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Unemployment and Economic Growth Between Saudization and Empowerment in the Vision of the Kingdom of Saudi Arabia

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Abstract

This research aims to analyze the connection between economic growth and the unemployment rate in Saudi Arabia from the first quarter of 2011 to the third quarter of 2022.The analysis is conducted using the standard OLS, OLS with robust standard errors and 2SLS techniques. In addition, the paper employs the difference version and gap version of Okun's Law.The results indicate a negative correlation between the global unemployment rate and economic growth. In addition, an increase in output by 1% induces a decrease in the global unemployment rate from -0.115% to -0.161%. The analysis also shows the validity of Okun's Law for the Saudi and non-Saudi labor force. However, the Saudi unemployment rate reacts more strongly than the non-Saudi unemployment rate. Finally, the study shows that only the male unemployment rate reacts to economic growth. Fluctuations in economic growth have no impact on the female unemployment rate, even when heteroscedasticity and endogeneity are considered. These results are of importance for the design of policies to reduce unemployment.

Keywords: *Unemployment, economic growth, Saudization, empowerment, Vision 2030.*

JEL Classifications : C22 ; J21 ; J23 ; O47.

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Емпіричне дослідження систем бізнес-аналітики та їх впливу на ефективність інновацій

Анотація

Це дослідження спрямоване на емпіричне вимірювання та перевірку концептуальної моделі величини впливу організаційної культури, рівня зрілості IT та якості даних на успішне впровадження систем бізнес-аналітики та їх наслідки для ефективності інновацій. Вибірка дослідження містила 4 комерційні банки та 58 звичайних комерційних банків у категорії національних приватних комерційних банків Індонезії, отже, загальна вибірка в цьому дослідженні становила 62 банки.

Сферами нашого емпіричного дослідження шляхом перевірки гіпотез були: оцінка впливу бізнес-аналітики на фінансову діяльність; вплив бізнес-аналітики на інновації; вплив бізнес-розвідки на успіх бренду; вплив інновацій на успіх бренду; вплив інновацій на фінансові показники.

У цьому дослідженні використовувалися методи неімовірнісної вибірки з методами цілеспрямованої вибірки в звичайних комерційних банках Індонезії. Метод аналізу даних використовує коваріанське структурне моделювання (Covarian Based-Structural Modeling, або CB-SEM) із засобами програмування, які підтримують первинний аналіз даних у Lisrell 8.5.

Результати цього дослідження показали, що чим вищий рівень впровадження організаційної культури, рівень IT-зрілості та якість даних, тим вищий рівень успішності впровадження систем бізнес-аналітики, які мають вплив на покращення ефективності інновацій, тоді як чим вищий рівень застосування систем бізнес-аналітики, тим вищий рівень інноваційної ефективності.

Впровадження організаційної культури є фактором, який має найбільш значний вплив на успіх впровадження систем бізнес-аналітики порівняно з іншими факторами, вивченими в цьому дослідженні.

Ключові слова: організаційна культура; рівень IT зрілості; якість даних; системи бізнес-аналітики; продуктивність інновацій.

1. Introduction

Unemployment is a global phenomenon that has the potential to affect economies at every stage of development. There has been an increasing focus on the examination of the factors that contribute to the occurrence of unemployment. The labor market is a crucial factor in any economy as it plays a role in driving demand and formulating policies that balance economic growth (hereafter EG) while reducing the unemployment rate (hereafter UR). Hence, EG is a

crucial determinant that exerts a direct impact on the UR. It is essential to perceive the relationship between unemployment and EG in order to understand the ways in which unemployment is impacted. Economic policies often aim to enhance EG rather than reduce existing UR. Therefore, economic policies aiming at improving growth rates contribute to reducing unemployment. This underscores the interconnected nature of the economy, as alterations in one factor have repercussions on others. Understanding the linkages between UR and EG requires careful consideration of the nature of EG. For instance, when certain sectors experience output growth, it results in job creation and a reduction in UR. The association between EG and UR is complex and interconnected. The connection between UR and EG has been examined through varying methodologies across different countries. Okun (1962) was the first to measure this relationship in the United States from 1947 to 1960. The study has confirmed a negative relationship between growth and unemployment. They are commonly referred to as Okun's Law. Indeed, increased government expenditure creates an environment that fosters investment, ultimately resulting in the growth of output and employment. Consequently, the majority of economies place a high priority on expediting their rates of EG with the aim of reducing UR. This is often accomplished by greater investment in government expenditure. By doing so, they can raise their GDP and reduce unemployment. Finally, countries consider unemployment to be a significant social problem that they actively work to address, recognizing its negative impact on both society and the economy.

This study investigates the linkages between EG and UR in Saudi Arabia from 2011Q1 to 2022Q3. By doing so, this research has many contributions to the literature. First, the research focuses on evaluating the relevance of Okun's law in Saudi Arabia. This is significant because previous studies have primarily examined developed nations, as well as a few countries in Asia and Latin America. Indeed, Saudi Arabia has been engaged in proactive efforts during recent decades aimed at mitigating UR in order to address the social consequences of this phenomenon. Vision 2030, implemented by the Kingdom of Saudi Arabia, has proposed a series of initiatives aimed at fostering EG and reducing UR. The vision includes many initiatives, such as the Financial Sector Development Programme, Financial Sustainability Programme, National Industry Development and Logistics Programme, National Transformation Programme, and Quality of Life Programme. Saudi Arabia has experienced financial transformations over recent decades, including various free trade agreements with Gulf Cooperation Council countries. Based on data from the World Bank, the objective is to attain economic expansion rates while concurrently decreasing the UR, which was recorded at 7.35% in the year 2021. According to the General Authority for Statistics (2022), Saudi Arabia had an unemployment rate of around 4.8% in the fourth quarter of 2022. In order to formulate effective labor market policies, policymakers in Saudi Arabia must have a comprehensive understanding of how economic activity affects unemployment. Second, this study examines whether Okun's law holds for groups within the labor force based on nationality (Saudi and non-Saudi) and gender (male or female). The purpose is to obtain insight into labor market gaps and identify measures that may be implemented for each group. It is worth emphasizing that while Okun's law may apply to subgroups of the population, it may not apply to the entire population. Third, this study aims to verify the stability and reliability of Okun's law in Saudi Arabia by using the gap and difference versions and implementing the standard Ordinary Least Squares (OLS), Ordinary Least Squares with robust standard errors (ROLS), and Two-Stage Least Squares (2SLS) techniques.

The rest of this paper consists of six sections. Section 2 summarizes the literature, while Section 3 explains the methodology and data. Section 4 presents the findings. Finally, the conclusion

and policy recommendations are provided in Section 5.

2. Brief Literature Review

Numerous studies examined the correlation between UR and EG, each taking a different perspective. Some have analyzed this relationship within a group of countries or regions, while others have focused on individual countries.

The Theoretical Link Between EG and UR

Okun (1962) was the first to investigate the connection between EG and UR. He examined how GDP affected UR in the United States from 1947 to 1960. The results demonstrated that a 1% increase in GDP corresponds to a 0.3% decrease in UR. This theory is commonly referred to as Okun's law. Okun's law has since become a point of reference for researchers to examine the growth-unemployment relationship. Okun's law is an important tool for understanding the relationship between EG and UR. It has been widely employed to analyze data from groups of countries or within different regions of the same country.

Empirical Studies on the Link Between EG and UR

Various empirical studies analyzed the connection between UR and EG. Some works concentrated on this relationship within a country, while others analyzed it across various countries. Regarding the studies focused on countries, we can highlight Louail and Benarous (2021). The authors provide empirical evidence supporting Okun's law in Algeria. The coefficients obtained from the gap version provided evidence that GDP had a significant and negative impact on the UR. Although there has been a noticeable decline in UR alongside the growth of GDP, the relationship between the increase in employment and each additional gain in GDP has been weak. Karikari-Apau and Abeti (2019) utilize the ADF and PP unit root tests and the ARDL cointegration test developed by Pesaran et al. (1999) to examine the impact of EG on UR in China. The findings indicate the presence of a negative association in the short-run and long-run between UR and EG. Chand et al. (2017) examined the impact of EG on the UR in India using correlation and regression analysis. The authors concluded a robust inverse relationship between EG and UR, which aligns with Okun's law and is consistent with previous research findings. In addition, gross domestic product is responsible for 48% of the variation in UR. The objective of Makaringe and Khobai (2018) was to examine the reaction of unemployment to EG in South Africa. The study utilized quarterly data from 1994Q1 to 2016Q4. The ARDL bounds test approach is employed to check the long-run impact of EG on UR. The findings indicate the presence of an association between UR and EG in the long term. The outcomes suggest a negative correlation between UR and EG in both the short and long-run. Hjazeen et al. (2021) also employed the ARDL model to examine the correlation between UR and other variables. The empirical evidence suggests a significant negative association between the UR and EG in Jordan.

Regarding the studies that have explored the correlation between UR and EG across countries, we can mention Porras-Arena and Martín-Román (2023). The study examines the validity of Okun's rule in Latin America by employing many econometric models. The results indicate that the influence of EG on UR is relatively less significant when compared to more developed economies. Ben-Salha and Mrabet (2019) make a valuable contribution by estimating Okun's law in four North African economies from 1991 to 2013. The study investigates the relationship between the UR and EG among various segments of the labor force. The authors estimate Okun's coefficients while considering the potential existence of structural breaks,

thresholds, and asymmetry. The empirical analysis shows that there are different results when it comes to the importance, extent, and consistency of coefficients across different labor forces and countries. Louail and Ben Haj Hamida (2021) suggest that Okun's coefficient is valid for Arab countries. When the UR falls within the range of 6.35 to 7.93, there is a negative correlation between GDP and UR. Benos and Stavrakoudis (2020) reveal a significant correlation between GDP and UR in the US, France, Canada, the UK, and Germany. However, Italy and Japan do not exhibit any significant relationship between EG and UR. Soylu et al. (2018) employ a panel data methodology to examine the correlation between EG and UR in Eastern European countries between 1992 and 2014. The study suggests a negative link between EG and UR, meaning that a 1% rise in EG decreases UR by 0.08%.

Empirical Studies on the Link Between EG and UR in Saudi Arabia

There have been only a few studies on the link between UR and EG in Saudi Arabia, and they have focused on unemployment among the whole population. At the same time, there is a lack of attention given to specific gender-based groups (females and males). Louail and Riache (2019) showed a significant association between EG and UR in Saudi Arabia from 1991 to 2017. Moreover, Alrasheedy (2017) checked the Okun's Law in Saudi Arabia. The findings indicate that increased unemployment among Saudi citizens resulted in a significant loss of real GDP amounting to 95 billion dollars. Additionally, the analysis revealed that the non-oil GDP lost 52 billion dollars due to increased UR. The research conducted by Amor and Hassine (2017) provided empirical evidence supporting the applicability of Okun's Law in Saudi Arabia between 1980 and 2015. The results indicated that a 1% rise in EG decreased the UR by around 0.33%. In addition, Amirat and Zaidi (2020) conducted a study to evaluate the EG potential associated with Vision 2030. The outcomes indicate that the knowledge economy in Saudi Arabia has five key components: employment, education, innovation, ICT, and human capital. A study by Acaroğlu (2018) also discovered a negative correlation between EG and UR within the G20 countries. The study also revealed the validity of Okun's law in Saudi Arabia.

3. Methodology and Data

Methodology

In this study, we estimate Okun's law by using two versions, namely the gap version and the first-difference version. Both versions imply that the link between unemployment and output is contemporaneous.

First-difference version

$$u_t - u_{t-1} = \sigma + \alpha[ln(y_t) - ln(y_{t-1})] + \theta_t \quad (1)$$

where ut represents the unemployment rate, whereas yt represents real GDP in year t. φ represents the constant term. The error term, denoted θt is a random variable with a mean of zero. It is considered to have no correlation with the output y. The coefficient α measures the degree of sensitivity of unemployment in response to changes in output.

Gap version

$$u_t - u_t^* = \varphi + \beta[ln(y_t) - ln(y_t)^*] + \varepsilon_t \quad (2)$$

where ut represents the unemployment rate, whereas yt represents real GDP in year t. The asterisk * denotes their respective long-run values, φ represents the constant term. The error term, denoted εt is a random variable with a mean of zero. It is considered to have no correlation with the output gap. The coefficient β quantifies the degree of sensitivity of the unemployment gap in response to changes in the output gap. Indeed, the deviations of production from its potential level and unemployment from the natural rate are often referred to as the output gap and the unemployment gap, respectively. The Hodrick-Prescott (HP) filter is used in this study to obtain the potential GDP and natural unemployment rate.

Data and Descriptive Statistics

The study examines the effects of EG on UR in Saudi Arabia using data from the first quarter of 2011 to the third quarter of 2022. We will test Okun's law for the labor force categorized by nationality and gender. Specifically, this study considers the global unemployment rate (GUR), the unemployment rate among Saudis (SUR), the unemployment rate among non-Saudis (NSUR), the unemployment rate among males (MUR), and the unemployment rate among females (FUR). Therefore, we have five specifications that will be estimated using the gap and first-difference versions. The statistics pertaining to EG and UR have been sourced from the Saudi Central Bank and the World Development Indicators provided by the World Bank. Figure 1 depicts the evolution of GDP growth and the different UR during the period 2011Q1-2022Q3.

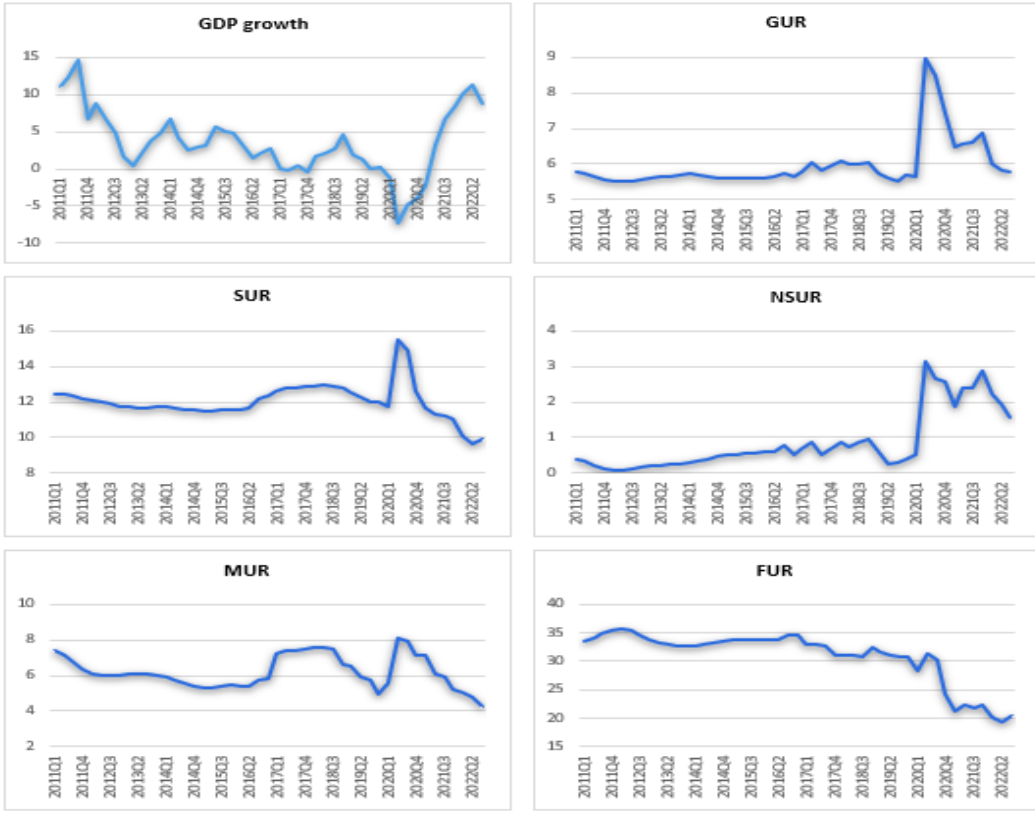

Figure 1: Evolution of Variables Under Study.

Table 1 presents the descriptive statistics of the different variables introduced in the analysis. As

shown, the GDP growth rate has an average of 3.503%. The average global unemployment rate (GUR) is 5.959%, while the maximum reached 8.979%. Regarding the different unemployment rates, the table shows that the average unemployment rate among the Saudi labor force (SUR) is higher than that of the non-Saudi labor force (NSUR). Finally, the average unemployment rate among females (FUR) is 30.956%, while the one for males (MUR) is 6.2%. Therefore, the unemployment rate among females surpasses the unemployment rate among males.

Table 1.Descriptive Statistics.

	OUTPUT	**GUR**	**SUR**	**NSUR**	**MUR**	**FUR**
Mean	3.503	5.959	12.026	0.862	6.200	30.956
Median	2.844	5.705	11.883	0.539	6.029	32.803
Maximum	14.568	8.979	15.447	3.124	8.091	35.700
Minimum	-7.377	5.517	9.665	0.080	4.262	19.343

The correlation matrix providing an initial check on the relationship between EG and UR is reported in Table 2. As shown, there is a negative and statistically significant correlation between output and the global unemployment rate, the unemployment rate of the Saudi labor force, and the male unemployment rate, while no significant correlation exists between the female unemployment rate and the non-Saudi unemployment rate. This may give an idea of the linkage between output and the different unemployment rates.

Table 2: Correlation Matrix.

Variables	**OUTPUT**	**GUR**	**SUR**	**NSUR**	**MUR**	**FUR**
OUTPUT	1.000					
GUR	-0.482***	1.000				
SUR	-0.577***	0.579***	1.000			
NSUR	-0.223	0.832***	0.097	1.000		
MUR	-0.391***	0.484***	0.832***	0.139	1.000	
FUR	-0.042	-0.361**	0.424***	-0.762***	0.202	1.000

*** represents the level of statistical significance at 1%.

4. Empirical Findings

Unit Root Test

In order to assess the stationarity of the time-series data on unemployment and output, we used several unit root tests, namely the ADF test developed by Dickey and Fuller (1979), the PP test developed by Phillips and Perron (1988) and the DF-GLS test developed by Elliott et al. (1992). The unit root tests are conducted for models with a constant and with a constant and a trend. Moreover, the considered variables are tested for stationarity for the difference version ($x_t - x_{t-1}$) and the gap version ($x_t - x_t^*$). Results are displayed in Tables 3 and 4.

Table 3: Unit Root Test Results – Difference Version.

$x_t - x_{t-1}$	**ADF test**		**PP test**		**DF-GLS test**	
	C	C + T	C	C + T	C	C + T
OUTPUT	-3.07**	-3.94**	-8.78***	-9.30***	-2.25**	-3.75**
GUR	-2.99**	-3.86**	-3.11**	-3.94**	-2.88***	-3.26**
SUR	-6.19***	-6.31***	-6.49***	-6.68***	-5.96***	-6.40***
NSUR	-7.64***	-7.56***	-9.12***	-9.51***	-7.67***	-7.68***

MUR	-5.68***	-5.61***	-5.62***	-5.59***	-5.65***	-5.68***
FUR	-3.88***	-4.11**	-5.99***	-6.99***	-2.02**	-3.25**

*** and ** denote the rejection of a unit root at the 1% and 5% levels of significance, respectively. For the model with constant only, the critical values for ADF and PP tests are -3.58 (1%), -2.92 (5%) and -2.60 (10%), and for the DF-GLS test are -2.61 (1%), -1.94 (5%) and -1.61 (10%). For the model with constant and trend, the critical values for ADF and PP tests are -4.17 (1%), -3.51 (5%), and -3.18 (10%), and for the DF-GLS test are -3.77 (1%), -3.19 (5%) and -2.89 (10%).

The findings in Table 3 suggest that the first difference of output is stationary for the two models and the three unit root tests. In addition, the different UR series are found to be stationary when considering their first differences. Most series are found to be stationary at the 1% statistical level. Therefore, Table 3 strongly confirms that all variables considered in the analysis are I(0). Table 4 contains the findings of unit root tests for the gap version. Therefore, the Hodrick-Prescott filter is applied to obtain the potential output and natural unemployment rates. The table shows that the variables are stationary using the ADF, PP, and DF-GLS unit root tests. Consequently, the output and different unemployment rate series are stationary at levels, and one could move to estimate the impact of EG on UR.

Table 4: Unit Root Test Results – Gap Version.

$x_t - x_t^*$	**ADF test**		**PP test**		**DF-GLS test**	
	C	C + T	C	C + T	C	C + T
OUTPUT	-4.78***	-4.77***	-4.30***	-4.09**	-3.30***	-3.80***
GUR	-3.66***	-3.63**	-3.12**	-3.56**	-3.70***	-3.72**
SUR	-4.20***	-4.13**	-3.27**	-4.19***	-3.02***	-4.07***
NSUR	-3.57**	-3.59**	-3.38**	-3.62**	-3.62***	-3.60**
MUR	-3.19**	-4.12**	-3.70***	-3.65**	-3.22***	-3.23**
FUR	-3.55**	-4.48***	-3.53**	-3.54**	-2.78***	-3.20**

*** and ** denote the rejection of a unit root at the 1% and 5% levels of significance, respectively. For the model with constant only, the critical values for ADF and PP tests are -3.58 (1%), -2.92 (5%) and -2.60 (10%), and for the DF-GLS test are -2.61 (1%), -1.94 (5%) and -1.61 (10%). For the model with constant and trend, the critical values for ADF and PP tests are -4.17 (1%), -3.51 (5%), and -3.18 (10%), and for the DF-GLS test are -3.77 (1%), -3.19 (5%) and -2.89 (10%).

Difference Version

Once ensuring that all variables in the first differences are stationary at levels, one could move to the estimation of Okun's coefficients for the different types of the labor force. The estimation is done using the OLS, OLS with robust standard errors and 2SLS. The findings are summarized in Table 5.

Table 5:Estimation of Okun's Coefficients – Difference Version.

	OLS		**OLS with robust standard errors**		**2SLS**	
	Coefficient	std. Error	Coefficient	robust std. Error	Coefficient	std. Error
GUR	-0.115***	0.038	-0.115***	0.037	-0.135***	0.043
SUR	-0.114***	0.049	-0.114**	0.048	-0.136**	0.058
NSUR	-0.100***	0.029	-0.100***	0.029	-0.114***	0.033
MUR	-0.123***	0.036	-0.123***	0.037	-0.116***	0.042

FUR	0.019	0.086	0.019	0.088	-0.044	0.102

*** and ** denote the significance at the 1% and 5% levels, respectively.

As shown, the coefficient of the global unemployment rate is negative and statistically significant at the 1% level when using the OLS technique. These findings are confirmed when we use the OLS with heteroscedasticity robust standard errors. Finally, the 2SLS technique, which accounts for endogeneity, is also implemented. The results show that the coefficient (-0.135) is negative and statistically significant at the 1% level. Therefore, all techniques show that output is negatively related to the global unemployment rate in Saudi Arabia when using the difference version of Okun's Law. A rise of 1% in output decreases the global unemployment rate by -0.115% to -0.135%. We then move to estimate Okun's coefficients for the Saudi and non-Saudi labor force. The three techniques show that coefficients of SUR and NSUR are negative and statistically significant when using the OLS, OLS with heteroscedasticity robust standard errors, and 2SLS techniques. Moreover, the coefficients of output for SUR (-0.114 -0.136) are higher than for NSUR (-0.100 to -0.114). Consequently, one could conclude that the output in Saudi Arabia is inversely associated with Saudi and non-Saudi unemployment rates. However, the reaction of the Saudi unemployment rate reacts more to output. Finally, we estimate the effects of output on Saudi male and Saudi female unemployment rates. The results show that the coefficients of the output are negative and statistically significant at the 1% level using all techniques. The coefficients range between -0.116 and -0.123, which means that an increase in output results in a reduction of the Saudi male unemployment rate by -0.116% to -0.123%. Surprisingly, the coefficients of the Saudi female unemployment rate are not statistically significant when using the OLS, OLS with Heteroscedasticity robust standard errors, and 2SLS techniques. This finding shows that output has no impact on the female unemployment rate in Saudi Arabia, which means that when output increases/decreases, the UR among Saudi females does not react. Therefore, the difference version shows that Okun's Law is confirmed for the global unemployment rate, Saudi unemployment rate, non-Saudi unemployment rate, and Saudi male unemployment rate. The Saudi female unemployment rate is not affected by output.

Gap Version

After conducting the difference version of Okun's Law, we also use the gap version to estimate the impact of the output gap on UR in Saudi Arabia. The results are summarized in Table 6.

Table 6:Estimation of Okun's coefficients – Gap version.

	OLS		**OLS with robust standard errors**		**2SLS**	
	Coefficient	std. Error	coefficient	robust std. Error	Coefficient	std. Error
GUR	-0.130***	0.024	-0.130***	0.025	-0.161***	0.036
SUR	-0.132***	0.036	-0.132***	0.038	-0.156***	0.055
NSUR	-0.095***	0.020	-0.095***	0.025	-0.139***	0.030
MUR	-0.149***	0.032	-0.149***	0.033	-0.192***	0.049
FUR	0.089	0.077	0.089	0.076	0.152	0.119

*** and ** denote the significance at the 1% and 5% levels, respectively.

The findings shown in Table 6 demonstrate a statistically significant negative association

between the global unemployment rate and output gap using the OLS and OLS with robust standard errors. To control the endogeneity of the GDP variable, the results of the 2SLS are the same, with a coefficient of -0.161. These results are similar to the results of the difference version since the global unemployment rate is inversely related to the output gap. Therefore, these results provide support for the validity of Okun's Law for the global unemployment rate. The Okun's Law is also verified for Saudi and non-Saudi unemployment rates, with negative and significant coefficients at the 1% statistical level. As for the difference version, the coefficients for the Saudi labor force are higher than the non-Saudi labor force. Finally, we move to the labor force by gender. The table shows that the coefficients of output are negative and statistically significant at the 1% level, with coefficients ranging between -0.149 and -0.192. Therefore, a rise of 1% in output induces a decrease in Saudi male unemployment rate by -0.149% to -0.192%. Similar to the difference version, the OLS and OLS with robust standard errors show that the impact of the output gap on the Saudi female unemployment rate is not statistically significant. To control the possible endogeneity of GDP, we added a second estimate using the 2SLS technique. The results appear to be the same, indicating the invalidity of Okun's law for the female labor force.

5. Concluding Remarks and Policy Recommendations

The relationship between EG and the UR is one of the most discussed topics in economic sciences. This paper contributes to the literature by examining the impact of EG on the UR in Saudi Arabia between 2011Q1 and 2022Q3. The paper estimates the impact of EG on the global unemployment rate and unemployment rates by nationality (Saudi and non-Saudi) and gender (male or female). The paper employs the difference version and gap version of Okun's Law obtained using the Hodrick-Prescott filter. The analysis uses the OLS, OLS with robust standard errors, and 2SLS techniques to account for heteroscedasticity and endogeneity. The findings of the study show that the global unemployment rate is negatively associated with EG when using the difference and gap version of Okun's Law and employing the three estimation techniques. Okun's coefficients range between -0.115 and -0.161, which means that an increase in output by 1% induces a decrease in the global unemployment rate from -0.115% to -0.161%. When considering the unemployment rate of the Saudi and non-Saudi labor force, the analysis shows that both of them react negatively to EG and the validity of Okun's Law. However, the reaction of the Saudi unemployment rate to EG is higher than that of the non-Saudi unemployment rate. These findings mean that the Saudi labor force is more sensitive to variations in EG than the non-Saudi labor force. Finally, the analysis shows that only the male unemployment rate reacts to EG, with a negative association between them. The female unemployment rate is not affected by variations EG, even when accounting for heteroscedasticity and endogeneity.

The results of the present paper may be useful for the design of labor market policies in Saudi Arabia. First, the study shows that the reaction of Saudi unemployment to EG is higher than that of the non-Saudi unemployment rate. Therefore, during periods of economic recession, it is preferred to set some specific policies to support the Saudi labor force since they are more affected by the slowdown in gross domestic product. This would accelerate the implementation of the Saudization plan. Second, our results show that the female unemployment rate is not affected by economic growth. Consequently, more support for this specific labor force may be provided to facilitate its integration into the labor market and exploit the benefits of economic activity to create more jobs for females and encourage female empowerment.

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