in the economic situation and is often due to the long-term presence of workers without a job in the field of work. The second type, which is frictional unemployment, arises as a result of the change of job to another better job due to the nature of the economic transition. Disguised or hidden unemployment, the term refers to a group of workers who work in a company without wages. Cyclical unemployment is a key element in overall unemployment, which is influenced by the ups and downs of the economy. Elective unemployment occurs when a worker or employee leaves his or her job to find a better job elsewhere, these besides mandatory unemployment which is the case when the manager or organization dismisses the worker (Hayes,2024).

The findings of the 8th Development Plan describe unemployment in the kingdom as a 'structural unemployment'. Meteb (2017), confirmed that recently, the growing incompatibility between the education and training system outputs and the labor market needs have resulted in structural unemployment among Saudi citizens. Structural unemployment is a more severe type of unemployment compared to cyclical, frictional, or seasonal unemployment. Kenton, (2023) mentioned many factors that cause structural unemployment. One of the primary causes of structural unemployment is technological changes. As industries move from one process to another and harness technological capabilities, many jobs and roles become obsolete. Companies may also seek ways to leverage technology as cost-cutting measures, putting their workforce at risk as the business seeks more efficient ways to operate. Second reason, it may be caused by poor training or a lack of education programs, and third, it may be caused by competition and globalization.

The description is based on the discrepancy between manpower supply and demand in regards of both quality and quantity. The discrepancy between labour market supply and demand and absence of attraction to work in the private sector jobs is attributed in part to low wages compared to the public sector and in essence to 'skills imbalance'. According to the Ministry of Planning report (2009), Saudi job seekers do not possess the skills desired by the private sector. Saudi unemployment comprises 629 Saudis of them 12% are able to work and 5.7% of the total force work if foreign workers are counted.

The Government of Saudi Arabia has been working hard to achieve higher economic growth. It is worth to mention that, despite their diversity in size, demographics and wealth, most oil-exporting Arab countries face similar challenges to create jobs and foster more inclusive growth. The current environment of likely durable low oil prices has exacerbated these challenges (IMF, 2016). Generally, unemployment is caused by various reasons, such as the high growth rate of population and the lack of jobs opportunity and the inefficiency of the public sector such reasons, which can lead to poverty.

In Saudi Arabia unemployment as Meteb, (2017) demonstrated in his study that there are many causes of unemployment: at first, unemployment is basically arising from the dependence of the private sector organizations and their preference to hire foreign labours instead of Saudi because of several reasons like it is cheaper and thus profitable for the private sector to recruit them rather than Saudis who need more training. It is clear that the rate of Saudis' employment contribution in the private sector compared to that of the non-Saudis in the same sector estimated about 15.4% in 2015 compared to almost 13% in 2005. It is a limited rate which indicates that Saudis' do not have the desire to work in the private sector as they prefer to work in the public sector or the government sector. Secondly, unemployment in the KSA country is a direct result of discrepancy between education outcomes and labour market demands at the secondary and university levels. Thirdly, the concealment of business ownership and the sponsorship system exploitation led to increase the unemployment rates. Furthermore, there is an absence of any type of government social security system to support unemployed Saudis although they are able and willing to work. In the study of unemployment in the Kingdom of Saudi Arabia, it was obvious since the beginning of planned development that Saudi population and work force did not satisfy all manpower related requirements of the highly and rapidly developed economy.

The relationship between economic growth and unemployment shows that there is a high correlation between the economic growth rate and the decrease in unemployment rates. An increase in the growth rate, increases or decreases the unemployment rate. The relationship between economic growth and unemployment has been studied experimentally in the economic literature based on what is known as the Okun Law, which shows that there is an inversely proportional relationship between the change in the growth rate (GDP) and the change in the unemployment rate. Okun as succeeded to show that there is a reciprocal correlation

between unemployment and economic growth. He found that if unemployment decreased by (1%), then this would be due to an increase in real gross domestic product (RGDP) by (3%) and vice versa, and when an increase in the RGDP occurs, an increase in employment is achieved.

Thus, one of the researchers' main areas of concern was investigating the correlation between economic growth and unemployment. For instance, studies like those of Ben Amor and Ben Hassine (2017); Alkofahil (2020); Meteb (2017), indicate a significant unidirectional causality between the unemployment rate and the real output. A 1% increase in the real output for the gap (difference) model leads to a decrease in the unemployment rate by about 0.33% (0.54%), *ceteris paribus*. According to Meteb (2017), employment is significantly determined by the growth rate, and asserted that the Saudi labour market dilemma is a consequence of high unemployment rates spread among Saudis while massive numbers of foreign workforce were employed. Indeed, due to the high oil prices, the Saudi government was convinced to hire a large number of foreign workers employed basically in the private sector to help build the country's infrastructure, while Saudis were simultaneously employed in government jobs.

The unemployment issue has a negative impact on economic, social and psychological aspects. On the economic side, the gap between production and consumption is increasing. It is also identified as one of the most important economic issues that have hindered the lives of many people in recent times (Khogeer & Shaheen, 2021). Unemployment is one of the main causes of social exclusion, particularly in the group of long-term. Unemployment also causes social difficulties, and most of the unemployed ones, belong to the young age group (36-54). The study conducted by Negara ((2024, showed that the impacts of youth unemployment on economic growth were leads to low income, low savings, low investment, low national income and loss of gross domestic product (GDP) and unemployed youth constitute threat to security as they often involve in social vices. Moreover, it demonstrated that in the both short and long run, unemployment rate increases economic growth becomes decline. Furthermore, unemployment has been seen one of the serious impediments to social progress, it is representing a huge waste of a country's manpower resources, and it generates welfare loss in terms of lower output thereby, leading to lower income and well-being of the people (Raheem, 1993).

Also, prolonged unemployment can lead to an erosion of skills, robbing the economy of otherwise useful talents. The experience of unemployment can alter how workers plan for their futures. It can lead to greater scepticism and pessimism. Also, the absence of income created by unemployment can force families to deny educational opportunities to their children and deprive the economy of those future skills. Other studies have shown that prolonged unemployment harms workers' mental health and can worsen physical health and shorten lifespans. Simpson (2024), added that the issue of unemployment brought about some social and economic consequences such as, increase in crime rate, loss of respect and identity, reduction in purchasing power, psychological injuries, corruption among others. Muhammad, et al (2011) mentioned that unemployment constitutes a series of serious development problems. While Alanana (2003) argued that unemployment is potentially dangerous as it sends disturbing signals to all segment of the economy.

It is worth to mention that, every government regime comes with its own economic growth increase strategy, but none has been able to achieve the desired goal. Since the continuous increase in population begun, developing nations have been characterized by unemployment. Despite the massive efforts made, during the Development Plans (1970-2000), to increase the supply of qualified Saudis through rapid expansion of the education and training systems, and although the size of the foreign labour force participation in the government sector has significantly diminished, Saudi Arabia still relies to a large extent on a foreign work force which is of higher quality than its Saudi counterpart (Al-Asmari, 2008). Addressing the impacts of unemployment, is therefore crucial for the well-being of individuals, the health of the economy, and the stability of societies.

The main objective of this study is to examine the effect of unemployment on economic growth in Saudi Arabia for the period of time 1995 to 2023. The study focuses on exploring the effects of variables on economic growth rather than unemployment rate namely: government expenditure, gross fixed capital formation, growth of population and education. An investigation of the determinants of growth would contribute to better understanding of factors that can boost growth in Saudi Arabia. Moreover, the contribution of employment is important and need to be investigated. Understanding the driving forces of unemployment may help shed light on the performance of economic growth on KSA. Also, analysing these variables may help in providing some relevant policy recommendation to address.

The rest of this study is divided into four sections. Section two contains the literature review. The source of data and methodology will be shown in section three. Section four dealing with results presentation and Discussion, while section five is devoted to conclusion, limitation, and recommendations.

2- Literature Review

Several studies such as of Ghaban *et al.* (2002), and Al-Nowaiser (2001), among other have handled unemployment in the Saudi Arabia. They reported the following findings. Saudi Arabia differs in its unemployment from the other Arab countries because the Saudi labour market subjects to change based on the oil prices fluctuation as they are the main economic source to the K.S.A. Unemployment rates are equally high among both uneducated and educated Saudis, regardless of their fields of study which do not fulfil the skills demand by the labour market. Unemployment rates prevail throughout the K.S.A either in cities or villages or

among males or females. They reported that the economic growth does not have direct effects to reduce the unemployment rates, but reduces unemployment by providing further through jobs in the economy. However, the increase in the unemployment rate for Saudi core working age population (aged 25-54), was mainly driven by an increase in the unemployment rate for females by 1.1 pp from 14.6% in Q4 2022 to 15.7% in Q1 2023. (Labor Market Statistics Q1/2023)

Amassoma & Nwosu (2013) examined the impact of unemployment on productivity growth in Nigeria using an error correction modelling approach and co-integration technique to analyse the data used from 1986 to 2010. The result showed that unemployment rate had an insignificant influence on productivity growth in Nigeria both in the short and long run.

Sadiku.et.al (2015) examined unemployment relation with growth using a Vector Auto Regressive (VAR) approach with a quarterly based data from 2000-2012. It was observed that no negative relationship between unemployment and economic growth as propounded by Okun's Law and also no direction of causality between unemployment and economic growth.

.Omitogun, et al (2017) investigated the impact of unemployment on economic growth in Nigeria in the 21st century using a Vector Auto Regressive (VAR) approach using a secondary data spanning from 1986 to 2015. It was observed that the impact of unemployment varies over time as effort towards eradicating it are been made by the government in the country.

Hjazeen, et.al (2021) investigated the impact of unemployment on Jordan's economy over the period 1991–2019. The study used the auto-regressive distributed lag (ARDL) model. The empirical finding indicated a long-run relationship between the unemployment rate, economic growth, education, female population, and urban population in Jordan. Also, the finding shows the negative linkage between economic growth and unemployment, and a positive relationship among the education, female population, and urban population and unemployment in Jordan.

Khalid. et.al (2021) examined the impacts of real GDP, inflation rate, exchange rate on the unemployment rate in South Africa by considering the annual time-series data covering the period 1980-2018. The findings of the Johansen approach to cointegration concluded that there was no evidence of a long-run connection among the variables. The findings of Granger causality reported that there was bidirectional causality between the pairs of real GDP vs. unemployment rate, exchange rate vs. unemployment rate, and inflation rate vs. unemployment rate; however, a unidirectional causality was found in the pairs of real GDP vs. exchange rate and inflation rate vs. exchange rate.

Alam, et.al (2023) explored the relationship between GDP growth, unemployment rate, and labor force participation rate in the Gulf Cooperation Council (GCC) countries from 1990 to 2018. Cointegration was found among GDP growth, unemployment rate, and labor force participation. Long-term, the unemployment rate has a statistically significant negative effect on economic growth in the GCC nations. Okun's rule and the unidirectional causality from economic growth to unemployment indicate that the primary cause of unemployment in GCC nations is a failure to adequately expand their economies.

Talatu & Binta, (2023) investigated the effect of inflation and unemployment on economic growth in Sierra Leone. Using a quarterly time series data, the study adopted the Autoregressive Distributed Lag (ARDL) model for the purpose of estimation. The study established the existence of a long run relationship in the model, and as a result, both a long-run and short-run ARDL models were estimated. From the long-run results, it was revealed that the effect of Inflation and unemployment on economic growth in Sierra Leone was significantly negative.

Adewale & Adeyemo (2024) investigated the effect of unemployment and inflation on economic growth in Nigeria from 1999 to 2021. Findings reveal a significant positive correlation between inflation and GDP growth, while unemployment exhibits a negative correlation with GDP growth.

Ndukwu & Chinaka, (2024) examined the effects of unemployment rate on economic growth of Nigeria from (1990- 2022). The study used Vector Error Correction Model (VECM) technique for the data analysis. Their major findings were that unemployment rate has a negative effect on the gross domestic product (GDP), government expenditure as well as gross fix capital formation amongst others in Nigeria.

Musliudeen & Ebubechukwu (2024) analyzed the relationship between unemployment and economic growth using an error correction model for estimation. Data spanning the years 1981 to 2020 was employed. The Granger Causality Test and the Augmented Dickey Fuller test were employed to analyze the causality relationship and stationarity. The findings, indicated that unemployment was negative, and had a significant impact on economic growth. Also, there is no causal relationship between unemployment and economic growth in Nigeria over the period under study.

However, the mentioned results from the above studies, clearly point to the fact that unemployment have not been fully explored and a lot of questions still remain unanswered. And a few studies related to Saudia Arabian economy. Thus, this study adds to the existing literature by examining the effects of unemployment on economic growth on Saudia Arabia.

3. Data and Methodology

3.1 Data

The data used in this study, is obtained from different sources. Economic growth was measured by Gross domestic product (GDP) and unemployment was measured by unemployment rate. The national unemployment rate is defined as the percentage of unemployed workers in the total labour force. It is widely recognized as a key indicator of the performance of a country's labour

market. This study used literacy rate as a proxy for education. literacy rate is an outcome indicator to evaluate educational attainment. It can be also used as a proxy instrument to see the effectiveness of education system; a high literacy rate suggests the capacity of an education system to provide a large population with opportunities to acquire literacy skills (Worldbank,2022). Unemployment, government expenditure, gross capital formation, growth of population and education were treated as independent variables. Time series covering the period between 1995-2023 was employed. The study used the vector error correction model. All series were converted

to logarithms. Logarithmic transformation of data, is often observed in the empirical literature for various reasons. Some of these reasons include, stabilizing the variance of a variable over the observed range (overcoming the problem of heteroskedasticity) and improving the normality of a skewed distribution, especially in serious cases, Besides, the need to ensuring the unbiasedness of the point estimate of the expectation of the dependent variable, for example, (Ogun,2021).

3.2 Model Specification

The model used to investigate the impact of unemployment on economic growth is the model applied by Durosinmi (2022) for Nigeria and extended by Ndukwu and Chinaka (2024) we removed two variables (foreign direct investment and exchange rate). And incorporating two new other variables in the model (education and growth of population). The education is included, it has been noted that education helps people acquire the skills and knowledge necessary to compete in the job market. Without these educational foundations and opportunities for skill development, individuals can struggle to meet the demands of employers or adapt to changing job market requirements, resulting in higher rates of unemployment, (<https://www.generation.org>,2024). The inclusion of the growth of population is motivated by the findings in Imiosi *et al.* (2017) they found that, the significant effects of unemployment, population, and the labour force on economic growth. In addition, the existing literature highlights the direct relationship between population growth and unemployment, emphasizing that an increase in population contributes to a growing labour supply (World Bank, 2022). Mwangi, (2024) asserted that, one of the primary reasons for unemployment in Africa is a lack of education and training, particularly among the youth, and the insufficient skills for the job market contribute to high unemployment rates.

The model that used by Ndukwu and Chinaka (2024) represented by the equation (1):

$$GDP = F(UMPL, FDI, GEXP, EXR, GFCF, Ut) \text{ -----1}$$

Where; GDP = Gross Domestic Product (growth rate) UEMPL = Unemployment rate GEXP = Growth rate of government expenditure EXR = Exchange Rate GFCF = Gross Fixed Capital Formation Ut = Error Term

However, with the modification, the new model for this study was specified as follows:

$$GDP = F(UMPL, GEXP, GFCF, GPOP, EDU, Ut)$$

Where; GDP = Gross Domestic Product (growth rate) UEMPL = Unemployment rate GEXP = Growth rate of government expenditure GFCF = Gross Fixed Capital Formation, GPOP= Growth rate in population, EDU= Education Ut = Error Term

The following represents the Mathematical form is:

$$GDP = b_0 + b_1UMPL + b_2FDI + b_3GEXP + b_4 GFCF + b_5 GPOP + b_6EDU+ Ut \text{----2}$$

Representing this relationship in a functional VAR framework;

$$GDP-1 = \beta_0 + \beta_1UMPL-1 + \beta_2GEXP-1 + \beta_3GFCF-1 + \beta_4GPOP-1 + \beta_5EDU-1 + U_1 \text{ -- -- --eqn 3.1}$$

$$UMPL-1 = \beta_0 + \beta_1GDP-1 + \beta_2GEXP-1 + \beta_3GFCF-1 + \beta_4GPOP-1 + \beta_5EDU-1 + U_1 \text{ -- -- --eqn.3.2}$$

$$GEXP-1 = \beta_0 + \beta_1UMPL-1 + \beta_2GDP-1 + \beta_3GFCF-1 + \beta_4GPOP-1 + \beta_5EDU-1 + U_1 \text{ -- -- --eqn.3.4}$$

$$GFCF-1 = \beta_0 + \beta_1UMPL-1 + \beta_2GEXP-1 + \beta_3GDP-1 + \beta_4GPOP-1 + \beta_5EDU-1 + U_1 \text{ -- -- --eqn.3.6}$$

$$GPOP-1 = \beta_0 + \beta_1UMPL-1 + \beta_2GEXP-1 + \beta_3GFCF-1 + \beta_4GDP-1 + \beta_5EDU-1 + U_1 \text{ ----qn.3.7}$$

$$EDU-1 = \beta_0 + \beta_1UMPL-1 + \beta_2GEXP-1 + \beta_3GFCF-1 + \beta_4GPOP-1 + \beta_5GDP-1 + U_1 \text{ qn.3.8}$$

β = Intercept of the Regression equation $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ = Regression Coefficients

The Vector Error Correction Model is given as:

$$\Delta GDP = \beta_0 + \beta_1\Delta UEMPL-1 + \beta_2\Delta GEXP-1 + \beta_3\Delta GFCF-1 + \beta_4\Delta GPOP-1 + \beta_5\Delta EDU-1 + ECM + V_t-1$$

β = Intercept of the Regression equation $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Regression Coefficients

The Vector Error Correction Model is given as:

$$\Delta GDP = \beta_0 + \beta_1\Delta UEMPL-1 + \beta_2\Delta GEXP-1 + \beta_3\Delta GFCF-1 + \beta_4\Delta GPOP-1 + \beta_5\Delta EDU-1 + ECM + V_t-1$$

The study uses the Johnson cointegration and vector error correction (VECM) model. The idea of using cointegration vector in the study of nonstationary time series comes from the work of Granger (1981) and Engle and Granger (1987) and it is used in econometrics to discuss long run economic relation. The VEM is used to captured interrelationship amongst macroeconomic variables and examine the impacts of unemployment on economic growth in the context of Saudi Arabia economy. VECM allows distinguishing between short run and long run Granger Causality.

4-Results and Discussions

4.1 Descriptive Analysis

Table 4.1 Descriptive statistics

	LOG(GDP)	LOG(UMPL)	LOG(GEXP)	LOG(GFCF)	LOG(EDU)	LOG(GPOP)
Mean	26.93859	1.707039	3.156402	3.204588	4.488472	0.818309
Median	26.93083	1.722767	3.158410	3.274402	4.521789	0.877330
Maximum	27.36918	1.862529	3.378326	3.532913	4.595120	1.375940
Minimum	26.54593	1.470176	2.873805	2.921617	4.290459	-0.749364
Std. Dev.	0.278164	0.096678	0.120990	0.186210	0.087874	0.443296
Skewness	-0.029388	-0.825832	-0.283411	-0.143401	-0.751985	-1.795753
Kurtosis	1.523826	3.111901	2.646359	1.646169	2.320453	7.079626
Jarque-Bera	2.637241	3.311454	0.539339	2.314095	3.291149	35.69690
Probability	0.267504	0.190953	0.763632	0.314413	0.192902	0.000000
Sum	781.2190	49.50414	91.53566	92.93306	130.1657	23.73096
Sum Sq. Dev.	2.166498	0.261707	0.409878	0.970880	0.216212	5.502315
Observations	29	29	29	29	29	29

Authors' Computation from **EViews**, December, 2024

From table (4.1) above, 29 observations were used in the work (1995-2023). The gross domestic product (GDP) has a mean value of 26.94 and median of 26.93 also, the table shows that the maximum and minimum values for the year studies were 27.37billion and 26.55 billion respectively, UMPL revealed a mean value of 1.70 % and the middle value was 1.72 also the maximum and the minimum values for UMPL were 1.86 and 1.47 % respectively. GEXP has an average value of 3.15 and a middle value of 3.16, while the maximum and minimum values were 3.38 and 2.87 respectively. The coefficient of GFCF has a mean value of 3.20 with media of 3.27 while the maximum and minimum values were 3.53 and 2.29 respectively. EDU has a mean value of 4.49 with media of 4.52, while the maximum and minimum values 4.60 % and 4.29 respectively. GPOP had a mean value of 0.82 with media of 0.88 respectively and maximum and minimum value were 1.38 and -0.75 in Saudi Arabia for the years studied.

All the variables are negatively skewed as indicated by the negative skewed coefficients of all the variables. The study also tested for data normality using Jaque-Bera normality test. Five variables of the study such as GDP, unemployment, growth in government expenditure, gross fixed capital formation and education, were found to be normally distributed since the P-values for Jarque-Bera test were greater than 0.05 for the variables. While the population growth is not normally distributed as indicated by their P-values of less than 0.05. This study has revealed that unemployment, growth in government expenditure and gross fixed capital formation, population growth and education among others are significant explanatory variables of economic growth in Saudia Arabia

Table 4.2: Unit Root test

	Unit Root test pp					
	Level Values			First Difference		
variables	constant	Constant & Trend	Without constant & trend	Constant	Constant & Trend	Without constant & trend
LOG(GDP)	-1.4378 0.5495	0.0145 0.9944	-1.0199 0.9147	-3.3711* 0.0213	-0.9788 0.9292	-3.1394** 0.0029
LOG(UMPL)	-2.5209 0.1215	-2.4998 0.3257	-0.7941 0.3630	-3.0211* 0.0455	-2.8904 0.1808	-3.0456** 0.0037
LOG(GEXP)	-2.4708 0.1330	-2.4773 0.3358	-0.0757 0.6488	-4.5075** 0.0014	-4.7587** 0.0041	-5.9899*** 0.0000
LOG(GFCF)	-1.2383 0.6432	-2.1993 0.4717	0.9973 0.9115	-4.5075** 0.0014	-4.4894** 0.0071	-4.4908*** 0.0001
LOG(EDU)	-2.5517 0.1148	-12.8864*** 0.0000	3.0258 0.9988	-7.1902*** 0.0000	-7.0755*** 0.0000	-5.8853*** 0.0000
LOG(GPOP)	-2.0981 0.2468	-6.7771*** 0.0000	-1.1095 0.2359	-6.4566*** 0.0000	-4.1605** 0.0159	-6.4396*** 0.0000

Unit Root test ADF						
Variables	Level Values			First Difference		
	constant	Constant & Trend	Without constant & trend	constant	Constant & Trend	Without constant & trend
LOG(GDP)	-1.4671 0.5333	0.4624 0.9985	0.9269 0.9010	-0.9268 0.7625	-0.9788 0.9292	-1.1563 0.2188
LOG(UMPL)	-2.7497* 0.0790	-2.8904 0.1808	-0.8896 0.3219	-3.0829* 0.0400	-2.8904 0.1808	-3.1135** 0.0031
LOG(GEXP)	-2.4268 0.1438	-4.7587** 0.0041	-0.0952* 0.6421	-5.5473*** 0.0001	-4.7587** 0.0041	-4.4908*** 0.0001
LOG(GFCF)	-1.3259 0.6032	-2.6129 0.2777	0.6913 0.8591	-4.5462** 0.0013	-4.4894** 0.0071	-4.4908*** 0.0001
LOG(EDU)	-1.9414 0.3094	-2.6129 0.2777	2.4193 0.9948	-6.8817*** 0.0000	-7.0755*** 0.0000	-5.8853*** 0.0000
LOG(GPOP)	-2.0818 0.2530	-2.7511 0.2255	-1.2491 0.1894	-5.7339*** 0.0001	-4.1605* 0.0159	5.8174*** 0.0000
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant						
*MacKinnon (1996) one-sided p-values.						

4.2 Unit Root Test

The study examined the non-stationarity or integration properties of the time series, using the widely used augmented Dickey-Fuller (ADF) and Philip-Perron (PP) unit root tests. Table 4. 2 presents the testing of the unit root results.

The results from the table above shows that the pp test shows that the growth domestic product and Unemployment is stationary at 5% level of significance after first differencing. Whereas growth government expenditure, gross fixed capital formation, total population, and education were stationary at 1% level of significance after first differencing. While the results from ADF tests indicated that unemployment, growth government expenditure, gross fixed capital formation, total population, and education were stationary at various levels of significance and only the gross domestic products was significant 10 % level of significance.

Table 4.3 Johansen Cointegration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.887326	134.1938	95.75366	0.0000
At most 1 *	0.711649	75.24587	69.81889	0.0173
At most 2	0.541910	41.66930	47.85613	0.1682
At most 3	0.382652	20.59067	29.79707	0.3837
At most 4	0.198778	7.567947	15.49471	0.5127
At most 5	0.056989	1.584291	3.841465	0.2081
Trace test indicates 2 cointegrating equation(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Max-eigenvalue)				
Hypothesized		Max-Eigen	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.887326	58.94790	40.07757	0.0001
At most 1	0.711649	33.57657	33.87687	0.0542
At most 2	0.541910	21.07863	27.58434	0.2715

At most 3	0.382652	13.02272	21.13162	0.4501
At most 4	0.198778	5.983656	14.26460	0.6153
At most 5	0.056989	1.584291	3.841465	0.2081
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

4.3: Co-integration Test Result

The results from the Johansen Juselius test for co-integration using model with Trace statistics and model with Max-Eigen value in Table (4.3) confirm the existence two cointegrating equation(s) at the 0.05 level in trace model and one cointegration equation in Max-Eigen value model. Therefore, we conclude that there is a long-run relationship among the dependent and independent variables or that the variables moved together in the long-run. That is, there is a long-run relationship between GDP and unemployment, government expenditure, gross fixed capital formation, population and education. This finding is in line with the result of researchers such as, Musa & Yakubu (2019).

4.4 Vector Error Correction Model

Table 4.4 Vector Error Correction Estimates

Dependent Variable: D(LOG(GDP))				
	Coefficient	Std. Error	t-Statistic	Prob.
ECM	-0.706973	0.204654	-3.454481	0.0027
D(LOG(GDP (-1)))	0.041172	0.450712	0.091348	0.9282
D(LOG(UMPL (-1)))	-0.178069	0.288766	-0.616654	0.5448
D(LOG(GEXP(-1)))	0.567663	0.238966	2.375499	0.0282
D2(LOG(GFCF(-1)))	-0.644459	0.231503	-2.783802	0.0118
D(LOG(EDU(-1)))	-2.793390	0.934821	-2.988156	0.0076
D(LOG(GPOP(-1)))	0.038611	0.054835	0.704138	0.4899
C	0.054493	0.022352	2.437933	0.0248
R-squared	0.467823	F-statistic		2.386056
Adjusted R-squared	0.271757	Prob(F-statistic)		0.062425
Durbin-Watson stat	1.733593			

The result of the Error Correction Model analysis (ECM) in table 4.4 shows that unemployment has a negative and insignificant impact on economic growth over the period under study. Suggesting that higher unemployment leads to decreased GDP growth. indicating that unemployment rate increases economic growth becomes decline. This is confirmed by Zhorzholiani (2024) who asserted that rising unemployment signifies a growing number of jobless individuals, resulting in reduced individual incomes. In response, the population curtails consumption expenditures, leading to decreased demand. This reduction in demand subsequently impacts output, causing a decline in the country's total domestic product and a slowdown in the GDP growth rate. Also, this result is similar to the Hjazeen, *et.al* (2021) and Musliudeen &Ebubechukwu (2024) which shows a negative relationship between unemployment and GDP proxy for economic growth which is in line with Okun's. The Okun's law related unemployment with economic growth... Also, the results show the coefficient of growth government expenditure is positive and significant only at the 5 percent level of significance. This result is consistent with findings of Chandana, *et.al*, (2020), Nhemhafuki, (2023) & Rahman *et al* (2023) In addition, this result, conform with the proposition that increase in the Government Expenditure, should increase GDP Growth because Government Expenditure leads to increase in the aggregate demand of the goods and services as well as the stimulating the productivity, innovation and competitiveness. Thereby promoting investment that helps the GDP to increase. Also, this result confirms theoretical argument that, government purchases are a tool to boost overall spending and correct a weak economy (Dollarhide ,2024).

The gross fixed capital formation is found to be significant at the 5 percent level and is negatively signed, implying that a decrease in gross domestic capital formation causes GDP growth to rise. This result is inconsistent with the findings of Ndukwa & Chinaka (2024) who showed that the continuous rise in gross fixed capital formation, the more the economic activities will trigger. In addition, gross fixed capital formation, which is the major component of domestic investment, is seen as an important process that could accelerate economic growth. (Danie & Kazeem, 2019).

The coefficient of the education is negative and significant only at the 1 percent level of significance. This is contrary to the theoretical predictions that, increase in education would increase the economic growth. this result is in consistent with conclusion of Reza and Widodo (2013) who suggests there are positive correlation between education and economic growth. However, the empirical evidence on the impact of education on economic growth has long been mixed. In addition, Glewwe, *et .al*

(2014)) suggests that the impact of education on economic growth in Sub-Saharan Africa is lower than in other countries, likely due to lower school quality.

The estimated coefficient on the population growth is positive and insignificant. This result confirms the theoretical argument, that the estimated effects of population growth on economic growth are not robust, varying between being positive, negative, and insignificantly different from zero Heady & Hodge (2009). In addition, the result seems to be consistent with view that however, population growth can increase economic growth and technological innovation, Filipenko (2024) .

The model revealed an R² value of 47% and 27% for R² adjusted, meaning that about 47% of the variations in the dependent variables are accounted for by the independent variables, also, the f-statistics values of 2.39 is high enough to conclude that the data fits the model, also the econometrics criteria were all verified as the residuals of the model were normally distributed, heteroskedastic and there was no autocorrelation. The Durbin Watson statistics value of 1.73 suggested that the estimated model is free from first order positive serial auto correlation.

The error correction model (ECM) conforms to the economic criteria as it has a negative value, it revealed that it will take the series approximately 71% to realign back to equilibrium in case of any distortion. And the coefficient for ECM was statistically significant 0.448 it implied that 44.8% of the dis equilibrium as a result of previous year shock was adjusted back to equilibrium in the current year.

4.4 Granger Causality test

The direction of causality was established by the VEC Granger Causality /block Exogeneity Wald Test in table 4.5. In general causality test show that there is evidence of unidirectional causality running from growth government expenditure, the gross fixed capital formation, education (literacy rate) and population growth to economic growth (GDP) at positive different confidence and level of significance in Saudi Arabia. This result confirms the argument that increase in these variables will affect the economic growth in positive fashion because they create a climate which conducive to increase to investment which tend to raise economic growth. In fact, causality also running from growth government expenditure, the gross fixed capital formation, and population growth to unemployment (unemployment rate).

Also, the results of causality revealed that, unidirectional causality exists from education to unemployment. The causation of unemployment through education is inconsistent to the view of Januar. et.al (2023) who asserted that, Skills education has a vital role in reducing unemployment, especially among vocational high school graduates. In addition, education can also encourage the creation of new jobs through innovation and entrepreneurship. The causality results indicate that there no Granger causality between economic growth (GDP) and unemployment in Saudia Arabia during the period of study.

Table 4.5: VEC Granger Causality/Block Exogeneity Wald Test

Dependent variable: D(LOG(GDP))			
Independent variables	Chi-sq	df	Prob.
D(LOG(UMPL))	0.380262	1	0.5375
D(LOG(GEXP))	5.642995	1	0.0175
D(LOG(GFCF))	7.749552	1	0.0054
D(LOG(EDU))	8.929078	1	0.0028
D(LOG(GPOP))	0.495811	1	0.4813
All	12.19529	5	0.0322
Dependent variable: D(LOG(UMPL))			
Independent			
D(LOG(GDP))	0.480337	1	0.4883
D(LOG(GEXP))	7.695989	1	0.0055
D(LOG(GFCF))	4.132274	1	0.0421
D(LOG(EDU))	3.060073	1	0.0802
D(LOG(GPOP))	6.513203	1	0.0107
All	10.89392	5	0.0535
Dependent variable: D(LOG(GEXP))			
D(LOG(GDP))	0.111552	1	0.7384
D(LOG(UMPL))	0.956456	1	0.3281
D(LOG(GFCF))	0.182167	1	0.6695

D(LOG(EDU))	0.159029	1	0.6901
D(LOG(GPOP))	0.070789	1	0.7902
All	1.689612	5	0.8902
Dependent variable: D(LOG(GFCF))			
D(LOG(GDP))	2.039571	1	0.1533
D(LOG(UMPL))	0.466389	1	0.4947
D(LOG(GEXP))	1.316355	1	0.2512
D(LOG(EDU))	0.295924	1	0.5864
D(LOG(GPOP))	2.783107	1	0.0953
All	6.177882	5	0.2893
Dependent variable: D(LOG(EDU))			
D(LOG(GDP))	0.015353	1	0.9014
D(LOG(UMPL))	0.391357	1	0.5316
D(LOG(GEXP))	2.057801	1	0.1514
D(LOG(GFCF))	1.625748	1	0.2023
D(LOG(GPOP))	2.415472	1	0.1201
All	1.689612	5	0.8902
Dependent variable: D(LOG(GPOP))			
D(LOG(GDP))	2.433592	1	0.1188
D(LOG(UMPL))	7.632087	1	0.0057
D(LOG(GEXP))	0.171115	1	0.6791
D(LOG(GFCF))	6.634474	1	0.0100
D(LOG(EDU))	0.976739	1	0.3230
All	12.53812	5	0.0281

In addition, table 4.5 revealed that Gross fixed capital formation Granger caused population growth. On the other side, population gross Granger caused gross fixed capital formation. Thus, feedback occurs between population growth with gross fixed capital formation

Furthermore, table 4.5 indicated that population Granger caused unemployment. On the other hand, unemployment Granger caused population growth. Thus, bidirectional causation between unemployment and growth of population was found in Saudia Arabia under the period of study. The causation of unemployment through population growth supports the hypothesis that population growth is the promotes the unemployment in Saudia Arabia during 1995-2023.

4.5 Conclusion

This study aimed to explain the relationship between unemployment and economic growth in the Saudia Arabia during the 1995-2023 periods. The study employed cointegration test and vector error correction model for analysing time series data. The study used GDP as proxy for economic growth unemployment rate for unemployment and literacy rate for education. Data for the variables is collected from the World Bank database and others sources. To avoid the problems of spurious correlation often associated with non-stationary time series to concurrently generate long-run equilibrium relationships the augmented Dickey-Fuller method and Philips perron test were used.

Findings indicated that unemployment, growth in government expenditure, gross fixed capital formation, population growth and education among others are significant explanatory variables of economic growth in Saudia Arabia under the period of investigation. Also, there are negative relationships between the unemployment and economic growth. This study is in line with Okun's Law and previous studies, where the findings are in accordance with the view that an increase in economic growth decreases unemployment (Hjazeen et al., 2021; Sahib & Ibrahim, 2022). In addition, the results show that all the variables were not stationary at level but stationary at first difference. The Johansen co-integration test was used to determine the long run relationship among the variables and the results show that the variables had a long run relationship and the long run model shows that there exists a negative relationship between unemployment rate and economic growth in Sudia Arabia. Furthermore, the results revealed that bidirectional causation between unemployment and growth of population was found in Saudia Arabia.

4.5.1 Recommendations

Based on findings the study recommends

- 1- Increasing economic growth should lead to reduction in unemployment if the growth is inclusive, Job creation and employment creation should be the priority of the government in order to reduce unemployment.
- 2- Evidence suggests a clear need for massive investment in education and attention should be made by the government of Saudia Arabian to the quality of education system and training programs and skills of labour.

4.5.2 Limitation of the study

The study faces some limitation. First the analysis of the study employs annual data 1995-2023. The size of the sample has been limiting factor, if the data is available in desired frequency and period (quarterly or even longer annual bases period) more conclusive result should be obtained. Also, the data are collected from different sources so the overall quality and reliability of the data is quite questionable. Result based on such data may not be highly reliable and will be interpreted with caution.

Moreover, all the variables in the data were transformed into log form, however the data transformation should be applied with caution and correctly as they fundamentally alter the nature of the variable, making the interpretation of the results somewhat more complex.

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