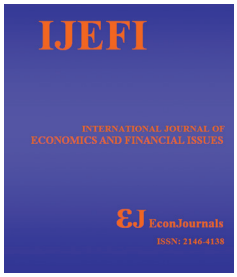

International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2025, 15(6), 105-111.

Does Government Spending, Investment, and Natural Resources Reduce Unemployment in Riau Province, Indonesia?

Muhammad Hidayat[1]*, Raja Septian Armel[2], Resti Yulistia Muslim[3]

[1]Department of Economics, Faculty of Economics and Business, Universitas Muhammadiyah Riau, Indonesia, [2]Department of Accounting, Faculty of Economics and Business, Universitas Muhammadiyah Riau, Indonesia, [3]Department of Accounting, Faculty of Economics and Business, Universitas Bung Hatta, Indonesia. *Email: m.hidayat@umri.ac.id

Received: 02 April 2025 **Accepted:** 12 August 2025 **DOI:** https://doi.org/10.32479/ijefi.20261

ABSTRACT

Unemployment is a major macroeconomic problem included in the SDG 2030 agenda, Goal 8. This study aims to analyze the unemployment rate, examine the dynamic patterns in unemployment between regions in Riau Province, and demonstrate the effect of government spending, investment, and natural resources on the unemployment rate. The method used is quantitative with static and dynamic panel data modelling. The data set used is the 2011-23 period and the district/municipality analysis unit. The results of the static panel model show two significant variables for reducing unemployment, namely FDI and manufacturing. For the dynamic model results, variables significantly reduce unemployment, including economic growth, FDI, natural resources, and the industrial sector, while government spending is positive for unemployment. The results of this study prove the occurrence of a dynamic pattern in unemployment, so severe handling is needed from policymakers for the long term.

Keywords: Natural Resources, Government Spending, FDI, Unemployment, Panel Data
JEL Classifications: E24, H50, O13

1. INTRODUCTION

Unemployment has been one of the world's macroeconomic problems since the Great Depression. It is still being studied to this day. Until the seriousness of this problem is used as an agenda for the Sustainable Development Goals (SDGs) 2030 Goal 8, the government needs to pay attention to reducing unemployment. Unemployment hurts economic growth, productivity, and stability (Anghel et al., 2017; Kalinová and Kroutlová, 2023). The reciprocal relationship between unemployment and economic development was pioneered by Okun (1962) and is better known as Okun's Law; this continues to be a topic of research at the international level, such as Bartošik (2020); Elhorst and Emili (2022); Hasková et al. (2019); Monusová (2020), and locally in Indonesia, including by Lee and Huruta (2019); Sasongko et al. (2020); Suryono et al. (2020).

Riau is one of Indonesia's largest oil and gas-producing provinces, located in the Strait of Malacca, and a profitable position because it is directly adjacent to Malaysia and Singapore. Riau's economic achievements during the 2011-23 period, with an average economic growth indicator of 2.7%, the annual achievement value fluctuates, and the growth rate continues to increase after the COVID-19 pandemic, and in 2023 it will be 4.21%. The percentage of unemployment in Riau Province has continued to fluctuate for the past 13 years, with a downward trend from 2010, 8.72% to 4.23% in 2023. The relationship between unemployment and growth indicates the validity of Okun's Law. In addition, the unemployment rate is still above the 2024 RPJMN target of 3.6%. Therefore, it must still be a highlight for policymakers in the local government.

Apart from economic growth, the role of government in fiscal policy, namely government spending plotted into several strategic activities, is one of the factors that reduce unemployment, as shown in the results of Patrick et al. (2023). The article from Akhmad et al. (2022) states that government spending positively

impacts growth and reduces unemployment. Furthermore, the findings of Raifu et al. (2024) in Nigeria show that government spending provides a unidirectional causality to the decline in unemployment. Different results from Nepram et al. (2021) for India found that inappropriate government spending can increase unemployment. Abouelfarag and Qutb (2021) in Egypt stated that increasing government spending can increase the unemployment rate in the long term.

In economic literature, investment is vital for reducing unemployment by creating job opportunities and increasing economic growth (Mankiw, 2012; Nafziger, 2012). The results of studies from several developing countries, such as Indonesia and Nigeria, emphasize the importance of investment from foreign and domestic investment in reducing unemployment rates (Anowor et al., 2019; Hawariyuni and Andrasari, 2022; Siregar, 2022). In addition, technological development and educational investment have been identified as essential factors in reducing unemployment, highlighting the importance of a multifaceted approach to addressing this problem (Sumanto et al., 2020). Furthermore, Jacob and Ehijiele (2019) entrepreneurship education has positively reduced unemployment, emphasizing the need for skills development and entrepreneurial opportunities to eradicate unemployment effectively.

Unemployment is closely related to the availability of jobs; therefore, potential sectors in providing jobs, such as the natural resources and manufacturing sectors, are still very much expected to develop, which must be supported by economic growth. Empirical results from Rusiadi et al. (2024) state that natural resources are essential in improving the economy in ASEAN countries, especially Indonesia. Specifically, Hidayat et al. (2022) state that investment and infrastructure energy can drive the convergence process in the Sumatra region. The results of research by Ulloa-De Souza et al. (2024) state that the production and consumption of renewable energy can create jobs directly due to the need for workers to develop and maintain this technology and indirectly, through cheaper energy, production efficiency, and better conditions for expansion.

This paper has two research objectives. The first is to analyze the unemployment rate and prove the dynamic patterns that occur in the unemployment rate in the Riau region. Second, to investigate the influence of government spending, investment, and natural resources on reducing unemployment. This paper is structured as follows: the first part is an introduction, the next part contains the theoretical basis and a brief review of research conducted on the subject. The next part explains the dataset and methodology, and the fourth part presents and explains the empirical results. The last part presents the conclusions and policy implications.

2. LITERATURE REVIEW

Unemployment is confronted with employment, a concept pioneered by Keynes, which was a response to the failure of the classical model in the West in the 1930s or the occurrence of the "Great Depression." In Keynes' model, a country's employment opportunities and gross national product (GNP) increase. Unemployment occurs because aggregate (total) demand by consumers, businesses, and government for goods and services is insufficient for GNP to achieve full employment. As long as there is unemployment and unused capital capacity in the economy, GNP will automatically respond to increased demand through increased employment opportunities (Nafziger, 2012; Romer, 2019).

Theoretically, the relationship between economic growth and unemployment rates is known as Okun's Law, stating that every increase in economic growth will reduce the unemployment rate and vice versa. Several recent studies have proven this theory, including those that state that it is proven, including Kalinová and Kroutlová (2023) in the Czech Republic, Rasheed (2023) in Nigeria, Al-Kasasbeh (2022) in Jordan, Bilal and Hayet (2021) in Arab countries, Besime and Avdiu (2020) in Kosovo, Soylu et al. (2018) for the Eastern European region, Huang and Yeh, (2013) proved for the entire country using panel data. For local Indonesia, including Lee and Huruta (2019), Sasongko et al. (2020), and Suryono et al. (2020). This study will also prove whether Okun's law theory occurs in the Riau region. What makes the research gap from previous research is modelling, which, in the current study, uses dynamic panel data elements and comparisons with static panel data. In contrast, no one used this in earlier research, and we also made this one of the novelties.

Furthermore, from the government spending variable, several recent studies have shown a negative relationship or can reduce the unemployment rate, including Tran Pham (2024), who found that increased government spending and better institutions can reduce the unemployment rate in Asian countries. Findings from Hammad et al. (2023) in Iraq public spending significantly reduces the unemployment rate; an increase in public expenditure by 1% can reduce unemployment by 3%. Rahmat and Saeidi (2017) prove that government spending in Iran significantly reduces unemployment. The results of Akhmad et al. (2022) state that policy simulations show that increasing capital spending, total government spending, and spending on goods and services by local governments hurt unemployment in South Sulawesi. Furthermore, the results of Patrick et al. (2023) and Raifu et al. (2024) in African countries state that government spending significantly negatively affects unemployment in both the short and long term. Conversely, the results of studies that state a positive relationship include Abouelfarag and Qutb (2021) and Nepram et al. (2021). The results of this debate provide a gap for our current research using different modelling.

Based on general macroeconomic theory, investment is one way to develop a country to be more advanced, hoping to reduce unemployment. Several recent research results are the pros and cons of the theory, including Anowor et al. (2019), Hawariyuni and Andrasari (2022), and Siregar (2022) and con from Almula-Dhanoon et al. (2020). As a research gap with previous research, this study will use current foreign and domestic investment modelling.

An empirical study by Khobai et al. (2020) The relationship between renewable energy consumption and unemployment in South Africa from 1990 to 2014 revealed that renewable energy

consumption significantly reduces unemployment in the long term. However, there is no significant relationship in the short term. Azretbergenova et al. (2021) examined the impact of renewable energy on employment in the European Union using the ARDL panel model, finding that renewable energy generation has a positive effect on employment in European Union countries in the long term. Furthermore, the research results by Huseynli and Huseynli (2022) found a causal relationship between unemployment and renewable energy production and between renewable and traditional energy production in Azerbaijan. The findings of Borhan et al. (2023) stated that energy consumption affects the reduction of unemployment in the short term and not in the long term in Malaysia. The results of research by Bilgili et al. (2017) found a negative impact of energy consumption on the youth unemployment rate. They produced a unidirectional causality from energy consumption to the youth unemployment rate in Europe. The research results by Afolayan et al. (2019) In Nigeria, a 1% increase in electricity consumption would decrease the unemployment rate by around 0.22%.

3. METHODOLOGY

3.1. Dataset

The research method used is quantitative, comparing static and dynamic panel data. The analysis unit consists of 12 regions in Riau Province, and the time series for 2011-23. The data used are unemployment data, GRDP, FDI, domestic investment, and government spending sourced from several surveys by the Central Statistics Agency (BPS) and the Directorate General of Fiscal Balance of the Ministry of Finance.

In order for the modeling formula to be used, several variables must be defined as follows: (1) Unemployment (U), is open unemployment in percent units calculated by BPS; (2) Economic growth (EG), is the rate of economic growth from year to year in percent units; (3) Government spending (GS) is proxied using government spending, capital expenditure items, namely expenditures used for the purchase/procurement or construction of tangible fixed assets with a benefit value of more than a year, and/or the use of services in implementing regional government programs and activities, in billions of rupiah; (4) Foreign investment (FDI), is the value of foreign investment in US$ units; (5) Domestic investment (DI) is proxied from the value of domestic investment in million rupiah units; (6) Natural resources (NR) is the percentage of the value of the non-mineral and metal natural resources sector to GRDP; (7) Natural mineral resources (NRM) is proxied from the value of natural resources including mining, minerals, and oil and gas to GRDP; (8) Manufacturing (Ind) is proxied by the value of the manufacturing industry sector to GRDP in percentage units.

3.2. Panel Data Regression

Panel pooled data combines cross-sectional and time series data from similar individuals observed over a specific time. If the number of time units is the same for each individual, then the data is called a balanced panel; if the number of time units is different for each individual, it is called an unbalanced panel (Greene, 2012). This study uses balanced panel data. Data were obtained from 12 districts/municipalities observed over 13 years, resulting in 156 observations.

To take into account the individuality of each cross-section unit, this can be done by making different intercepts in each region so that in the fixed effect model (FEM), dummy variables are added. So, the model equation is written as follows:

$$Y_{it} = \alpha + \beta_i X_{it} + \sum_{i=1}^{11} D_i^c \alpha_i + \mu_{it} \quad (1)$$

Meanwhile, for the random effect model (REM), there is a fundamental difference from FEM, where the specific effect of each α_i is used as a random error component and has no correlation with the observed explanatory variable X_{it}. Thus, the REM equation is written as follows:

$$Y_{it} = \alpha_i + \beta_j X_{it} + E_{it} \quad (2)$$

$$E_{it} = (\mu_{it} + v_t + w_{it})$$

Description: $\mu_i \sim N(0, \delta_u^2)$ = component cross-section error; $v_i \sim N(0, \delta_v^2)$ = component time series error; $w_{it} \sim N(0, \delta_w^2)$ = component error combination.

Hausman test is used to choose the right model between FEM and REM. The Hausman test hypothesis is H_0: Random effect model is appropriate to use, and H_1: The fixed effect model is appropriate. If the Hausman prob value is <0.05, then the FEM model is the best and vice versa.

Dynamic panel data is used if the independent variable is a lag of the dependent variable. This is based on the fixed effects and random effects models that use the variance-covariance residual structure in the FGLS estimator. If there is a lag between the dependent and independent variables, then there is a correlation between the dependent variable and the residual (Verbeek, 2017). The general form of the dynamic panel data regression model proposed by Baltagi (2005) is as follows:

$$y_{it} = \delta y_{i,t-1} + x_{it}^{'} \beta + u_{it} \quad (3)$$

Where δ is a scalar, $x_{it}^{'}$ is a $1 \times K$ matrix and β is a $K \times 1$ matrix. Next, assume u_{it} as a one-way error component as follows:

$$u_{it} = \varepsilon_{it} + \mu_{it} \quad (4)$$

Where: μ_{it} is the individual effect and ε_{it} is the error term with each assumed $\mu_{it} - \text{IID}\left(0, \sigma_\mu^2\right)$ and $\varepsilon_{it} - \text{IID}\left(0, \sigma_\varepsilon^2\right)$.

By combining equations (3) and (4), the following dynamic panel equation is obtained:

$$y_{it} = \delta y_{i,t-1} + x_{it}^{'} \beta + \varepsilon_{it} + u_{it} \quad (5)$$

The application of equation (5) for model estimation in this study is as follows:

$$U_{it} = \alpha + \beta_1 U_{it-1} + \beta_2 EG_{it} + \beta_3 GS_{it} + \beta_4 FDI_{it} + \beta_5 DI_{it} + \beta_6 NR_{it} + \beta_7 NRM_{it} + \beta_8 Ind_{it} + u_{i,t} \quad (6)$$

Description: U is the unemployment rate, EG is economic growth, GS is government spending, FDI is foreign investment, DI is domestic investment, NR is natural resources, NRM is natural resources mining and quarry, and Ind is the manufacturing industry sector.

Furthermore, the selection of panel data models is carried out with several criteria used to find the best model, namely (Arellano and Bond, 1991; Arellano and Bover, 1995; Baltagi, 2005; Blundell and Bond, 1998): the first stage, the Valid Instrument test is checked using the Sargan test. The instrument will be valid if the Sargan test cannot reject the null hypothesis, which means that the variables used are valid and there is no serial correlation in the error. In the second stage, the consistency properties of the estimator obtained can be checked from the Arellano-Bond statistics m_1 first order and m_2 second order, which are calculated automatically on some software. The estimator will be consistent if the m_2 statistic shows that the null hypothesis is not rejected. As an additional requirement, the prob value m_1 shows that the null hypothesis is rejected.

4. RESULTS AND DISCUSSION

The unemployment trend that occurred in the districts/municipalities in Riau Province is presented in Figure 1. The figure 1 shows that the entire region experienced a downward trend, although there were fluctuations. The area with the lowest unemployment rate at the end of 2023 was Indragiri Hilir Regency at 1.71%, and the area with the highest unemployment was Bengkalis Regency at 7.09%. A significant decline occurred in Kampar Regency from 16.98% in 2011 to 3.38% in 2023. This cannot be separated from the consistency of the local government in overcoming the unemployment problem.

Furthermore, the unemployment rate for municipalities is still above the provincial rate (4.23%) in 2023, including Pekanbaru City at 6.2% and Dumai City at 5.15%. The high unemployment rate in urban areas is more due to the flow of migration into cities that have the attraction of having a decent living and work. It's just that immigrants are not equipped with low personal skills and academics.

Before proceeding to the analysis of the results, the initial procedure is selecting static and dynamic models to achieve the best model. The first stage is conducting a Hausman test for the selection of a static model between the fixed effect model (FEM) and the random effect model (REM), with the criteria that if the probability value produced in the Hausman test is <0.05, then the selected model is FEM. Vice versa, if the probability value is >0.05, then the REM model is the best. Based on Table 1, the results of the Hausman test are 0.000, and this value is <0.05, so the selected static model is FEM, and this model will be used in comparison with the dynamic model.

Furthermore, the selection of dynamic models between first difference (FD-GMM) and system GMM (Sys-GMM) uses two standard procedures, namely by conducting the Sargan Test as a valid instrument test aimed at no serial correlation in errors, then using the Arellano-Bond (AB) test as a check for consistency estimators. Based on Table 1, the probability value of the Sargan test for each model is obtained with a value >0.05, indicating that the instrument is valid and there is no serial correlation in errors. Furthermore, the AB-test, with the criteria that the first order (m_1) must be <0.05 and the second order (m_2) must be >0.05. The Prob m_1 value for FD-GMM is 0.005, and Sys-GMM is 0.0083, which is <0.05. The Prob m_2 value for FD-GMM is 0.7945, and Sys-GMM is 0.3052, which is >0.05, which means the estimator is consistent. Thus, the results of

Figure 1: Unemployment trends districts/cities in Riau

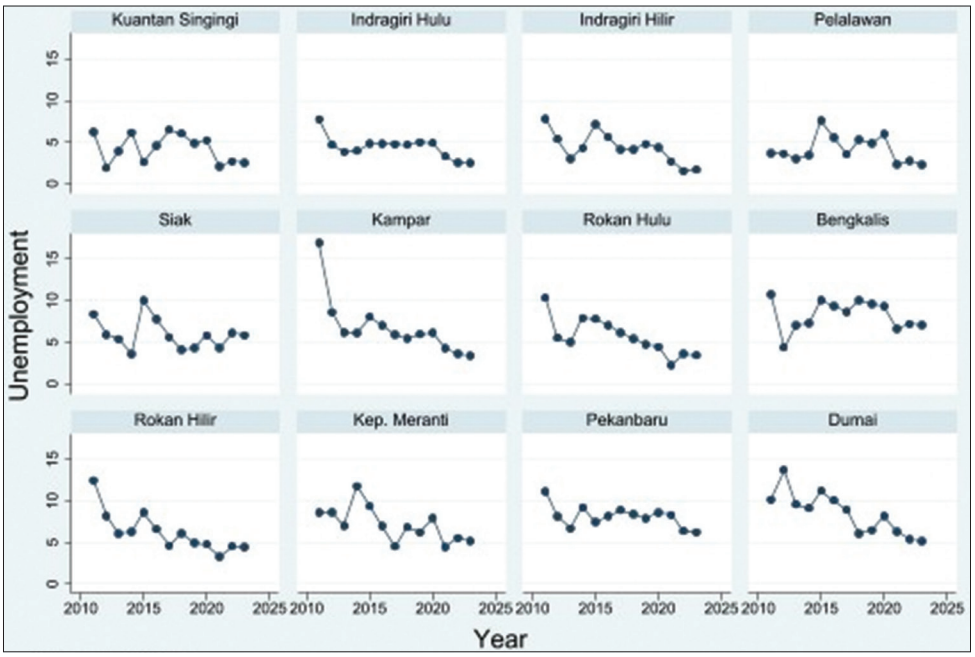

Table 1: Panel data static and dynamic result

Item	FEM	REM	FD-GMM	Sys-GMM
EG	−0.0963 (0.0604)	−0.0324 (0.0728)	−0.2294*** (0.0631)	−0.1905*** (0.0486)
GS	−0.0001 (0.00069)	−0.0002 (0.0010)	0.0018** (0.0006)	0.0022** (0.0006)
FDI	−0.000002* (0.000001)	−0.000001 (0.0000009)	−0.000002** (0.0000007)	−0.000001** (0.0000005)
DI	0.00000003 (0.0000001)	−0.0000001 (0.00000008)	0.000000004 (0.00000005)	−0.00000008 (0.00000005)
NRM	−0.2926 (0.1410)	0.0137 (0.0241)	−0.3223** (0.0996)	−0.0352 (0.0251)
NR	−0.3813 (0.2096)	−0.0864*** (0.0235)	−0.6074*** (0.1446)	−0.0565 (0.0323)
Ind	−0.6659*** (0.1251)	−0.0461 (0.0352)	−0.3485* (0.1419)	−0.0226 (0.0384)
U_{t-1}	-	-	0.2658*** (0.0632)	0.3277*** (0.0769)
Hausman (Prob)	0.0000		-	-
Sargant test (Prob)	-	-	0.5947	0.3585
Prob m_1	-	-	0.0050	0.0083
Prob m_2	-	-	0.7945	0.3052
R^2	0.2841	0.1632		-
N	156	156	132	144

Robust standard errors are shown in parentheses. *P<0.05 **P<0.01; ***P<0.001

the robust model will be used to analyze unemployment from a dynamic perspective.

To answer the research question, the proof of whether or not a dynamic pattern of unemployment occurs is proven by the lag-Y variable U_{it-1} in equation (6). Based on Table 1, the Prob value of U_{it-1} is significant at the 0.1% level for FD-GMM and Sys-GMM. The coefficient value of U_{it-1} for FD-GMM is 0.2658, and Sys-GMM is 0.3277, which states that unemployment in the previous period can positively affect unemployment in the current period, assuming other variables in the model are considered constant. The results of the two models can illustrate the dynamic relationship between variables, proving the occurrence of a dynamic unemployment process between districts/municipalities in Riau Province.

Based on the results of the static panel FEM model, the economic growth coefficient is −0.0963, which means that every 1% increase in economic growth will reduce unemployment by 0.09%, assuming other variables are constant, only the t-prob value is not significant, making this variable not strong enough to influence unemployment reduction. Furthermore, government spending from the capital expenditure side is not substantial on unemployment with a coefficient value of −0.0001, which means that if capital expenditure increases by one billion Rp, it will reduce the unemployment rate by 0.0001%. From investment, FDI significantly reduces unemployment with a coefficient value of −0.000002, which means that if there is an increase in FDI of 1 million US$, it will reduce unemployment by 1.9%. For domestic investment (DI), it is not significant, with a coefficient value of 0.00000003. On the natural resources side, it does not substantially affect unemployment. However, the coefficient value on natural resources minerals and natural resources is negative, which means an increase in NRM and NR will reduce unemployment. The last variable, the industrial sector, significantly influences unemployment with a coefficient value of −0.6659, which means that if there is a 1% increase in the industrial sector, it will reduce unemployment by 0.6%.

Furthermore, in the dynamic FD-GMM model, almost all variables are significant at the lowest level of 5%, including economic growth, government spending, and FDI, while domestic investment is not significant. Meanwhile, for Sys-GMM, the only significant variables are economic growth, government spending, and FDI; the rest are insignificant. From the output of both models, the coefficient values are not too different, and the direction of the relationship between the independent and dependent variables is the same. Furthermore, the FD-GMM model is considered more efficient or robust and is used for discussion.

In the FD-GMM dynamic model, economic growth significantly affects the reduction of unemployment with evidence of a negative coefficient value of −0.2294, which means that every 1% increase in economic growth will reduce the unemployment rate by 0.21%. These results prove that Okun's law occurs in districts/municipalities in Riau Province and these results are in line with previous studies (Al-Kasasbeh, 2022; Bartošik, 2020; Besime and Avdiu, 2020; Bilal and Hayet, 2021; Elhorst and Emili, 2022; Huang and Yeh, 2013; Kalinová and Kroutlová, 2023; Rasheed, 2023; Soylu et al., 2018). Meanwhile, the results of this study are not in line with Hidayat and Nurlela (2018), who stated that there was no Okun's law in Riau Province using the two-stage least square approach, and Sasongko et al. (2020) using panel data and Granger causality for 34 provinces in Indonesia.

Government spending from capital expenditure items is significant for unemployment, which will cause unemployment to increase. This result is more due to the capital expenditure item being used more for the purchase/procurement or construction of tangible fixed assets whose benefit value is more than a year compared to labour-intensive use. Based on the portion of the regional government spending structure, this item also experienced a downward trend and ranged from 11%-20%. In other words, an increase in this item cannot reduce unemployment. It is common in every region in Riau that the government spending budget is more dominant for routine regional operational payments. These findings align with Abouelfarag and Qutb (2021) and Nepram et al. (20, who state that an increase in government spending causes an increase in the unemployment rate in the long term. On the other hand, these results are not in line with the findings by Akhmad et al. (2022), stating that an increase in capital expenditure, total government spending, and spending on goods and services can reduce unemployment, and the difference from the current findings is that the variables used are only capital expenditure.

Furthermore, the FDI variable from the dynamic model results in significantly reduced unemployment; the resulting coefficient value of −0.00000176 can be interpreted that if an increase in FDI of 1 million USD, it will reduce unemployment by 1.76%. These results provide evidence that FDI entering the Riau area can reduce unemployment because some foreign investments are high-tech and labour-intensive in the plantation sector, food industry, chemical and pharmaceutical industry, and hotels. The results of this study are in line with Anowor et al. (2019) with the developing country analysis unit, Vladi et al. (2019) in the Western Balkan Countries, and Hawariyuni and Andrasari (2022) in Indonesia. On the other hand, there is research that does not align with these results, namely from Almula-Dhanoon et al. (2020), stating that FDI does not affect unemployment in Middle East and North Africa (MENA) countries but instead increases unemployment. The results from Siregar (2022) for Indonesia with a dynamic model are also insignificant.

Natural resources mining has a significant impact in reducing unemployment, as evidenced by the coefficient of −0.3223, meaning that if there is an increase in the share of natural resources mining value by 1%, it can reduce unemployment by 0.32%, assuming other variables are held constant. This result is in line with the reality that occurs in almost all areas of Riau Regency, which depend on mineral and metal mining results, which can absorb local labour; however, the majority of labour absorption in this sector is unskilled labourers with lower secondary education levels. Furthermore, the coefficient of natural resources has a negative value of −0.6074. It is statistically significant, meaning that if there is an increase in the share of natural resources by 1%, it can reduce unemployment by 0.6%. This result does not contradict the actual conditions in the districts and cities where there are many oil palm plantations, both community and cluster plantations owned by private companies. A complex system in the flow of plantations to the processing industry can provide job opportunities that will automatically reduce the unemployment rate. The results from both sides of natural resources can give policymakers input and considerations for reducing unemployment to achieve long-term planning targets.

The following result is that the manufacturing industry has a significant influence in reducing unemployment that occurs between regions in Riau Province based on the coefficient value of −0.3485, which is statistically significant at the 5% level. If there is an increase in the value of the industry's share of GRDP by 1%, it will reduce unemployment by 0.34%. Almost all areas in Riau have a growing manufacturing industry, which provides opportunities for work for those who are not yet working. In addition, the development of oil palm plantations triggers the growth of derivative industries to continue to emerge and develop, creating jobs for the region. Suppose we match it with the results of the two natural resources that impact unemployment reduction. In that case, industrial development is also in line with the results of the natural resources variable.

5. CONCLUSION

Based on the results and discussions, it was concluded that in each district/municipality, there was a different trend of decreasing unemployment rates; a significant decrease during the research period was in Kampar Regency and for the municipal areas of Pekanbaru and Dumai, it was still above Riau Province. Furthermore, the modelling results showed a dynamic process in unemployment rates. The dynamic data panel model results stated that economic growth, FDI, natural resources minerals, natural resources, and the manufacturing sector significantly decreased unemployment rates, and capital expenditure had a significant positive impact on unemployment, while domestic investment was not significant.

Based on these results, policymakers can use them to implement development planning in each region to achieve long-term goals. This study suggests that policymakers remain focused on increasing investment from both FDI and PMDN by maintaining economic stability, investment vibes, and improving infrastructure. In addition, the development of the natural resources and manufacturing sectors is expected to be based downstream. Regarding government spending, it is better to recommend items with labour-intensive output so that they can absorb labour. Ideas for further research include modifying the government spending proxy and not only using capital expenditure.

6. ACKNOWLEDGMENT

This research can be completed thanks to the support and assistance of various parties. From the research team, we would like to express our gratitude for the funding from the Universitas Muhammadiyah Riau with an internal research block grant in 2024. We would also like to thank the various parties who helped the team compile this paper.

REFERENCES

Abouelfarag, H.A., Qutb, R. (2021), Does government expenditure reduce unemployment in Egypt? Journal of Economic and Administrative Sciences, 37(3), 355-374.

Afolayan, O.T., Okodua, H., Matthew, O., Osabohien, R. (2019), Reducing unemployment malaise in Nigeria: The role of electricity consumption and human capital development. International Journal of Energy Economics and Policy, 9(4), 63-73.

Akhmad, A., Amir, A., Saleh, S., Abidin, Z. (2022), Effectiveness of regional government expenditure in reducing unemployment and poverty rate. European Journal of Development Studies, 2(4), 90-99.

Al-Kasasbeh, O.M. (2022), The relationship between unemployment and economic growth: Is Okun's Law valid for the Jordan case? International Journal of Economics Development Research, 3(3), 217-226.

Almula-Dhanoon, M., Dhannoon, M.A.M., Al-Salman, M.M., Hammadi, M.F. (2020), Do FDI and domestic investment affect unemployment in MENA countries? Dynamic panel data analysis. Journal of Contemporary Iraq and the Arab World, 14(3), 223-236.

Anghel, M.G., Anghelache, C., Manole, A. (2017), The effect of unemployment on economic growth. Romanian Statistical Review Supplement, 65(7), 174-186.

Anowor, O.F., Chinyere, U.Q., Francisca, C.N. (2019), How investment does affect unemployment in a developing economy. Sumerianz Journal of Economics and Finance, 2(7), 82-88.

Arellano, M., Bond, S. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. The Review of Economic Studies, 58(2), 277.

Arellano, M., Bover, O. (1995), Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68(1), 29-51.

Azretbergenova, G., Syzdykov, B., Niyazov, T., Gulzhan, T., Yskak, N. (2021), The relationship between renewable energy production and employment in European union countries: Panel data analysis. International Journal of Energy Economics and Policy, 11(3), 20-26.

Baltagi, B.H. (2005), Economic Analysis of Panel Data. 3rd ed. New Jersey: John Willey & Sons.

Bartošik, K. (2020), Temporary contracts and Okun's law in Poland. Equilibrium. Quarterly Journal of Economics and Economic Policy, 4, 735-760.

Besime, Z., Avdiu, M. (2020), Econometric analysis to examine the relationship between unemployment and macroeconomics aggregates. Evidence from Kosovo. Academic Journal of Economic Studies, 6(2), 33-41.

Bilal, L., Hayet, B.H.H. (2021), Asymmetry relationship between economic growth and unemployment rates in the Arab countries: Application of the OKUN Law during 1960-2017. Management, 25(2), 1-21.

Bilgili, F., Ozturk, I., Kocak, E., Bulut, U. (2017), Energy consumption-youth unemployment nexus in Europe: Evidence from panel cointegration and panel causality analyses. International Journal of Energy Economics and Policy, 7(2), 193-201.

Blundell, R., Bond, S. (1998), Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115-143.

Borhan, H., Ridzuan, A.R., Razak, M.I.M., Mohamed, R.N. (2023), The dynamic relationship between energy consumption and level of unemployment rates in Malaysia: A time series analysis based on ARDL estimation. International Journal of Energy Economics and Policy, 13(2), 207-214.

Elhorst, J.P., Emili, S. (2022), A spatial econometric multivariate model of Okun's law. Regional Science and Urban Economics, 93, 10376.

Greene, W.H. (2012), Econometric Analysis. 7th ed. United Kingdom: Pearson Education.

Hammad, S.A., Shallal, A.A.H., Ata Allah, A.K., Faisal, F.G., Abdullah, T.H. (2023), The impact of public spending on unemployment: A study on the Iraqi economy for the period 2004-2021. Global Journal of Economics and Business, 73(213), 375-384.

Hasková, S., Volf, P., Machová, V. (2019), Economic convergence of Czech regions in terms of GDP and unemployment rate in response to FDI flows: Do businesses and regions flourish? Ad Alta: Journal of Interdisciplinary Research, 9(1), 326-329.

Hawariyuni, W., Andrasari, M. (2022), Role of investment and macroeconomic variables on unemployment in Indonesia. Economics Development Analysis Journal, 11(3), 321-328.

Hidayat, M., Bachtiar, N., Sjafrizal, S., Primayesa, E. (2022), Does investment and energy infrastructure influence convergence in Sumatra Island, Indonesia? International Journal of Energy Economics and Policy, 12(4), 274-281.

Huang, H.C., Yeh, C.C. (2013), Okun's law in panels of countries and states. Applied Economics, 45(2), 191-199.

Huseynli, B., Huseynli, N. (2022), Econometric analysis of the relationship between renewable energy production, traditional energy production and unemployment: The case of Azerbaijan. International Journal of Energy Economics and Policy, 12(4), 379-384.

Jacob, A., Ehijiele, E. (2019), Unemployment in Nigeria: The Role of Entrepreneurship Education. In: Conference: 2nd International Conference on Management, Economics and Finance.

Kalinová, E., Kroutlová, K. (2023), The relationship between unemployment and macroeconomic indicators. SHS Web of Conferences, 160, 01008.

Khobai, H., Kolisi, N., Moyo, C., Anyikwa, I., Dingela, S. (2020), Renewable energy consumption and unemployment in South Africa. International Journal of Energy Economics and Policy, 10(2), 170-178.

Lee, C.W., Huruta, A.D. (2019), Okun's law in an emerging country: An empirical analysis in Indonesia. International Entrepreneurship Review, 5(4), 141-161.

Mankiw, N.G. (2012), Macroeconomics. 8th ed. United Kingdom: Worth Publishers.

Monusová, G.A. (2020), Perception of unemployment by Europeans. World Economy and International Relations, 64(4), 84-95.

Nafziger, E.W. (2012), Economic development. In: Economic Development. 5th ed. United Kingdom: Cambridge University Press.

Nepram, D., Singh, S.P., Jaman, S. (2021), The effect of government expenditure on unemployment in India: A state level analysis. Journal of Asian Finance, Economics and Business, 8(3), 763-769.

Okun, A.M. (1962), Potential GNP, its measurement and significance. Business and Economics Statistics Section. United States: American Statistical Association.

Patrick, D.P., Gilbert, N.A., Gerard, T., Orfe, C.N., Salim, N.A.A. (2023), Is the effect of disaggregated public spending on unemployment reinforced by governance in Cameroon? Asian Journal of Empirical Research, 13(1), 1-13.

Rahmat, D.M., Saeidi, K. (2017), The effect of government development expenditures on unemployment rate in the provinces. International Journal of Economics and Financial Issues, 7(5), 71-77.

Raifu, I.A., Aminu, A., Afolabi, J.A., Obijole, E.O. (2024), Government expenditure and unemployment nexus in Nigeria: Does institutional quality matter? Journal of Public Affairs, 24(2), e2917.

Rasheed, O.N. (2023), The effect of unemployment on economic growth in Nigeria. American Journal of Applied Statistics and Economics, 2(1), 11-14.

Romer, D. (2019), Advanced Macroeconomics. 5th ed. United States: McGraw Hill.

Rusiadi, R., Hidayat, M., Rangkuty, D.M., Ferine, K.F., Saputra, J. (2024), The influence of natural resources, energy consumption, and renewable energy on economic growth in ASEAN region countries. International Journal of Energy Economics and Policy, 14(3), 332-338.

Sasongko, G., Artanti, N.P., Huruta, A., Lee, C.W. (2020), Reexamination of Okun's law: Empirical analysis from Panel Granger Causality. Industrija, 48(4), 63-80.

Siregar, S.I. (2022), Have Investment and Technology Been Effective in Reducing Unemployment? (An Analysis in Indonesia Using Generalized Method of Moment). In: Nusantara Science and Technology Proceedings.

Soylu, Ö.B., Çakmak, İ., Okur, F. (2018), Economic growth and unemployment issue: Panel data analysis in Eastern European Countries. Journal of International Studies, 11(1), 93-107.

Sumanto, A., Hasyim, M., Abbas, I., Merlinda, S., Rahmawati, F. (2020), Technological changes, investments, and unemployment in Indonesia. KnE Social Sciences, 2020, 679-691.

Suryono, D.W., Burda, A., Chandra, R. (2020), Does Indonesia's Economic Growth Reduce Unemployment? In: Conference: 6th Annual International Conference on Management Research (AICMaR 2019). p. 169-171.

Tran Pham, T.K. (2024), Impact of government expenditure on unemployment in Asian countries: Does institutional quality matter? International Journal of Development Issues, 24, 170-184.

Ulloa-De Souza, R.C., González-Quiñonez, L.A., Reyna-Tenorio, L.J., Salgado-Ortiz, P.J., Chere-Quiñónez, B.F. (2024), Renewable energy development and employment in Ecuador's rural sector: An economic impact analysis. International Journal of Energy Economics and Policy, 14(1), 464-479.

Verbeek, M. (2017), A Guide to Modern Econometrics. 5th ed. United States: John Wiley & Sons, Inc.