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Economic Growth and Gender-Specific Unemployment: Comparison of Selected Oil Exporters and Eastern European Countries (1996 - 2021)

Ekonomik Büyüme ve Cinsiyete Dayalı İşsizlik: Seçilmiş Petrol İhracatçısı ve Doğu Avrupa Ülkelerinin Karşılaştırması (1996 - 2021)

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ÖZET

Bu çalışmada gelişmekte olan ekonomilerde ekonomik büyüme ile cinsiyete dayalı işsizlik arasındaki ilişki 1996-2021 dönemi için analiz edilmiştir. Çalışmanın kapsamını Doğu Avrupa ülkeleri ve petrol ihraç eden ülkeler oluşturmaktadır. Cinsiyete dayalı işsizlik verileri erkek, kadın ve toplam işsizlikteki yıllık değişimlerden oluşmaktadır. Bağımlı değişken olarak reel GSYİH büyüme oranı modele dâhil edimiştir. Panel veri yönteminin kullanıldığı çalışmada Okun Yasası'nın GSYH açığı modeli, petrol ihraç eden Orta Doğu ülkeleri (Model 1) ve Doğu Avrupa ülkeleri (Model 2) için test edilmiştir. Birinci Modelin PMG ve FMOLS sonuçlarına göre, petrol ihraç eden Orta Doğu ülkelerinde kadın ve erkek işsizlik oranları ekonomik büyümeyi olumsuz olarak etkilemektedir. Yani işsizlik arttıkça ekonomik büyüme yavaşlamakta, hatta negatife dönmektedir. İkinci Model olan Doğu Avrupa ülkelerinde cinsiyete göre işsizliğin büyümeye etkisi Birinci Modelden farklıdır. PMG ve FMOLS sonuçlarına göre kadın işsizlik oranı büyümeyi olumlu etkilemekte, erkek işsizlik oranlarının büyüme üzerindeki etkisinin yönü beklendiği gibi her iki ülke grubu için de negatiftir. Model 2 ülkelerinde kadın işsizliği ile büyüme arasında aynı yönlü bir ilişki bulunmaktadır. Bu sonuç, işsizlik yardımlarının yaygınlığını ve bu ülkelerdeki iş yasalarının işsizliğin etkisini azaltmada etkili olabileceğini göstermektedir.

Anahtar Kelimeler:

Ekonomik Büyüme,

Cinsiyete Dayalı İşsizlik,

Okun Yasası,

ABSTRACT

In this study, the relationship between economic growth and gender-based unemployment in developing economies was analyzed for the period 1996-2021. Eastern European countries and oil exporting countries constitute the scope of the study. Gender-specific unemployment data consists of annual changes in male, female, and total unemployment. The real GDP growth rate has been included in the model as the dependent variable. In the study using the panel data method, the GDP gap model of Okun's Law was tested for oil-exporting Middle Eastern countries (Model 1) and Eastern European countries (Model 2). According to the PMG and FMOLS results of the First Model, the unemployment rates of women and men in oil-exporting Middle Eastern countries negatively affect economic growth. In other words, as unemployment increases, economic growth slows down and even turns negative. In the second model, the effect of unemployment by gender on growth in Eastern European countries is different from the first model. According to the PMG and FMOLS results, the female unemployment rate positively affects growth, while the direction of the impact of male unemployment rates on growth is negative for both country groups, as expected. There is a same-directional relationship between female unemployment and growth in Model 2 countries. This result shows the prevalence of unemployment benefits and suggests that labor laws in these countries can be effective in reducing the impact of unemployment.

Keywords:

Economic Growth,

Gender Specific Unemployment,

Okun's Law,

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1. INTRODUCTION

As studies on the economy progress, the relationship between growth and employment has begun to gain importance. In this regard, the strong relationship between economic growth and unemployment has been discussed for many years. The relationship between these two fundamental issues is based on the theory known as Okun's Law. In his studies in the 1960s, Okun stated that there was a mutual correlation between economic growth and unemployment. In this case, the labor force of a country is expected to positively affect the production of goods and services in that country. Therefore, measuring how economic growth responds to periods when unemployment increases or decreases is more important, especially in developing countries with high fertility rates. After the relationship between economic growth and unemployment was established on a theoretical basis, the relationship between unemployment and economic growth has become popular in developing countries.

High unemployment negatively impacts individuals, society, and the economy. It increases government costs, wastes resources, hinders long-term growth, and is linked to social unrest and instability. Unemployment causes financial insecurity, leading to poverty, debt, and increased crime rates. It also contributes to family breakdowns, health issues, and other social problems. Disadvantaged minorities, the less-educated, and young people are particularly affected. High unemployment destabilizes business expectations, reducing private investment and technological progress, and leads to a deterioration of labor skills, ultimately lowering productivity and economic growth (Ssebulime and Muvawala, 2019:27-36).

Unemployment is a major problem in developing economies. High unemployment means inefficient use of labor resources. Therefore, full employment should be one of the primary macroeconomic goals of any government as it will maximize output. Reducing the unemployment rate is of great importance for developed and developing countries, especially those called today's emerging economies. In this sense, explaining the relationship between unemployment and economic growth attracts the attention of economic policy makers as well as economists.

The Okun Model, which advocates the view that an increase in economic growth will reduce the unemployment rate, is mostly studied in the literature. However, in this study, the alternative Okun Model, which investigates the effect of unemployment on economic growth, was used. Eastern European countries consisting of Romania, Czech Republic, Latvia, Bulgaria, Slovakia, Hungary, and Slovenia and oil exporting country groups consisting of Bahrain, Oman, Kuwait, Saudi Arabia, United Arab Emirates, Iran, and Iraq constitute the scope of the study. Studies using the alternative Okun Model, which analyzes the effect of unemployment on growth, are relatively few and do not exist for selected countries. ARDL and FMOLS methods used in this study have not been used before in the studies conducted in the literature on the alternative Okun Model, which is based on the selected countries and country groups. The study will contribute to the literature in terms of the selected country group, the model used and the analysis methods.

After the introduction part of the study, information about Okun's Law is first given, and it is mentioned that the main problem of Okun's Law is to reveal the relationship between the unemployment rate and economic growth. In the third chapter, how the relationship between economic growth rate and unemployment is evaluated theoretically and methodologically within the framework of studies in the literature, and the findings are evaluated in terms of the sample country groups considered. The fourth chapter discusses the relationship between economic growth and gender-based unemployment. The relationship between the variables that constitute the main problem of the study is based on economic growth and gender-based unemployment. In the other section, which is discussed in terms of model and methodology, ARDL and FMOLS methods are tested with detailed information, tests and analysis about the variables considered within the framework of the established model, the countries within the scope of the sample and the method. The analysis findings were evaluated with results and findings by associating them with economic theory.

2. OKUN'S LAW

Arthur Okun analyzed U.S. economic and unemployment data following World War II and discovered that high real growth rates corresponded with lower unemployment rates. Conversely, during periods of low or negative real growth rates, unemployment rates increased (Göçer, 2015:2). Based on his study of U.S. data from 1947 to 1960, Okun found that when actual output exceeded potential output by 1%, the actual unemployment rate was 0.3% below the natural unemployment rate.

It is often stated that for every 3% increase in gross domestic product (GDP), unemployment decreases by 1%. According to Okun's Law, changes in labor force participation rates, working hours, and productivity contribute to an inverse relationship between the unemployment rate and potential output. Over time, the relationship described by Okun's Law has evolved, showing that the link between unemployment and growth varies depending on the country and the period studied (Brincikova and Darmo, 2015:383).

The second alternative model of Okun's Law uses the first difference method to test the sensitivity of output to changes in unemployment. This model shows a negative relationship between output growth and the unemployment rate but does not establish a causal link between them. Therefore, a Granger causality test is considered appropriate to determine this (Noor et al., 2007:341). While Okun's Law is valuable for policymakers as it helps measure the impact of specific growth targets on unemployment rates, it remains an empirical regularity (Dornbush and Fischer, 1998:19) or, in other words, a rule.

The extensive literature shows that studies do not always confirm the findings in Okun's original study. Following the oil shocks of the 1970s, low output growth in the United States accompanied by high and persistent unemployment suggested that the relationship between output and unemployment had undergone a structural change. The strong relationship between growth and employment seen in the 1970s has also weakened in OECD and European countries. It has been revealed that the employment creation effect of economic growth has been limited due to high productivity increases after the 1990s and that increasing economic growth is not the only solution to reduce unemployment. While the Okun coefficient has decreased for the United States since the early 1990s, it has increased for many countries. Following the global economic crisis in 2008, there was a sharp contraction in the global economy. Although the global economy began to recover in 2010, with Asian countries taking the lead, unemployment rates continued to increase during the recovery period. In this context, it is examined that the relationship that Okun put forward in his original study, that an increase in output will reduce unemployment, may change over time (Vakıfbank Economic Research Directorate, 2021:2).

While productivity triggers an increase in production with globalization process, it may lead to a growth process that does not create employment. Productivity increases are observed when employees who are worried about losing their jobs, especially during the economic crisis, tend to increase their effort and performance. Such productivity gains can lead to economic growth that does not create employment and may even lead to continued rising unemployment. It is observed that in many countries around the world, while the economy is growing, employment does not increase, or even employment decreases and unemployment increases. The increase in labor productivity is one of the main factors causing the "*growth that does not create employment*" process in the world. Negative relationship between growth and unemployment, with the effect of the increase in labor productivity, revealed by Okun, may be neutral or positive. (Vakıfbank Economic Research Directorate, 2021:5). The second version of the model highlights a simple linear relationship between the deviation of unemployment from its natural rate (estimated at 4%) and the deviation of output from its potential level (output gap). The equation is as follows;

$$(Y - Yp)/Yp = -\alpha\,(U - U^*) \qquad (1)$$

Yp: Potential GDP

Y: Real GDP

U: Unemployment rate

U*: Natural rate of unemployment

α: A coefficient measuring the decrease in unemployment when production exceeds a certain threshold

Potential GDP, according to Okun, represents the economy's productive capacity. The term (Y - Yp) denotes the output gap. This equation implies that unemployment stabilizes around the natural unemployment rate (also

known as the non-accelerating inflation rate of unemployment). However, it does not measure how much output could be generated by unlimited aggregate demand (Pehlivanoğlu ve Tanga, 2016:32).

3. LITERATURE

Many studies in the literature affirm the relationship between economic growth and unemployment as outlined in Okun's Law. Analyses using the alternative Okun Model, which examines the direction and magnitude of the unemployment-growth relationship, have found that reductions in the unemployment rate positively impact economic growth. While numerous studies test the validity of Okun's Law, there are relatively few that investigate the relationship between gender-specific unemployment and growth. These studies have shown that the Okun coefficient varies by gender. Changes in the growth rate do not affect unemployment rates equally across different ages and genders.

Lynch and Hyclak (1984) analyzed the impact of economic growth on gender-specific unemployment rates in the USA using data from 1954 to 1981. They concluded that the unemployment rate for men is more responsive to changes in the economic growth rate. Similar findings were reported by Ewing et al. (2002), Bisping and Patron (2005), and Peiró et al. (2012). Ewing et al. (2002) observed that men's unemployment rates are higher and more persistent compared to those of women, and that black individuals face higher and more prolonged unemployment rates than white individuals. Bisping and Patron (2005), Peiró et al. (2012), and Belaire-French and Peiró (2015) found that men's unemployment rates are more affected by economic downturns and crises, such as slowdowns in economic growth, compared to women’s rates. Additionally, research has shown a positive relationship between labor productivity and Okun's coefficient (Huang and Lin, 2008).

Studies analyzing the validity of Okun's Law for European countries show that the Okun coefficient is high in regions where productivity growth is low in Spain (Villaverde and Maza, 2007), and that the sensitivity of the unemployment rate to the growth rate is high when productivity is low in G7 countries (Malley and Molana, 2008). They found that the male unemployment rate in the EU 28 countries is more sensitive to changes in growth than the female unemployment rate (Brincikova and Darmo, 2015).

It has been shown that the unemployment rate of men is more sensitive to economic fluctuations and crises in European countries than the unemployment rate of women (Hutengs and Stedtmann, 2014; Belaire-French, Peiró, 2015; Bod'a and Pawazanova, 2015). Zanin (2015) demonstrated that similar results hold true for OECD countries. This study tested the validity of Okun's Law across age and gender groups within OECD countries and found that the absolute magnitude of the Okun coefficient was higher for men than for women. Zanin argued that this is because men are more likely to be employed in sectors such as manufacturing and construction, which are more sensitive to economic fluctuations, while women are more often employed in the service sector.

Studies examining the validity of Okun's Law in European countries have shown that the Okun coefficient is higher in regions of Spain with low productivity growth (Villaverde and Maza, 2007). In G7 countries, the unemployment rate is more sensitive to economic growth when productivity is low (Malley and Molana, 2008). Research also indicates that in the EU 28 countries, male unemployment rates are more responsive to changes in economic growth than female unemployment rates (Brincikova and Darmo, 2015). Additionally, it has been demonstrated that in European countries, men's unemployment rates are more affected by economic fluctuations and crises compared to women's rates (Hutengs and Stedtmann, 2014; Belaire-French and Peiró, 2015; Bod'a and Pawazanova, 2015).

4. THE GENDER-SPECIFIC UNEMPLOYMENT AND GROWTH RELATIONSHIP ANALYSIS

This study aims to explore the impact of gender-specific unemployment on economic growth in oil-exporting and Eastern European countries from 1996 to 2021, using Okun's Law as a basis. The Eastern European countries in focus are Romania, the Czech Republic, Latvia, Bulgaria, Slovakia, Hungary, and Slovenia, while the oil-exporting countries include Bahrain, Oman, Kuwait, Saudi Arabia, the United Arab Emirates, Iran, and Iraq. To facilitate the analysis, two distinct model groups were created for interregional comparison.

In this research, Okun's Law is examined using an alternative version that is less commonly found in the literature. While much attention has been given to the impact of economic growth on unemployment or employment, there has been less focus on how unemployment, differentiated by gender, affects economic

growth. This study seeks to understand how the composition of the labor force and its gender distribution, fundamental to Okun's Law, influences a country's production potential through unemployment.

The aim is to determine how variations in the unemployment rate among the labor force affect the production of goods and services and identify which gender is most impacted. These findings will highlight the sensitivity of regional production potential to labor-intensive production types.

The study evaluates the validity of Okun's Law in oil-exporting countries and those in the Eastern European bloc. It employs Autoregressive Distributed Lag (ARDL), Fully-Modified Ordinary Least Squares (FMOLS), and Granger causality methods. The direction and magnitude of the relationship between gender-specific unemployment and economic growth are compared across these two groups of countries.

4.1. Model and Methodology

Okun's Law is formulated as follows;

$$\frac{\bar{Y} - Y}{\bar{Y}} = c\left(u - \tilde{u}\right) \qquad (2)$$

$\bar{Y}$: Potential GDP

Y: Real output

c: Change in economic output caused by the change in unemployment

u: Real unemployment rate

$\tilde{u}$: Natural unemployment rate

In this study, studies such as Shahid (2014), Ademola and Badiru (2016), Kukaj (2018), Seth et al., (2018), Makaringe and Khobai (2018), Karikari and Abeti (2019), Hjazeen et al., (2021) are followed and a linear growth model was established as follows;

$$Y = f(UNF, UNM) \qquad (3)$$

$$Y_{it} = \beta_0 + \beta_{1it} UNF + \beta_{2it} UNM + \varepsilon_{it}(1) \quad (4)$$

Y represents economic growth, UNF represents the female unemployment rate, and UNM represents the male unemployment rate in Equation 3. β_0 is the constant term, $\beta_{1.2t}$ are the slope coefficients of the model showing the effect of the change in male and female unemployment rates on economic growth. In the study, two models were established for two groups of countries. While the first model (first group) includes oil-exporting countries, the second model (second group) includes selected Eastern European countries.

Table 1. Definition of Variables and Country Groups

Symbol	Definition	Calculation Unit	Sources
Y	Economic Growth	GDP Growth (Annual%, 2015:100)	WDI
UNF	Unemployment (Female)	% of female labor force(Modeled ILO Estimate)	WDI
UNM	Unemployment (Male)	% of male labor force (Modeled ILO Estimate)	WDI
		Country Group	
	Model 1 (Firsth Group))		**Model 2 (Second Group)**
	Bahraine, Oman, Kuwait, Iran, Irak, United Arap Emirates, Saudia Arabia		**Slovenia, Slovakia, Romania Latvia, Bulgaria, Hungry, Czechia**

Table 1 provides the definitions and country groupings for data obtained from the World Bank. The economic growth rate (Y) is calculated based on constant 2015 prices, according to the national accounts from the World Bank and the OECD, representing the annual GDP change. Unemployment rates, derived from International Labor Organization (ILO) calculations, indicate the proportion of the labor force that is unemployed but actively seeking work. This unemployment may result from either excess demand or a lack of supply in the labor market.

The study's methodological framework, aiming to explain the correlation between gender-based unemployment and economic growth, includes the following steps;

1. Determining panel stationarity using the Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), and Augmented Dickey-Fuller Fisher (ADF-Fisher) methods.
2. Testing for a cointegration relationship between variables using Kao and Fisher cointegration techniques.
3. Analyzing short- and long-term results between variables with the ARDL-PMG estimator.
4. Checking the consistency of long-term ARDL results using the FMOLS method.
5. Determining the direction of causality between variables using the Dumitrescu-Hurlin panel causality method.

The analysis includes seven countries from Europe and seven from the Middle East, divided into two model groups. The first group consists of major oil-exporting countries, including Saudi Arabia, the United Arab Emirates, Kuwait, Iraq, Iran, Bahrain, and Oman. These countries are either members of OPEC or closely aligned with its policies. The second group comprises relatively less developed Eastern European countries like Romania, the Czech Republic, Latvia, Bulgaria, Slovakia, Hungary, and Slovenia. These countries have since joined the European Union (EU) and significantly contribute to the overall European workforce.

Tablo 2. Descriptive statistic and Correlation Matrix

Descriptive statistics		**Model 1**	
	Y	UNF	UNM
Mean	3.824448	10.07097	4.162352
Median	3.216383	7.966500	2.726500
Maximum	53.38179	30.73800	14.36400
Minimum	-36.65815	1.504000	0.421000
Std. Dev.	7.009487	6.913928	3.715722
Skewness	1.409616	0.874681	0.846520
Kurtosis	23.12374	2.741081	2.376937
Jarque-Bera	3131.256	23.71539	24.68066
Correlation Matrix			
	Y	UMF	UMM
Y	1		
UMF	0.0744	1	
UMM	0.0534	0.7281	1
Descriptive statistics		**Model 2**	
	Y	UNF	UNM
Mean	2.904534	8.708247	8.750082
Median	3.439567	7.507500	7.426500
Maximum	11.97184	20.55000	22.74300
Minimum	-14.26014	2.375000	1.717000
Std. Dev.	4.039177	3.862331	4.308339
Skewness	-1.216478	0.916618	1.032377
Kurtosis	5.963819	3.261380	3.654285
Jarque-Bera	111.5015	26.00378	35.57569
Correlation Matrix			
	Y	UNF	UNM
Y	1		
UNF	0.0023	1	
UNM	0.0577	0.9206	1

Table 2 displays the descriptive statistics and correlation coefficients for the data in the two models. In the first model, which pertains to oil-exporting countries, the variable with the highest mean and median is the female unemployment rate (UNF). The economic growth rate (Y) has the highest standard error. The mean values for Y, UNF, and the male unemployment rate (UNM) are 3.82, 10.07, and 4.16, respectively. According to the correlation matrix, there is a positive relationship between Y and the unemployment variables.

In the second model, representing Eastern European countries, the male unemployment rate (UNM) has the highest mean value, while the female unemployment rate (UNF) has the highest median. The mean values for Y, UNF, and UNM in this model are 2.90, 8.70, and 8.75, respectively.

According to the correlation matrix results of the second model, there is a positive correlation between Y and unemployment types. According to Table 2, there are remarkable differences when the first and second models are compared. For example, the growth average of oil-exporting countries is approximately 1 point higher than the growth average of Eastern European countries. This situation provides some evidence for the advantages of exporting oil. In addition, the standard deviation of growth and female unemployment rates in Model 1 is much higher than in Model 2. Therefore, the deviation is much greater in oil-exporting countries. Another striking situation in Table 2 is the average unemployment rate by gender.

Accordingly, the average female unemployment rate is approximately 1.5 points higher in oil-exporting countries. The average male unemployment rate is higher in Model 2 countries. Additionally, there is a difference of approximately 6 points between the average female unemployment rate and male unemployment rate in the countries included in Model 1. However, in the Eastern European countries included in Model 2, the average of the two types of unemployment is almost the same. It is estimated that the differences in unemployment averages in the two models arise from factors such as culture, education, geographical location and belief. Because the participation rate of women in the workforce is low in Middle Eastern countries. The reasons for this can be shown as the limited job fields available to women in the workforce, harsh working conditions due to labor-intensive production, and cultural and social pressures.

4.2. Unit Root Test, Cointegration Tests, PMG-FMOLS Tests, and Pairwise Dumitrescu HurlinTest

In order to identify the cointegration relationship between the variables, it was observed whether the data were stationary or not. In this regard, LLC, IPS and ADF-Fisher tests were used to detect the stationarity process in the study. In addition, the size of the long-term relationship between unemployment types and economic growth was determined with the ARDL-PMG estimator. For LLC, IPS and ADF-Fisher tests, the following hypothesis is tested.

H_0: There is a unit root in the series. The series is not stationary.

H_1: There is no unit root in the series. The series is stationary.

Various static and dynamic methods have been developed in panel data analysis. Pooled OLS, fixed effects (FE) and random effects (RE) estimators are frequently used methods in static panels. However Samargandi et al. (2014), they mentioned the shortcomings Campos and Kinoshita, (2008) of Arellano (2003) these methods. Dynamic panel methods have begun to attract more attention against the problems inherent in static panel estimators. Among these methods, Generalized Method of Moments GMM and ARDL estimators stand out. However Samargandi et al. (2014), Christopoulos and Tsionas (2004) they mentioned the problems that may be encountered when applying the Pesaran et al. (1999) and GMM method and the limitations of the GMM method. Pesaran and Smith (1995). For example, the criticisms against the GMM method include not being able to obtain short-term results, unclear long-term results, and giving complex results if the time dimension increases. Despite the shortcomings of the GMM method, two methods called pooled mean group (PMG) and mean group (MG) based on the ARDL estimator have been developed (Klomp et al., 2013).

The MG method is based on the work of Pesaran and Smith (1995) and is considered to work well in heterogeneous panels. However, the results of the MG method may be inconsistent in homogeneous panels (Pesaran et al., 1999). In this situation Pesaran et al., (1999) The PMG method, which is considered to provide more robust results in homogeneous panels, was suggested by. The PMG method, which is considered an intermediate estimator, considers pooling and averaging together (Mehmood et al., 2014). Whether the slope coefficients are homogeneous or not is checked with the Hausman (1978) test. In the Hausman test, the null hypothesis states that the slope coefficients are homogeneous, and the alternative hypothesis states that the slope coefficients are heterogeneous. In this case, the PMG method, which is considered to give better results in homogeneous panels, is preferred (Klomp et al., 2013; Demetriades and Law 2006) . In this study, since the slope coefficients were homogeneous, the null hypothesis could not be rejected in the Hausman test and the PMG method was used.

ARDL estimator was developed by Pesaran et al., (2001). Alternative cointegration tests such as Engle-Granger (1987), Johansen (1991, 1995) and Johansen-Juselius (1990) are also very common methods. However, the

popularity of the ARDL method has increased due to some problems inherent in these methods. Therefore, the ARDL estimator has some advantages. First of all, the ARDL method is a frequently preferred long-term and short-term estimator. At the same time, in the ARDL method, it does not matter whether the variables are I (0) or I (1). In fact, according to Laurenceson and Chai (2003), they stated that the ARDL method is successful in solving problems arising from non-stationary time series data. However, the most important accepted limitation of the ARDL method is that the variables are not cointegrated at the I (2) level or higher. This method also gives successful results in models with low number of observations. The ARDL method can also produce a short-term error correction coefficient (ECT) through the error correction model (ECM). For this reason, the advantages of the ARDL method have been frequently mentioned in the literature (Pesaran and Pesaran, 1997; Nkora and Uko, 2016; Bahmani and NG, 2002; Shresta and Chowdhury, 2005; Ghatak and Siddiki, 2001; Sarı et al., 2008; Laurenceson and Chai, 2003; Narayan and Smyth, 2005; Wolde-Rufael, 2005).

In addition, the ARDL estimator is preferred in the literature in growth or unemployment models (Shahbaz et al., 2008; Morley, 2006; Odhiambo, 2009; Moosa, 2008; Feridun, 2007; Ghazouani et al., 2020; Zhang et al., 2021; Ahmed et al., 2021; Cary, 2021). As stated before, stationarity is not important in the ARDL method. The important thing in this method is to determine the order of (Ali and Manap, 2013) integration. If the stationarity period of the variables is at most I (1), the results of this method are robust. For this reason, in this study, the ARDL method was used for short and long term forecasts due to the advantages of the ARDL method and the fact that the variables are stationary at different levels. At the same time, the results of the ARDL method were supported by the FMOLS method.

The ARDL method involves three stages. The first stage is to determine whether there is a cointegration relationship between the variables. For this, the cointegration test proposed by Pesaran et al. (1999, 2001) is utilized to check for a long-term causal relationship between the variables. The following ARDL (p, q) model was established:

$$Y_{it} = \alpha_i + \sum_{j=1}^{p-1} \beta_{1ij} Y_{it-j} + \sum_{j=0}^{q-1} \beta_{2ij} UNF_{it-j} + \sum_{j=0}^{q-1} \beta_{3ij} UNM_{it-j} + \varepsilon_{it} \qquad (5)$$

If a cointegration relationship is identified, the next step is to estimate the long-term coefficients. In the final stage, the Error Correction Model (ECM) is estimated to check if short-term deviations are corrected in the long term. A negative and significant Error Correction Term (ECT) coefficient in the ECM model indicates that the short-term model is valid, confirming a stable long-term relationship. This study utilized Kao and Johansen-Fisher tests to determine the presence of a cointegration relationship between the variables. Given that a cointegration relationship was found in both models of this study, the second and third stages of the ARDL method were implemented. Consequently, the long-term and short-term ARDL models tailored to this study were established as follows:

$$\Delta Y_{it} = \alpha_i + \gamma_{1i} Y_{it-1} + \gamma_{2i} UNF_{it-1} + \gamma_{3i} UNM_{it-1} + \sum_{j=1}^{p-1} \vartheta_{1ij} \Delta Y_{it-j} + \sum_{j=0}^{q-1} \vartheta_{2ij} \Delta UNF_{it-j} +$$

$$+ \sum_{j=0}^{q-1} \vartheta_{3ij} \Delta UNM_{it-j} + \delta ECM_{t-1} + \varepsilon_{it} \qquad (6)$$

In Equation 2, the symbols p and q represent the appropriate lag lengths determined according to the Akaike Information Criterion (AIC). γ and ϑ are the coefficients for long-term and short-term effects, respectively. Δ represents the error term coefficient if the difference operator is Ɛ. The ECM (Error Correction Model) describes the short-term relationship. δ is the error correction term coefficient (ECT), which indicates the speed at which the ECM corrects deviations. If the parameter δ is less than zero (δ<0), it means the error correction term is effective, implying a strong and significant long-term relationship between the variables. The larger the absolute value of the δ coefficient, the faster the error correction rate. It is generally agreed that the δ coefficient should lie between 0 and -1. However, according to Narayan and Smyth (2006), an ECT coefficient between -1 and -2 indicates that balance is achieved gradually, often in the form of fluctuations.

Finally, to determine the direction of the relationship between the variables, the pairwise causality test developed by Dumitrescu and Hurlin (2012) was used. The Dumitrescu and Hurlin (DH) test is based on the Granger causality test.

4.3. Findings of the Research

At this stage of the study, empirical results are presented. First, unit root tests and then empirical results of ARDL and FMOLS estimators are reported.

Table 3. Unit Root Test Results

		MODEL 1			
Test: LLC	**Level**		**FirstDiff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	-5.101 (0.000)*	-4.472(0.000)*	-	-	I(0)
UNF	-0.397(0.356)	0.722(0.765)	-5.358(0.000)*	-4.816(0.000)*	I(1)
UNM	0.655(0.744)	0.592(0.723)	-1.977(0.024)**		I(1)
Test: IPS	**Level**		**Firsth Diff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	-4.338(0.000)*	-3.480(0.000)*	-	-	I(0)
UNF	1.026(0.847)	0.869(0.807)	-5.113(0.000)*	-4.044(0.000)*	I(1)
UNM	0.204(0.581)	1.478(0.930)	-3.017(0.001)*	-2.458(0.000)*	I(1)
Test: Fisher ADF	**Level**		**Firsth Diff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	45.57(0.000)*	35.95(0.001)*	-	-	I(0)
UNF	13.04(0.522)	9.475(0.799)	54.26(0.000)*	41.80(0.000)*	I(1)
UNM	17.10(0.250)	11.28(0.666)	39.62(0.000)*	37.31(0.000)*	I(1)
		MODEL 2			
Test: LLC	**Level**		**Firsth Diff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	-4.140(0.000)*	-2.340(0.009)*	-	-	I(0)
UNF	-0.192(0.423)	-0.879(0.189)	-3.332(0.000)*	-1.659(0.048)**	I(1)
UNM	-0.739(0.229)	-1.405(0.079)***	-	-	I(0)
Test: IPS	**Level**		**Firsth Diff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	-4.347(0.000)*	-2.498(0.006)*	-	-	I(0)
UNF	-0.719(0.235)	-1.907(0.028)**	-4.128(0.000)*	-2.424(0.007)*	I(1)
UNM	-1.373(0.083)***	-2.063(0.019)**	-	-	I(0)
Test: Fisher ADF	**Level**		**Firsth Diff.**		
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	
Y	43.92(0.000)*	27.18(0.018)**	-	-	I(0)
UNF	14.49(0.413)	24.91(0.035)**	43.13(0.000)*	28.24(0.012)**	I(1)
UNM	18.06(0.203)	25.63(0.028)**	-	-	I(0)

Note: *, **, and *** represent significance levels of 1%, 5%, and 10%, respectively. () shows probability results.

Table 3 presents the estimated unit root results for the two models. The dependent variable Y, for both model 1 and model 2, is stationary at the level according to all three methods. The female unemployment rate (UNF) is stationary at the first difference according to the three methods in both models. However, in the first model, the male unemployment rate (UNM) is stationary at the first difference according to all three methods, while in the second model, UNM is stationary at the level. These findings indicate different stationarity processes for the two models. Consequently, the results from the LLC, IPS, and ADF-Fisher tests are consistent across both models, confirming the robustness of the analysis. These results also suggest a cointegration relationship between the variables in the long term. The stationarity level of the variable with the highest stationarity being I(1) indicates that the ARDL-PMG method can be appropriately applied in this study.

Tablo 4. Panel Cointegration Results

Null Hypothesis: No cointegration Test↓		Model 1		Model 2	
Kao Cointegration					
ADF t-stat.		1.554(0.040)***		-3.370(0.000)*	
Residual Variance		95.752		23.937	
Hac Variance		5.985		9.111	
Johansen Fisher Cointegration					
	From Trade Test	From Max-eigen test		From Trade Test	From Max-eigen test
None	50.60(0.000)*	29.11(0.010)**		52.69(0.000)*	40.93(0.000)*
At most 1	34.29(0.001)*	26.60(0.021)**		25.25/0.032)**	22.07(0.077)***
At most 2	31.46(0.004)*	31.46(0.004)*		23.63(0.050)**	23.63(0.050)*

Note: The symbol ( ) indicates probability values. *,** and *** represent the 1%, 5% and 10% significance level, respectively.

Table 4 shows the cointegration results of the Kao and Johansen-Fisher techniques. First of all, according to the Kao test for both models, it is accepted that the prob (probability) value of the ADF-t statistic is less than 5% and that there is a long-term cointegration relationship between the variables. At the same time, the Johansen-Fisher technique also supports these results. Accordingly, there are at least two cointegration relationships at the 5% significance level for both models. After the existence of a cointegration relationship between the variables was accepted with unit root tests, Kao test and Johansen-Fisher test, the other stages of the ARDL-PMG method, namely long-term and short-term analysis, were carried out.

Table 5. Long Term Coefficients (PMG, FMOLS) and ARDL Short Term Coefficient (ECT)

MODEL 1		
	ARDL	FMOLS
Long Term		
UNF	-1.364 (0.000)* [0.226]	-0.233 (0.000)* [0.025]
UNM	-2.612 (0.000)* [0.422]	-0.728 (0.000)* [0.026]
Hausman (Chi-Sq Stat)	5.288(0.071)	
Short Term		
ECT(-1)	-1.020 (0.001)* [0.304]	-
MODEL 2		
Long Term		
UNF	3.161 (0.000)* [0.124]	1.066 (0.000)* [0.039]
UNM	-2.784 (0.000* [0.114]	-1.023 (0.000)* [0.058]
Hausman (Chi-Sq Stat)	4.126(0.128)	
Short Term		
ECT(-1)	-0.691 (0.017)** [0.304]	-

Note: * and ** represent the 1% and 5% significance level, respectively. () shows the probe values. [ ] indicates standard errors.

Table 5 presents the long-term coefficients, Hausman test statistics, and ARDL short-term coefficient (ECT) results for both the ARDL and FMOLS estimators. Firstly, the Hausman test statistic indicates that the slope coefficients are homogeneous, confirming the consistency of the PMG method results in this context. Consequently, the ARDL-PMG and FMOLS results, which show the impact of unemployment on economic growth in both models, are consistent and statistically significant at the 1% significance level. However, the results for the two models are notably different.

In the first model, which focuses on oil-exporting Middle Eastern countries, the PMG and FMOLS results show that both female (UNF) and male unemployment rates (UNM) negatively affect economic growth (Y). This means that as unemployment increases, economic growth slows down or even becomes negative. In the second model, which examines Eastern European countries, the effect of unemployment on growth varies by gender. According to the PMG and FMOLS results, the female unemployment rate (UNF) positively impacts growth, while the male unemployment rate (UNM) negatively affects growth. The positive effect of female unemployment on growth in these countries suggests the prevalence of unemployment benefits and indicates that labor laws may effectively mitigate the impact of unemployment. Social and civil rights given to people especially to women for example for specific periods of life can be a cause of this type of relationship between female unemployment and growth in these countries. Additionally, the gap between potential growth and actual growth in these countries is smaller compared to other developing nations. In these second group of countries also there is a more stable and consistent economic structure because of the rules of European Union which more of these countries belong to. Finally, short-term analysis results indicate that the ECM is effective in both models, meaning that short-term deviations are corrected in the long term, leading to a stable long-term relationship. However, the fact that the ECT (-1) coefficient is higher in absolute value in Model 1 countries suggests that the error correction process is faster. The long-term and short-term results of this study are statistically significant, with PMG results being more robust than FMOLS results.

Table 6. DH Granger

Null Hypothesis	Model 1				Model 2			
	W-Stat.	Zbar-Stat.	Prob.	Casuality	W-Stat.	Zbar-Stat.	Prob.	Casuality
UNF→Y	2.53457	0.31475	0.7530	No	2.98650	0.79003	0.4295	No
Y→UNF	0.95087	-1.35080	0.1768	No	4.06899	1.92846	0.0538	Yes
UNM→Y	2.56485	0.34659	0.7289	No	2.98333	0.78670	0.4315	No
Y→UNM	1.29893	-0.98475	0.3247	No	4.91049	2.81345	0.0049	Yes
UNF→UNM	4.86141	2.76183	0.0057	Yes	3.07516	0.88327	0.3771	No
UNM→UNF	5.82167	3.77172	0.0002	Yes	2.95644	0.75841	0.4482	No

Table 6 presents the results of the DH Granger causality test. These results do not strongly support the long-term findings. In Model 1 countries, there is no causal relationship between economic growth (Y) and the female (UNF) or male (UNM) unemployment rates. However, there is a bidirectional causality relationship between UNF and UNM. In Model 2 countries, there is no causal relationship from UNF or UNM to Y. Conversely, there is a unidirectional causality relationship from Y to both types of unemployment. Additionally, there is no causal relationship between the two unemployment rates in these countries.

5. CONCLUSION

The primary goals of economic policy include fostering economic growth and reducing the unemployment rate. These two objectives are interconnected and influence the outcomes of implemented policies. It's well-known that when economic growth accelerates, the unemployment rate tends to decrease. Okun's Law has been used to test the sensitivity of these two variables to each other, initially for the U.S. economy and subsequently for other countries. The traditional model of Okun's Law established a causal relationship from economic growth to unemployment. However, some studies have also explored the effect of unemployment on economic growth, forming an alternative interpretation known as the alternative Okun Model. This study examines gender-based differences in the relationship between unemployment and economic growth using the alternative Okun model with samples from oil-exporting countries and Eastern European countries.

For Model 1, seven oil-exporting countries were selected: Saudi Arabia, the United Arab Emirates, Kuwait, Iraq, Iran, Bahrain, and Oman. For Model 2, seven Eastern European countries were chosen: Slovenia, Slovakia, Romania, Latvia, Bulgaria, Hungary, and the Czech Republic. The study analyzed the impact of female and

male unemployment rates on potential growth rates in both groups using the ARDL and FMOLS methods. Additionally, it examined the causality relationships between the variables, considering the different structures of the country groups. The results varied for the two models. According to the analysis for Model 1, as the female and male unemployment rates increase, economic growth rates decrease.

Economic growth in oil-exporting countries appears highly dependent on labor employment. These findings suggest that increasing women's employment is crucial for these countries to achieve their potential growth rates, given the limited female employment. Women who are currently part of the labor force but unemployed have a significant impact on economic growth. Hence, if more female labor outside the labor force can be employed, it could present a substantial development opportunity. These results, highlighting the impact of different types of unemployment on growth, also suggest that oil-exporting countries heavily rely on a labor-intensive production system. According to these findings, Okun's Law holds true for both types of unemployment in oil-exporting countries, indicating an inverted U-shaped relationship between unemployment and growth. Thus, while Okun's Law applies to male unemployment in these countries, it does not apply to female unemployment.

The observation that high public transfer expenditures can positively affect economic growth through increased income for unemployed women hinges on the assumption that these women are actively seeking employment and are therefore included in unemployment statistics. If women are opting out of the labor force voluntarily, they would not be reflected as statistics. This consideration should be factored into analyses to accurately assess the dynamics between public expenditures, economic growth and unemployment.

In Model 2, the findings indicate that the negative impact of increasing female unemployment on economic growth is diminishing, attributed to lower growth rates across Europe. As mentioned previously, unemployment laws in EU member states partly offset the economic losses of the unemployed. High public transfer expenditures, such as unemployment benefits, maternity benefits, and paid leave for mothers, increase the income of unemployed women. Consequently, increased expenditures can positively affect growth, suggesting that unemployment might be voluntarily chosen, especially among women. This consequence can be valid if labor participation ratio for women decreases. If women voluntarily do not participate in employment, this will not be included in the rate of unemployment. The negative impact of male unemployment on growth in Model 2 underscores the importance of male employment. According to these results, an inverted U-shaped relationship exists between the male unemployment rate and economic growth in these countries. Thus, while Okun's Law applies to male unemployment in these countries, it does not apply to female unemployment. Another notable finding in Model 2 is that the impact of female unemployment on economic growth is greater than that of male unemployment. However, in Model 1, the male unemployment rate is more significant than the female unemployment rate. The short-term results of the model suggest that for Model 1 countries to achieve stable, sustainable, and potential growth, it is important to focus on labor-intensive production, undertake initiatives to reduce unemployment across both genders, and create conducive working conditions for women to join the workforce.

According to the DH Granger analysis findings, there is no causal relationship between economic growth and female and male unemployment rates in Model 1 countries. However, there is a bidirectional causality relationship between the female and male unemployment rates. In Model 2, no causal relationship was found from female or male unemployment rates to economic growth. Conversely, a one-way causality relationship was found from economic growth to unemployment types by gender. Additionally, there is no causal relationship between male and female unemployment rates in these countries. The existence of a one-way causality relationship from economic growth to gender-based unemployment types in Model 2 countries highlights the influence of unemployment laws, unions, and public sector transfer expenditures. This result suggests that economic growth and development may lead to increased unemployment benefits and more support for the unemployed, potentially increasing unemployment rates.

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