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Asymmetry Relationship between Economic Growth and Unemployment Rates in the Arab countries: Application of the OKUN Law during 1960-2017

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1. Introduction

According to the standard approach, the change in economic growth rates leads to a decline in unemployment rates of varying proportions, usually explained by the nature of economic growth achieved. Moreover, the high unemployment rates may affect economic growth because the labour market is connected to sectors that affect growth. Moreover, Okun, 1962 fixed the relationship between GDP and unemployment rates, and it was called Okun's law, after the war in the United States of America that the global economy has gone through.

Knowing the mutual effect of growth rates and unemployment rates is the most critical factor in understanding how unemployment is affected. Economic policies are usually developed to increase growth rates and reduce prevailing unemployment rates, which are considered external variables in most standard economic models.

Understanding how to influence unemployment should be based on

understanding the nature of the relationship with other economic variables such as growth, investment, the rate of wages and inflation. Moreover, that by installing unemployment rates could be stabilized towards their natural rates by stimulating the aggregate demand Bhattarai (2016) through fiscal or monetary policies with or without some increase in price levels is an issue widely investigated in the macroeconomic literature since Keynes (1936) and particularly after Phillips (1958). Since the above factors overlap and are all linked to changes in economic structure, the analysis of change is based mainly on linking unemployment to the change in the economy's ability to change, i.e., economic growth as the most critical measure of quantitative economic change. Therefore, economic policies that support growth are the same as those for eliminating unemployment. However, an economic analysis using the standard approach shows that the relationship between unemployment and growth varies according to several factors that may be considered certain factors in some economies.

Despite confirming the inverse relationship between output and unemployment, recent empirical studies have different results for Okun's law. First, some researchers in Okun's law focused on the extensive analysis of the different economic variables affecting unemployment, and they came to different results for Okun's coefficient (Zanin 2014; Razzu and Singleton 2013). State policies are likely to focus on age and gender differences to address the problem of unemployment. Second, many studies have assumed a linear correlation with a radially symmetric effect (Gabrisch and Buscher 2006; Christopoulos 2004). However, some recent empirical studies have also shown that Okun's law can show a nonlinear and asymmetric relationship (Koutroulis et al. 2016; Huang and Yangtze 2005; Silvapulle et al. 2004). Moreover, the main reason for the differences in Okun's law was the fluctuations in business cycles by many countries worldwide, which led to periods of growth and recession. Third, Other studies have been interested in Okun's law at the regional level and have concluded that Okun's fixed size is subject to extraordinary changes (e.g., Pereira 2014; Louail and Benarous, 2021; Louail and Riache, 2019).

Therefore, it appears that a link between growth and unemployment seems inaccurate if we adopt the legal analysis of each economy. It can also be concluded that economic policies supporting growth are not the same policies to eliminate unemployment.

So is it possible that an OKUN law can be achieved in the economies of the Arab countries in the short and long term? This paper aims to examine Okun's Law in the Arab countries by examining the impact of the OUTPUT gap on

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Unemployment rates and the contribution of economic growth to reducing unemployment. The empirical results show that there is an existence of Okun's law in Arab countries. Coefficients estimated using the different version and concluded a negative and significant impact of the gross domestic product gap on unemployment rates. The higher the gross domestic product by 1%, the lower the unemployment rate by 87.79%, in unemployment threshold limits, which is the case with the study of (Ting & Ling, 2011; Okun. 1962; Prachowny. 1993 and Abu. 2017; Louail and Benarous, 2021; Louail and Riache, 2019).

Moreover, the decision-makers in Arab countries seek to raise economic growth rates to address unemployment, so we seek to determine the causal relationship between the gross domestic product and unemployment rates.

This study attempts to contribute to Oku's Law; They were divided into five parts. First, Introduction, Second, Literature review and hypotheses, Third, *Empirical methodology*. Fourth, the discussion is the essential part of the study in the last, Conclusion Focus on Implication, Limitation and the future of research.

2. Literature review and research hypotheses

2.1. Literature review

Many studies and empirical research have proven the relationship between economic growth rates and the change in unemployment rates in any economy. Formal studies have also shown a causal relationship in the concept of Granger (Granger's Causality). However, the theoretical analysis does not always confirm this relationship because it focuses on unemployment as an economic phenomenon resulting from a defect in economic policies.

The first person to use the relationship between unemployment and growth economic scientist OKUN, 1962 on the American economy, where he studied the relationship between GNP and unemployment rates during the period (1947-1960) and concluded that every increase in GNP by 1% leads to a decrease in unemployment rates by 0.3%.

Some studies tried to apply Okun's law to regional groupings and cross-countries, and most of them concluded that there is a contradiction with Okun's results (Adanu, 2005; Binet and Facchini, (n.d.), Dureche, 2000). Moreover, some studies concluded no statistically significant differences in regional groupings and cross-countries, including (Rizitiz and Apergis, 2003; Villaverde and Maza, 2009).

The study of Maria et al., 2008 confirmed that unemployment and per capita income fluctuate over successive periods. Moreover, this fluctuates repeatedly,

i.e. the dynamic analysis between the positive growth of income towards a sustainable accumulation of knowledge.

Ball et al., 2015 also emphasized in their study that the difference in OKUN coefficients in most countries is due to the specific characteristics of national employment and has nothing to do with labor market regulatory legislation.

The Economou and Psarianos, 2016 study also confirmed that Okun's Law is strong to various specifications. The impact of output changes to state rates is weaker for countries with redoubled labor market protection expenditures, and it is a lot of persistent for countries with low labor market protection.

The Guisinger et al., 2018 study concluded that OKUN parameters were taken for each state in the United States by adding variables neglected in previous studies and had been shown to influence the relationship (such as educational level, residential achievement, low union rate in non-productive sectors).

As for the Arab countries, we find Ben-Salha and Mrabet, 2019 study of North African countries, where Okun›s factors were estimated by considering the possibility of structural breaks. The study focused on a difference between the study countries regarding Okun›s law, and the reason for this is the difference in the political effects of each country.

As shown by the results of Gil-Alana et al., 2020 Study, the unemployment and output growth rates series show some extent of long memory behaviour for many countries, whereas the soundness of Okun's constant is additionally challenged since it changes drastically.

In Benos and Stavrakoudis, 2020 study found that dependence between GDP and unemployment disturbances is strong only in the USA and France, followed by Canada, the UK and Germany. There is no dependence on Italy and Japan. It enhances Okun's Law's validity. It reinforces the validity of Okun's law within the former countries with its uncertainty in European countries and Japan, where there is still a negative relationship given through a systematic portion of estimates of the equations for the distinction of output and unemployment. Also, there are associate degree spatial holdings within the previous five countries. Production disruptions are linked to unemployment during recessions, while it is wholly decoupled during downturns in the United States, France, Canada, the United Kingdom and Germany. This study indicates that the United States, France, and to a lesser extent Canada, Great Britain and Germany provide the most favourable environment for countercyclical economic policies.

Widarjono, 2020 study concluded that the cointegration between state and output is found, and therefore the uneven Okun's law exists altogether the countries into account. It is suggested that economic upturn and downturn

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have different impacts on unemployment in the ASEAN-3. More importantly, economic downturns have a more considerable impact on unemployment than economic booms.

In addition to the presence of several studies that dealt with Okun's law, who was at the level of one country, including those who were at the level of a group of countries, and their results were consistent with what Okun mentioned among them, for example (Doğru, 2013; Imran et al., 2015; Omari, 2019; Owyang and Sekhposyan2012).

As for the Arab countries, we find a study by Louail and Riache, 2019, which dealt with the OKUN's coefficient in the Kingdom of Saudi Arabia and concluded that there is a negative and moral impact of unemployment rates on the growth of the Saudi economy. Moreover, Louail and Benarous, 2021's study dealt with the OKUN's coefficient on the Algerian economy. They concluded that there is a negative statistically significant impact of unemployment rates on the growth of the Algerian economy.

2.2. Research Hypotheses

To answer the previous problem and achieve the desired research objectives, we propose the following set of hypotheses:

H1: There is a negative effect between economic growth rates and unemployment rates in Arab countries.

H2: Economic growth rates negatively affect the unemployment rates in Arab countries.

H3: Unemployment rates negatively affect the growth rates of Arab economies.

H4: Policies adopted in the Arab countries have a positive impact on the growth of their economies.

3. Empirical methodology

In this section, we present the empirical methodology used to estimate long-term trends for unemployment and output. We begin with presenting the standard model of Okun's coefficient, followed by additional models with different interaction terms.

The "Okun's Law" is introduced by Arthur Okun (1962), which proved a negative relationship between unemployment and output. This law refers to the empirical regularity, which is to hold between cyclical output and cyclical

unemployment. A set of equations given by may formulate the level form of this relationship can be written as:

$$(U_t - U_t^*) = \theta(Y_t - Y_t^*) + \varepsilon_t \qquad (1)$$

$$\Delta U_t = \beta_0 + \beta_1 \Delta Y_t + \varepsilon_t \qquad (2)$$

U_t is the unemployment rate, Y_t is the logarithm of the real GDP level, U^* called "full employment", and Y^* is "potential output". According to Arthur Okun (1962), the empirical relationship between real GDP and unemployment can be estimated using a "first differences" (Equation 2) version or a "gap" version (Equation 1(2)), where ΔU_t represents the changes in the unemployment rate between current and previous period; ΔY_t is the economic growth rate of output (GDP) in per cent between the current period and the previous. Intuitively, the "Okun's Law" is held when the coefficient β_1 should be harmful, as a growing economy should lead to declining unemployment in the long run. FollowingKnotek II (2007), the first difference model has been extended to consider a time-lagged variable, and the model is called dynamic that corrects for omitted effects of past output on the unemployment rate. The following expression expresses the dynamic model:

$$U_t = \beta_0 + \beta_1 Y_t + \beta_2 Y_{t-1} + \beta_3 U_{t-1} + \varepsilon_t \qquad (3)$$

Most of the existing literature focuses on Okun's coefficient without studying the nature of adaptation to the nature of this linear relationship. We propose to specify the threshold asymmetry relationship between cyclical unemployment and cyclical output to underline this challenge. For this reason, we propose to use a nonlinear model proposed by Hansen, 1999 that the coefficient of unemployment depends on a threshold. Furthermore, the threshold panel non-dynamic model's strategy is first to test the threshold number. After that, we estimate the adequate model. In this step of our article, we use a set of dynamic panel threshold model with one threshold can be represented with the following expression:

$$U_{i,t} = \mu_i + \beta_1 U_{t-1} + \beta_2 Y_{t-1} + \beta_3 Y_{i,t} I(q_{it} \leq \lambda) + \beta_4 Y_{i,t} I(q_{it} > \lambda) + \varepsilon_{it} \qquad (4)$$

In this specification, λ is the parameter threshold that specifies the absolute value. It is an indicator function taking on the value one if the value of the

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threshold variable $U_{i,t-1}$ is below an absolute value of λ and takes 0 otherwise. ε_{it} is the error term that is $\varepsilon_{it} \sim iid(0, \sigma^2)$.

3.1. Empirical results and discussion

3.1.1. Data description and preliminary tests

The present study focus on a selection of Arab countries. Our data were extracted from the IMF database. We have therefore used annual data throughout 1991–2017. The descriptive statistics of the variables and sources of data used in the analysis are presented below.

Table 1. Description, data sources, and descriptive statistics of variables

Variable	Description	Data source
Growth GDP	Gross Domestic Product growth rate (annual %)	World Bank
Unemployment	Unemployment, total (% of the total labour force) (modelled ILO estimate)	World Bank

Source: all data are from the World Development Indicators Data Bank, the World Bank (databank.worldbank.org/wdi)

Following the preliminary analysis of the data, we note that Algeria, Libya, Tunisia, Jordan has the highest unemployment rate and the lowest real GDP.

Table 2. Descriptive statistics of GDP growth and unemployment by country

Country	GDP		Unemployment	
	Mean	**Sd.**	**Mean**	**Sd.**
Algeria	0.0308	0.0195	-0.0243	0.1077
Bahrain	0.0477	0.0249	-0.0021	0.0242
Egypt	0.0433	0.0148	0.0139	0.1049
Iraq	0.0962	0.1609	-0.0073	0.0535
Jordan	0.0505	0.0351	-0.0087	0.0676
Kuwait	0.0498	0.0794	0.1072	0.4854
Lebanon	0.0404	0.0329	-0.0091	0.0488

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Libya	0.0492	0.3481	-0.0035	0.0583
Morocco	0.0378	0.0379	-0.0182	0.1021
Oman	0.0381	0.0304	-0.0075	0.0263
Qatar	0.0992	0.0765	-0.1015	0.2057
Saudi Arabia	0.0282	0.0376	-0.0095	0.0624
Sudan	0.0523	0.0304	-0.0021	0.0102
Tunisia	0.0377	0.0217	-0.0002	0.0892
United Emirate	0.0444	0.0354	-0.0008	0.0895
Yemen	-0.0323	0.2278	0.0212	0.0662

Source: own study

Table 3. Descriptive statistics of GDP growth and unemployment for all sample

Variable	Mean	Std. Dev.
GDP	0.0432	0.1099
Unemployment	-0.0033	0.1502

Source: own study

A graphical illustration of the first difference of unemployment rate and the first difference of real GDP growth for panel data is presented in (fig. 1) below.

Following the preliminary study of variable shows the reject of symmetry of all series via the Skweness and Kurtosis test. We also reject the normality hypothesis for all variable via the JarqueBera test (cf. table 4). We can suggest the presence of a nonlinearity threshold.

Table 4. Normality test

Variable	Observation	Skeweness	Kurtosis	Jarque-Bera test
GDP	416	0.5580 (0.000)	61.5409 (0.000)	1.3e+05 (0.0000)
Unemployment	432	6.4607 (0.000)	90.1033 (0.000)	5.7e+04 (0.0000)

Note: The statistics for skewness and kurtosis tests, respectively, are typically distributed, while the joint test of Jarque-Bera is based on a Chi-Squared distribution.

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For the Skewness test, the null hypothesis confirms the symmetry of the distribution of the considered series.

For the Kurtosis test as a second sequence, the null hypothesis confirms the normality of the series's distribution after the symmetry is confirmed.

For the joint test of Jarque-Bera, the series's normality is validated when the null hypothesis is accepted.

***, **, and * indicate significance levels at 1, 5 and 10 per cent, respectively.
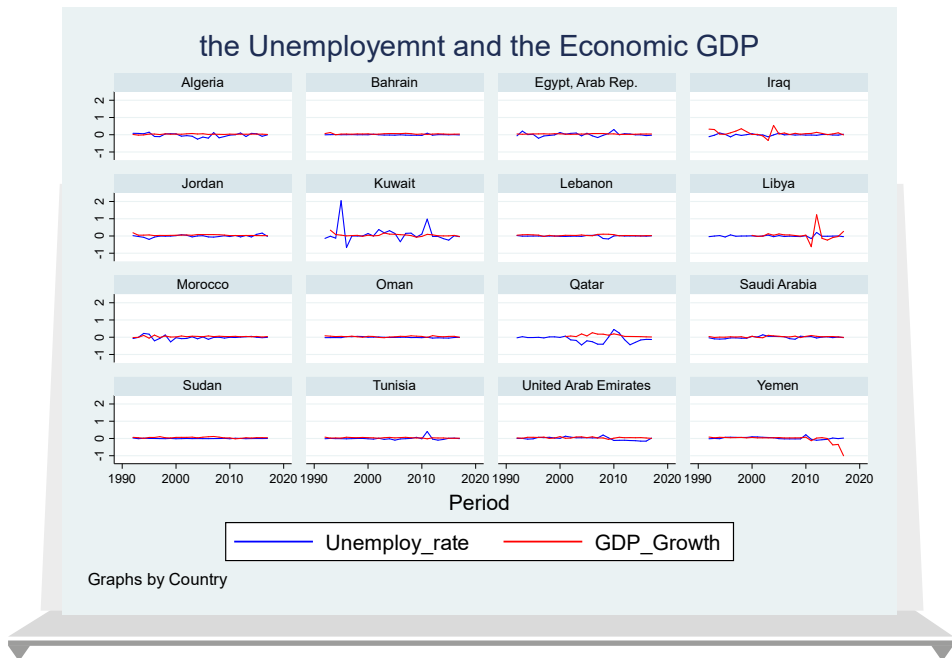
Source: own study

Figure 1. The GDP growth and the unemployment rate

Source: own study

3.1.2. Unit root tests

A stationary test is needed before specifying the presence of a nonlinear threshold between the GDP and unemployment and avoiding spurious regression results.

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Table 5. Unit root tests

Variable	Im-Pesaran-Shin unit-root test		Harris-Tzavalis unit root tests	
	In level	**In difference**	**In level**	**In difference**
GDP	-7.3077* (0.000)	0.0000*	-12.7696* (0.000)	0.0000*
Unemployment	-9.1568* (0.000)	0.0000*	-12.9624* (0.000)	0.0000*

Note: the value is the p-value

*, ** show's rejection of the null hypothesis of a unit root at 1 (10) per cent level of significance

Source: own study

3.2. Empirical results of the Okun coefficient model and dynamic version

To verify Okun's coefficient (the antagonistic relation between unemployment and GDP growth) for Arab countries.

We estimate the linear relationship between GDP growth and Unemployment variable with panel specification for the dynamic model. Following Table 6, we argue that the absence of a significant relationship between GDP growth and unemployment rate is approved for Arab countries.

Table 6. The dynamic Panel estimation model

Variables	Coefficient	Std-Error
Intercept	-0.0105	0.0549
Unemployment (t-1)	-0.1328	0.0062
GDP (t)	0.1142	0.8420
GDP (t-1)	0.0480	0.4598

Notes: *, **, *** level of significance at 1 per cent, 5 per cent and 10 per cent, respectively

Number of observation= 366

Number of groups =   16

Source: own study

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3.2.1. Threshold estimation of the difference and dynamic version

Threshold Estimation for all panel

To estimate the nonlinear panel model, we follow a two-stage procedure: The first step of our methodology is to determine the number of significant thresholds, informing us of the number of regimes that each variable can oscillate. The second step is to estimate the corresponding model. Also, we use 300 bootstrap replications to test for a single threshold effect. It is noted that the point estimate for the threshold is significant because it is included in the 95% confidence interval. Therefore, we suggest dividing the observations of the estimated threshold level into two systems. Table 7 shows the results of the threshold effects for unemployment for the dynamic version. The results indicate that we accept the nonlinearity with two thresholds at levels of 10% for unemployment.

Table 7. Tests for thresholds Unemployment effects

		Test for a single threshold	Test for double threshold	Test for triple threshold
F1		2.95	9.40	9.55
p-value		0.3033	0.0967	0.1533
critical values	**10%**	6.0246	9.2482	10.9449
	5%	8.2779	11.3179	13.1337
1%		14.1212	15.5441	17.3144

Note: 300 bootstrap replications to test for a threshold effect

Source: own study

Following the results of nonlinearity tests, we accept the model with two thresholds. The estimation parameters are shown in the following table 8.

**Table 8. The parameters of the dynamic version of the Okun:
Panel Threshold Regression estimation**

Variables		Coef	Std. Err	p-value
Intercept		0.0013	0.0062	0.836
GDP (t-1)		0.0935	0.0732	0.203
Unemployment (t-1)		0.1831***	0.0569	0.001
GDP(t)	GDP(t) ≤0.0385	0.0867	0.1116	0.438
	0.0385 < GDP(t) ≤0.0506	-0.8807***	0.2602	0.001
	GDP (t) >0.0506	-0.0886	0.0857	0.302

Notes: ***, **, * the significant level at 1% , 5% and 10% respectively

Source: own study

Following the estimation of the PTR model, we argue that if GDP growth is between 3.85 % and 5.06 %, the relationship between employment and GDP is significant and negative relation at 1% level. This result indicates the acceptance of the hypothesis that confirm the Okun theory.

Threshold Estimation for subgroups

In this section, we study the Okun theory for two groups: the Maghreb and East African countries (Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia), Middle East countries (Arabia-Saudi, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, United Emirate, Yemen).

Table 9. Tests for thresholds Unemployment effects for the two groups

Nonlinearity test	Maghreb and East African			Middle East Countries		
	Single threshold	Double threshold	Triple threshold	Single threshold	Double threshold	Triple threshold
F1	9.51	8.60	1.56	1.33	3.85	3.15
p-value	0.0000	0.0200	0.9200	0.600	0.5900	0.4867
Decision	Nonlinearity with two thresholds			Absence of Nonlinearity		

Note: 300 bootstrap replications to test for a threshold effect

Source: own study

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We conclude that the nonlinearity threshold regression between GDP growth and unemployment (the Okun's theory) mentioned in all panel data is due to the nonlinearity of this relationship in the Maghreb and East African countries. We have proved a nonlinearity with two thresholds with a significant level of about 1%.

Table 10. Panel Threshold Regression estimation, parameters of the dynamic version of the Okun for the Maghreb and East African countries

Variable		Coef	Std. Err	p-value
Intercept		-0.0048	0.0235	0.837
GDP (t-1)		-0.8078**	0.3151	0.012
Unemployment (t-1)		-0.1037	0.0965	0.286
GDP(t)	GDP(t) ≤0.0168	-5.0635***	1.2372	0.000
	0.0168 < GDP(t) ≤0.0382	2.1787***	0.7758	0.006
	GDP (t) >0.0382	0.1740	0.3477	0.618

Notes: ***,**, * the significant level at 1% , 5% and 10% respectively
F test that all u_i=0: F(3, 87) = 3.63   Prob = 0.0161

Source: own study

As mentioned in table 10, we have an interesting result: if GDP growth is less than 1.68%, we have a significant negative impact equal to -5.063 of the GDP growth on unemployment with 1% of significant level. However, if the GDP growth is between 1.68% and 3.82%, we significantly positively impact unemployment equal to 2.178.

Table 11. Panel Dynamic Regression estimation parameters of the dynamic version of the Okun for the Middle East Countries

Variables	Coefficient	Robust Std-Error
Constant	-0.0124	0.0258
Unemployment (t-1)	-0.1333	0.2018

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GDP (t)	0.0480	0.2898
GDP (t-1)	0.1487	0.3089

Notes: *, **, *** level of significance at 1 per cent, 5 per cent and 10 per cent, respectively
Number of observations   = 230
Number of groups = 10

Source: own study

We report in table 11 the estimation of the dynamic panel model for Middle East countries; We have used the Arellano-Bond robust VCE estimator to correct by two-step GMM estimators for the variance of linear efficiency. The results show the absence of the impact significantly of the GDP growth on unemployment.

4. Discussion

The results of this study indicate that Okun's coefficient is valid for the case of Arab countries in the different version, when unemployment rates reach the threshold and are between 3.85% and 5.06%, in which the impact of the GDP growth on unemployment rates is negative and significant, with a significant level of 1 per cent. As for outside the threshold, i.e. more than 5.06%, this effect is negative, but it is not significant. It can be explained by dividing the group of Arab countries into three groups.

The first African countries are Algeria, Egypt, Morocco, Tunisia, Libya, and Sudan. These countries are characterised by dense populations concentrated in their capitals and central provinces, causing an increase in unemployment rates and exceeding the threshold. As for the second group, represented by the Gulf Cooperation Council countries, which depend heavily on foreign workers in all sectors, which gives the impression that unemployment rates are low, i.e. less than the threshold, in addition to the distribution of the population, especially the citizens, in all the country's governorates. While the third group, represented in Iraq, Lebanon, Jordan and Yemen, the reason is that Jordan and Lebanon depend on the tourism sector in which the employment rate is low, while Yemen and Iraq are living in political and security crises that have led to high unemployment rates.

For this reason, we have subdivided the all panel into two groups: The Maghreb and East African countries (Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia),

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Middle East countries (Arabia-Saudi, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, United Emirate, Yemen).

We have proved the asymmetric relationship between unemployment and GDP growth for the Maghreb and East African countries. If GDP growth is less than 1.68%, we have a significant negative impact equal to -5.063 of the GDP growth on unemployment with 1% of significant level. However, if the GDP growth is between 1.68% and 3.82%, we significantly positively impact unemployment equal to 2.178.

5. Conclusion

Over the past decades, the relationship between unemployment and economic growth has received increasing attention. This study contributed to the debate by specialising in a sample of Arab countries usually ignored in previous studies. It is also distinguished from its predecessors by investigating the validity of Okun's law in the countries of the group. This analysis is also helpful as it allows estimating Okun's coefficients in Arab countries. Finally, when investigating the effect of economic growth on unemployment, our study looks at the possible existence of three main characteristics of macroeconomic relationships, threshold, namely structural change and asymmetry.

They are using annual data during the period 1960-2017; regarding the importance in Arab countries, the empirical investigation reveals some heterogeneity among, magnitude and stability of the Okun's coefficients. In Algeria, Egypt, Jordan, Morocco and Tunisia, the results indicate that production and unemployment are negatively correlated and that the correlation was not constant versus structural disruptions during the study period. Furthermore, He demonstrated that the inverse relationship between cyclic output and cyclical unemployment persists in periods of recession and expansion, thus confirming the inconsistency of Okun's law. Finally, we reveal that Algeria and Morocco have the most effective Okun's coefficients in absolute terms. It is due to the high youth population in these two countries. The relationship is found to be symmetric with approximately close Okun's coefficients in recession and expansion periods. Turning to Algeria, Egypt, Jordan, Tunisia and Morocco, the analysis shows some similarities. When considering structural discontinuities, the relationship between periodic output and cyclical unemployment becomes significant, indicating that this relationship is not stable over time. In general, the Okun Law is considered to be in effect, beginning in the first decade of the twenty-first century, when many economic reforms were implemented in

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these countries. The analysis also reveals that the reaction of unemployment to production is observed in periods of high unemployment. Finally, while there is overwhelming evidence supporting asymmetries within these countries, they have different behaviours with cyclical downturns and cyclical fluctuations. Our findings indicate that the inverse relationship between output and unemployment was during expansion periods in Tunisia, Egypt, and Jordan and recessions in Morocco and Algeria. This corresponds with the findings of other researchers (e.g., Louail and Benarous, 2021; Ben-Salha and Mrabet, 2019) and confirms the hypothesis H1.

In Iraq, Sudan, Lebanon, Libya and Yamen, the results indicate the production and unemployment are negatively correlated and that the correlation was constant versus structural disruptions during the study period. They are confirming the absence of asymmetry in Okun's law. Finally, in these countries, OKUN's coefficients are investigated for the unemployment rate threshold level. As for Saudi Arabia, Bahrain, Oman, United Emirate, Qatar and Kuwait, OKUN's coefficients are investigated for the unemployment rate threshold level. Mainly since these countries hugely depend on foreign workers, and this does not reflect Okun's law This corresponds with the findings of other researchers (e.g., Louail and Riache, 2019; Ben- Driouche, 2013) and confirms the hypothesis H2.

This paper's results maybe can provide recommendations for considering economic policies and conducting future empirical studies. Regarding the primary issue, as the results show that the unemployment response to production is weak within the studied countries, it is necessary to make more efforts to attract university graduates into the labour market, to do so, just as the educational system reform imposes itself ultimately, to reduce the mismatch between required skills and teaching skills (see: Louail and Benarous, 2021; Louail and Riache, 2019). The high levels of unemployed learners are due to the failure of education systems to provide the private sector with talent (Ben-Salha and Mrabet, 2019). Policymakers should undertake reforms, such as liberalising labour regulations, cutting taxes, improving the business climate, and removing bureaucratic barriers (World Bank 2018).

Before implementing reforms regarding policies, policymakers in Arabic countries need to conduct an impression evaluation of ALMPs1 to assess the degree of their effectiveness and improve the planning of programs. Another critical point that is raised is at the level of jobs created. Whether or not Okun's

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1   Active labour market policies (ALMPs)

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law is validated in our sample, it is crucial to focus on the jobs created. Firstly, job formation is not enough, but decent jobs that guarantee a safe and lasting income are necessary. Second, there is an urgent need for jobs that require skills to absorb the increasing numbers of university graduates in Arab countries. Policymakers must also visualise and build new economic models to create wealth using available and qualified human capital.

As for the methodological recommendation, the empirical investigation is concerned with looking at the unemployment requirements related to specific groups of the population when verifying the outcome of the unemployment relationship. Moreover, researchers must give special attention to specific econometric issues such as inconsistency, nonlinearity, and thresholds. Ignoring these standard economic features when estimating Okun's law may lead to unsatisfactory, if not incorrect, results.

Summary

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A well-known macroeconomic relationship is called the OKUN Law, which states that the negative correlation between unemployment rates and raw domestic output can be determined. This study will focus on the theoretical framework for developing models of the relationship between economic growth and unemployment rates. This study contributes to the existing literature by estimate Okun's law for Arab economies during the period 1960–2017. The results of this study indicate that Okun's coefficient is valid for the case of Arab countries in the different version, when unemployment rates reach the threshold and are between 6.35 and 7.933, in which the impact of the GDP on unemployment rates is negative and significant, with a significant level of 1 per cent. As for outside the threshold, i.e. less than 6.35 and more significant than 7.933, this effect is negative, but it is not significant.

Moreover, the decision-makers in Arab countries seek to raise economic growth rates to address unemployment. This investigation provides original empirical evidence on the association between unemployment and economic growth within Arab countries. The current international literature lacks empirical evidence on the relationship between variables of this study for Arab countries as a whole.

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