The Effect of Investment and Inflation on the Open Unemployment Rate with GRDP as the Mediating Factor

ABSTRACT

Aims: The study examined the effect of investment and inflation on the unemployment rate with gross regional domestic product (GRDP) as a mediating factor, in Central Java from 2019 to 2022.
Study design: This study was employed the mediating regression analysis to solve the different findings on the effect of investment to unemployment rate. GRDP has a potential role as mediating factor on the causal effect.
Place and Duration of Study: The population of this research is 35 districts or cities in Central Java Province for 2019–2022 period.
Methodology: This study is secondary data taken from the Central Bureau of Statistics. The method used to collect data is purposive sampling with data analysis using the Structural Equation Modeling approach. Tests worked are R Square Test, Q Square Test, Direct Hypothesis Test, and Indirect Hypothesis Test.
Results: The results show that: (1) Investment has no significant effect on Unemployment Rate, (2) GRDP has a negative effect on the Unemployment Rate, (3) Investment has a positive effect on GRDP, (4) GRDP can mediate the effect of Investment on the Unemployment Rate, and (5) Inflation has a negative effect on Unemployment Rate.

Keywords: Unemployment rate, Investment, Inflation, Economic Growth, GRDP

1. INTRODUCTION

Unemployment is an economic problem that greatly affects the country's economy, especially Indonesia. Indonesia's Unemployment Rate (UR) in August 2022 was 5.86 percent, a decrease of 0.63 percentage points compared to August 2021 (jateng.bps.go.id). Despite the decrease, the open unemployment rate in Indonesia is still above five percent. According to Sembiring & Sasongko [1], a person is said to be unemployed if he has worked for at least one week and received a wage from the job. Meanwhile, if a person does not work because he does not have a job, is looking for a job, or is waiting for a job call, then he is said to be unemployed.

Unemployment can prevent a society from maximizing the level of prosperity it achieves. This happens because unemployment can cause the actual national income achieved by the community to be lower than its potential income (which it would be), so the level of prosperity achieved by the community will also be lower. Central Java Province, which is the third most populous province in Indonesia, has a fluctuating open unemployment rate from year to year during 2019-2022 (jateng.bps.go.id). Addressing the high unemployment rates in these regions is essential to reduce effectively overall unemployment in Central Java. Conversely, the low unemployment rate in regencies/municipalities in Central Java is also still a problem that must be resolved quickly. This is done to prevent a surge in the rate of unemployment within these specific regencies or municipalities.

One of the variables that can affect the unemployment rate is investment. Investment is one of the indicators that can overcome unemployment, namely by realizing investment

opportunities in the private sector to invest, to create jobs for people who are generally still unemployed by Yanti [2]. For investment development to run, the government offers various stimulating facilities to attract investors in the economic sector that the government wants to develop, the study conducted by Dharma & Djohan [3]. The provision of facilities is based on all fields of business, the location of the community's need for products, the level of technology used, employment, and others.

According to research by Kurniawan [4], it was noted that investment plays a pivotal role in exerting a significant detrimental impact on the open unemployment rate. This observation aligns with the findings presented by Prayuda et al. [5] and Abiad et al. [25], where they discovered that investment, to some extent, bears a notable negative relationship with unemployment. However, these results appear to diverge from the study conducted by Yuliarmi and Senet [6], which argued that the level of investment in Bali Province had a positive but statistically insignificant influence on the unemployment figures. Hence, while there is consensus regarding the negative effect of investment on unemployment, discrepancies exist in the magnitude and significance of this impact across different studies.

Prior research has yielded inconclusive findings concerning the impact of investment on the unemployment rate. This study aims to address a notable research gap by examining the role of gross regional domestic product (GRDP) as a mediating variable in explaining these inconsistent outcomes. GRDP, as a mediating factor, exerts influence over the labor force, operating on the premise that an increase in GRDP value corresponds to a rise in the value added by final goods and services across economic units within a region, as indicated [2]. It's worth noting that the growth of GRDP is intrinsically linked to investment, as investment serves as a key driver of economic growth, not only leading to a substantial boost in output but also creating greater demand for inputs, ultimately resulting in increased employment opportunities and enhanced community well-being through the subsequent rise in income for individuals.

In addition to investment and GRDP, inflation is another variable that holds sway over the open unemployment rate. The inclusion of the inflation variable in this study serves the purpose of providing a more comprehensive understanding of the various factors affecting the open unemployment rate. Alper [22} states that there is negative association between inflation and unemployment. Inflation, characterized by price hikes, is driven by shifts in demand and can indirectly influence unemployment levels. Specifically, when inflation rates soar, the demand for products tends to increase, leading to a heightened need for labor to meet this upsurge in demand. Paradoxically, this surge in labor demand can lead to a reduction in unemployment. This phenomenon aligns with the principle of demand economics, wherein an increase in product demand results in higher product prices due to limited availability.

2. LITERATURE REVIEW

In accordance with the Harrod-Domar theory, attaining a state of stable economic growth with minimal unemployment necessitates a nation's commitment to boosting its economic investment. The rationale behind this assertion lies in the fact that increased investment serves as a catalyst for elevating the production of goods and services, consequently generating fresh employment opportunities, and ultimately diminishing the unemployment rate.

Harrod Domar's theory is supported by previous research, according to Ziddan and Sakti [7], Karisma et al. [8] and Johnny et al. [9], showed that there is a negative and significant relationship between investment and unemployment in Indonesia. Based on the preceding explanation, we put forward the subsequent hypothesis formulation:

H1: Investment negatively affects the Open Unemployment Rate.

Okun's law, a concept elucidating the correlation between a nation's economic growth and its unemployment rate, posits an asymmetric connection between the two variables. According to this principle, for each 1% uptick in economic growth, there tends to be an associated decline of approximately 0.5% in the unemployment rate. This theoretical framework gains support from empirical research conducted by Sembiring and Sasongko [1], as well as findings by Yasmin et al. [10], both of which underscore the significant negative impact of GRDP on unemployment levels in Indonesia during the period spanning from 2011 to 2017. In addition, Shiferaw [23] and Sanchez & Liborio [24] find that there is the inverse relationship dynamically between GDP and unemployment. Based on the preceding explanation, we put forward the subsequent hypothesis formulation:

H2: Gross Regional Domestic Product has a negative effect on Open Unemployment Rate

The theory regarding investment within GRDP posits that investment holds a pivotal role in fostering economic growth. High investment will encourage increased production of goods and services so that GRDP also increases. In addition, investment can also improve productivity, technology, and human resources which in turn will encourage economic growth. Zakaria et al., [11], Pangidoan & Hardi [12], and Sahu [13] also argue that investment has a positive effect on GRDP. Based on the preceding explanation, we put forward the subsequent hypothesis formulation:

H3: Investment has a positive effect on Gross Regional Domestic Product

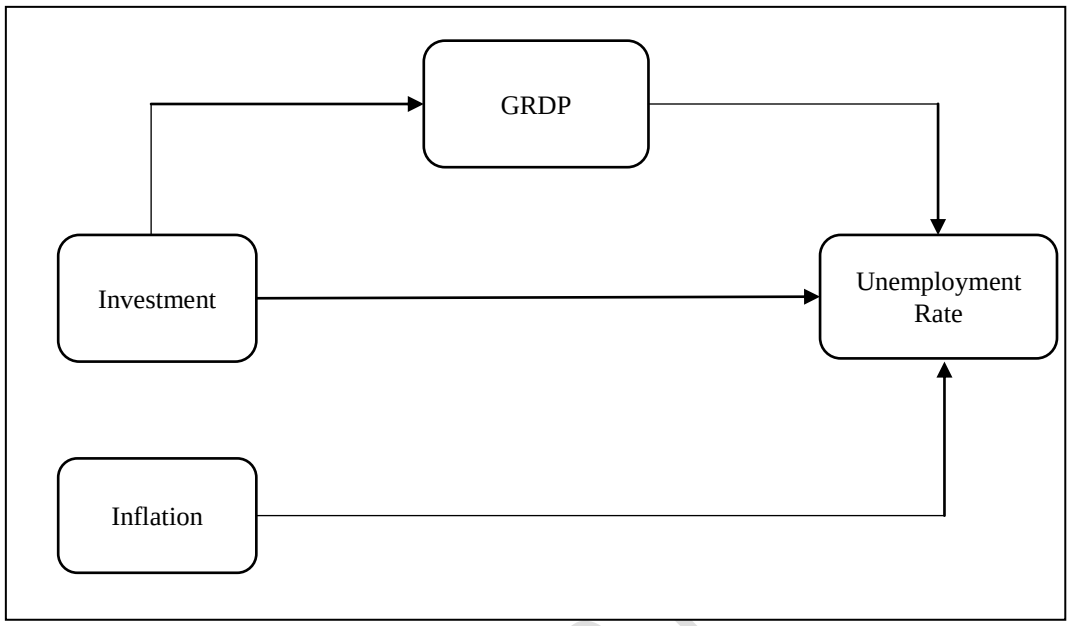
The Harrod-Domar theory, which elucidates the correlation between economic growth and a nation's investment activities, carries particular significance when considering unemployment, particularly in developing nations. This theory posits that in order to attain both stable economic growth and a lower unemployment rate, a country should escalate its investment levels within its economy. Sembiring and Sasongko [1] provide evidence supporting the notion that GRDP has a substantial negative impact on the unemployment rate. Furthermore, it's worth noting that investment partially influences GRDP, as demonstrated by Pangidoan and Hardi [12]. This is consistent with Sahu's findings in 2021 [13], which corroborate prior research suggesting that Foreign Direct Investment exerts a positive and significant effect on economic growth. Building upon these insights, the following hypothesis formulation is proposed:

H4: Gross Regional Domestic Product acts as a mediating factor in the relationship between Investment and the Open Unemployment Rate.

As per the Phillips Curve, the relationship between inflation and unemployment represents a trade-off scenario. In this dynamic, when a government seeks to maintain low inflation, it must acknowledge the potential consequence of an uptick in unemployment, and conversely, when aiming to reduce unemployment, it may incur higher inflation rates. Fluctuations in the overall demand for goods and services in the market serve as the catalyst for price adjustments or inflation. This theory finds validation in the research findings of Yehosua et al. [14], Salsabila and Muhajir [15], Tenzin [16] as well as Shiferaw [23], all of which conclude that inflation exerts a negative and statistically significant impact on the unemployment rate. In light of this context, we propose the following hypothesis:

H5: Inflation negatively influences the Open Unemployment Rate

In accordance with the hypothesis development, we propose the research model as shown in Picture 1.



Picture 1. Research Model of Unemployment Rate and the Predictors.

3. METHODS AND DATA

The study was conducted in Central Java Province, encompassing a research scope that spanned 35 regencies and cities in this region. The rationale for this selection is grounded in the fluctuating trends observed in the unemployment rate within Central Java between 2019 and 2022. Sampling for this research was conducted through purposive sampling, a method chosen based on specific criteria and considerations. The selection of this sampling technique was guided by the belief that the chosen sample's characteristics could effectively mirror those of the broader population being investigated [17].

The data source for this research is secondary, meaning it was not collected directly. But, rather obtained from external sources, whether through individuals or documents. Specifically, the data used in this study is sourced from the Bureau of Statistics (BPS) and consists of annual data for the years 2019 to 2022.

3.1 Operational Definition of Variables

3.1.1 Unemployment Rate (Y)

The concept of open unemployment rate encompasses more extensive definitions, attributes, and measurement standards, making it a vital gauge for assessing the labor market conditions within a country. The open unemployment rate reflects the imbalance between labor supply and labor demand in the economy, so its measurement is important to gauge the effectiveness of government policies in promoting economic growth and creating adequate employment.

3.1.2 Investment (X1)

Investment is the spending or buying of assets to earn profits or income in the future. Investment can be made in various forms of assets, such as stocks, bonds, and real estate, or productive assets such as machinery and equipment. In this study, investment is

measured using PMA and PMDN in units of a million rupiah per district/city in Central Java in 2019 - 2022.

3.1.3 GRDP (Z)

The GRDP serves as a metric employed to gauge the collective worth of goods and services generated by a specific region over a designated timeframe, typically spanning one year. The GRDP data employed in this research pertains to GRDP at constant prices, denominated in millions of rupiah, for the Central Java Regency/City during the years 2019 to 2022

3.1.4 Inflation (X2)

Inflation is a situation where the prices of goods and services have increased continuously, and this condition is due to excess demand (excess demand) for goods and services in the economy as a whole [18]. In this study, inflation is measured using the GDP deflator per district/city in Central Java for the period 2019 - 2022. The GDP deflator measures price changes in the economy as a whole. The scope of price changes measured in the GDP deflator is broader than the CPI and IHPB. The deflator figure is calculated by comparing nominal GDP in a given year with GDP in a specified year. The GDP deflator shows the magnitude of price changes of all new goods, locally produced goods, finished goods, and services.

$$\text{GDP Deflator} = \frac{GDP\ at\ current\ \ prices}{GDP\ at\ constant\ \ prices}\ x\ 100 \qquad (1)$$

4 RESULT AND DISCUSSION

4.1 Descriptive Analysis

A descriptive statistical analysis of each variable in this study is shown in Table 1. The average value of the open unemployment rate for 4 years is 5.44 percent, meaning that 5.44 out of 100 people of productive age were unemployed during the study period. The standard deviation of the open unemployment rate is 1.93 percent. The low variation of the unemployment rate data is shown by the standard deviation value which is lower than the average.

The average investment value during the observation period is 5,100,154.21 billion rupiah. The standard deviation value is 17,097,273.08 billion rupiah. The high variation of investment value data is indicated by the standard deviation value which is higher than the average.

The average GRDP value during the 2019-2022 observation period is 28,571.801 billion rupiah, this value is still below the average value of Indonesian GRDP which is 8,712,982.6 billion rupiah The standard deviation value is 25,991.88 billion rupiah. The low variation of GRDP data is indicated by a standard deviation value that is lower than the average.

The average inflation value measured by the GDP Deflator during the observation period 2019 - 2022 is 1.44 percent, this value is below the average value of Indonesia's inflation of 1.52 percent as measured by the GDP Deflator. The standard deviation value is 0.07 percent. Low inflation rate data variation is indicated by a standard deviation value that is lower than the average.

Table 1. Descriptive Statistics Analysis Results

Variables	N	Mean	Stdev	Max	Min
Open Unemployment Rate (%)	140	5.440	1.926	9.97	1.76
Investment (M Rp)	140	5,100.154	17,097.273	153,355.049	4.103
GRDP (M Rp)	140	2,8571.801	25,991.876	152,999.374	11,873.2
Inflation (%)	140	1.439	0.0700	1.664	1.1374

Source: Data Processed (Excel)

4.1.1 Q–Square and R-Square Test Results

The Q-square value serves as a crucial metric for assessing the predictive capacity of an independent (exogenous) model on the dependent (endogenous) variables. According to Ghozali [21], Q^2 falls within a range of 0 to 1, with values between these bounds signifying the predictive performance of the model. The calculation of Q^2 follows a specific formula:

$$Q^2 = 1 - (1 - r_1^2)(1 - r_2^2) \ldots\ldots (1 - r_n^2)$$

$$Q^2 = 1 - (1 - 0.078)(1 - 0.182)$$

$$Q^2 = 0.245$$

Based on the calculation of the Q^2 value, it can be seen that Q^2 (0.2) is between $0 < Q^2$ (0.2) < 1, meaning that Q^2 is in the range of tolerated values, meaning that the research model fits the data and can be observed.

The R Square value for the open unemployment rate stands at 0.078, equivalent to 7.8%. This indicates that approximately 7.8% of the variability in the open unemployment rate can be accounted for by the investment, GRDP, and Inflation variables, leaving the remaining 92.2% influenced by unexamined factors. Furthermore, the R Square value pertaining to GRDP, assessed using the PDRB proxy, is 0.182, representing 18.2%. This suggests that the investment variable contributes to around 18.2% of the variability in GRDP.

4.2 Hypotesis Results

4.2.1 Direct Effect

The assessment of the Path Coefficient relies on specific criteria, including a P-Value less than 0.05 and T-statistical value exceeding 1.96 at a 95% confidence level (α 5%). In the analysis of the bootstrapping output table, the resulting T-statistic value was found to be 1.778. Notably, this outcome falls short of the critical T-table value of 1.96. Furthermore, the P-Value recorded as 0.078 surpasses the significant threshold of 0.05. Consequently, it can be deduced that investment lacks a significant impact on the open unemployment rate (OUR). In other words, statistically, alterations in investment levels do not exert any discernible influence on the level of open unemployment.

The analysis yields T-statistic value of 2.987, notably exceeding the critical T-table value of 1.96. Furthermore, the P-Value, registered at 0.003, falls below the significant level of 0.05. These findings collectively point to a clear conclusion: GRDP exerts a negative and substantial impact on the open unemployment rate. This relationship can be attributed to the mechanism wherein an increase in community income stimulates economic growth, consequently driving up aggregate demand. The surge in aggregate demand, in turn, necessitates a greater labor force, leading to a subsequent reduction in the unemployment rate.

The analysis generates a substantial T-statistic value of 9.582, clearly surpassing the critical T-table value of 1.96. Additionally, the P-Value, registering at 0.000, falls well below the significant level of 0.05. These outcomes lead to a compelling conclusion: investment wields a positive and noteworthy influence on GRDP, thereby affirming hypothesis 3. Investment serves as a conduit for business entities to broaden their operational scope, utilizing capital for endeavors like enhancing production facilities, collaborating with other enterprises, and advertising, among others. These expanded opportunities translate into favorable outcomes for businesses, including increased earnings. Such heightened income levels, in turn, contribute to robust economic growth.

The analysis yields T-statistic value of 2.852, clearly surpassing the critical T-table value of 1.96. Additionally, the P-Value, standing at 0.005, falls below the significant level of 0.05. These findings lead to a definitive conclusion: inflation exerts a negative and noteworthy impact on the open unemployment rate, thereby confirming hypothesis 5. High levels of inflation signify an upswing in aggregate demand, which, in turn, places constraints on production capacity. To meet this heightened demand, producers respond by augmenting their production capacity, a move that necessitates an expanded labor force and, consequently, leads to increased output. This surge in labor demand subsequently contributes to a reduction in unemployment rates.

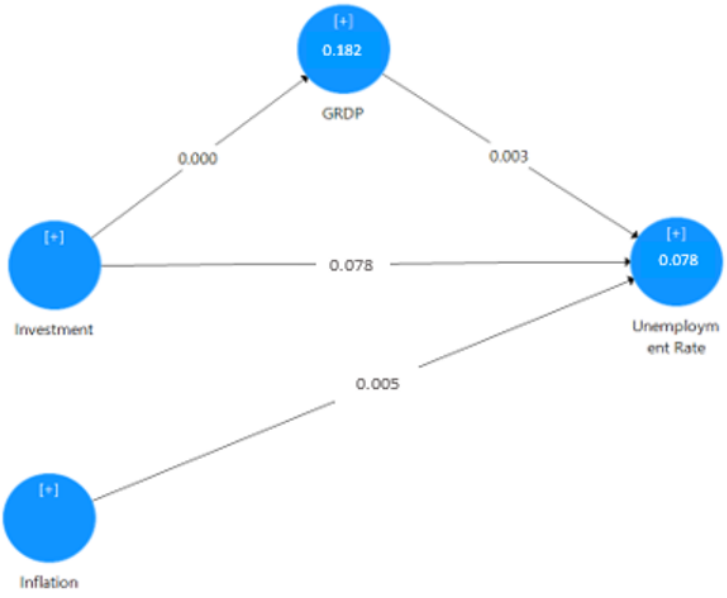
Table 2. Hypothesis Test Results Direct Effect

	Original sample (O)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Criteria
Investment → GRDP	0.426	0.045	9.582	0.000	Accepted
GRDP → OUR	-0.307	0.103	2.987	0.003	Accepted
Investment → OUR	0.155	0.087	1.778	0.078	Rejected
Inflation → OUR	-0.214	0.075	2.852	0.005	Accepted

Source: Data Processed (Smart-PLS)

4.2.2 Indirect Effect

As evidenced in table 3 and picture 2, the P-Value, denoted as 0.007, falls below the significance threshold of 0.05, while the t-statistic value of 2.765 surpasses the critical t-table value of 1.96. This conveys the presence of an indirect effect, affirming the acceptance of hypothesis 4. It is consequently established that GRDP serves as a mediating factor in the relationship between investment and the open unemployment rate (OUR).



Picture 2. Partial Least Square Output for Unemployment Rate and the Predictors.

Investment plays a pivotal role in driving economic growth by not only spurring a substantial increase in output but also by fostering heightened demand for inputs. This surge in input and output, in turn, augments the value added to final goods and services across economic units within a region, consequently bolstering a country's overall economic growth. To satisfy the

amplified demand for both output and input, a robust labor force is requisite. Consequently, companies open up employment opportunities to meet this surging labor demand, thereby mitigating unemployment.

Table 3. Hypothesis Test Results Indirect Effect

	Original sample (O)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Criteria
Investment → GRDP → OUR	-0.131	0.047	2.765	0.007	Accepted

Source: Data Processed (Smart–PLS)

We also specifically analyzed data during the corona virus pandemic from 2020 to 2021. The results show that the investment variable has a positive effect on regional economic growth. Meanwhile, other relationships among variables in the equation model are not significant.

5 CONCLUSIONS

By incorporating Gross Regional Domestic Product (GRDP) as a mediating factor, this study aims to unravel the dynamics governing the open unemployment rate in Central Java's districts and cities in relation to investment and inflation. The following key conclusions emerge from the analysis:

a. Investment exhibits no discernible impact on the Open Unemployment Rate.
b. GRDP exerts a negative influence on the Open Unemployment Rate.
c. Investment yields a positive effect on GRDP.
d. GRDP possesses the capacity to mediate the influence of Investment on the Open Unemployment Rate.
e. Inflation negatively influences the Open Unemployment Rate.

6 FINDINGS

The findings of this study offer pertinent recommendations for policymakers as follow. Firstly, the study underscores that investment alone does not significantly alter the open unemployment rate. However, when channeled into sectors such as infrastructure, this investment can augment the gross regional domestic product and, in turn, curtail unemployment. Therefore, it is advisable for governmental bodies, particularly the investment and One-Stop Integrated Services Department, to allocate funds from both foreign and domestic investors judiciously, prioritizing sectors with the potential to boost economic output and mitigate unemployment. Secondly, this study emphasizes the adverse effect of inflation on open unemployment. To counteract this, the government can implement expansionary fiscal and monetary policies, which can bolster aggregate demand and consequently drive employment rates upwards, alleviating the issue of unemployment.

Because the investment, GRDP and inflation variables only influence the open unemployment rate by 7.8% and the remaining 92.2% is influenced by other factors, it is hoped that further research can add other variables such as government expenditure and minimum wages, which can influence the open unemployment rate. In addition, this study does not discuss in depth and specifically the relationship between variables related to the Covid-19 pandemic that has hit the entire world. The future research needs to separate the research period into the situation due to the corona virus outbreak starting in 2020. During this period, there was very little investment activity due to restrictions on community activities so it needs special discussion.

REFERENCES

1. Sembiring, V. B. P., & Sasongko, G. (2019). The Effect of Gross Regional Domestic Product, Inflation, Minimum Wage, and Population on Unemployment in Indonesia for

the Period 2011-2017. *International Journal of Social Science and Business*, *3*(4), 430-443.
2. Yanti, N. F. (2017). Analysis of the Influence of Inflation, Investment and GRDP on the Unemployment Rate in the Sulawesi Region for the Period 2010-2014. *Catalogis*, *5*(4).
3. Dharma, B. D., & Djohan, S. (2015). The Effect of Investment and Inflation on Employment Opportunities through Economic Growth in Samarinda City. *PERFORMANCE*, *12*(1).
4. Kurniawan, C. R. (2013). Analysis of the Effect of GRDP, MSE, and Inflation on Open Unemployment in Malang City in 1980-2011. *Journal of Economics and Development Studies, Universitas Brawijaya: Malang*.
5. Prayuda, M. G., Dewi, U., & Henny, M. (2015). The Effect of Inflation and Investment on Unemployment in Bali Province in 1994-2013. *E-Journal of Development Economics*, *Udayana University, 5*(1), 44590.
6. Yuliarmi, N. N., & Senet, D. R. (2014). Factors Affecting the Number of Unemployment in Bali Province. *E-Journal of Development Economics*, *Udayana University, 3*(6), 44460.
7. Ziddan, R. M., & Sakti, R. K. (2022). The Effect of Investment, Provincial Minimum Wage, and Inflation on Unemployment Rate in Indonesia in 2015-2019. *Journal of Development Economic and Social Studies*, *1*(3).
8. Karisma, A., Subroto, W. T., & Hariyati, H. (2021). The Effect of Education and Investment on Unemployment in Java. *COSTING: Journal of Economic, Business and Accounting*, *5*(1), 441-446.
9. Johnny, N., Timipere, E. T., Krokeme, O., & Markjackson, D. (2018). Impact of foreign direct investment on unemployment rate in Nigeria (1980-2015). *International Journal of Academic Research in Business and Social Sciences*, *8*(3), 57-69.
10. Yasmin, F., Shaheen, R., Yasin, A., & Naseer, S. (2020). An Analysis of Causal Relationship between Economic Growth and Unemployment: Evidence from Pakistan. *Annals of Social Sciences and Perspective*, *1*(1), 9-17.
11. Zakaria, J., Baharuddin, D., Muslim Indonesia, U., Urip Sumoharjo Nokm, J., Panakkukang, K., Makassar, K., & South, S. (2023). The Effect of Foreign Investment, Domestic Investment, and Capital Expenditure on Processing Industry and Gross Regional Domestic Product in South Sulawesi Province. *Journal on Education*, *05*(03).
12. Pangidoan, E., & Hardi, B. (2022). The Effect of Investment and Labor on the GRDP of North Sumatra. *Journal of Education and Counseling (JPDK)*, *4*(6), 8113-8120.
13. Sahu, J. P. (2021). Does Inflow of Foreign Direct Investment Stimulate Economic Growth? Evidence From Developing Countries. *Transnational Corporations Review*, *13*(4), 376-393.
14. Yehosua, S. A., Rotinsulu, T. O., & Niode, A. O. (2019). The effect of inflation and interest rates on the unemployment rate in Manado City. *Journal of Efficiency Scientific Periodicals*, *19*(01).
15. Salsabila, A. M., & Muhajir, M. (2023). The Effect of Inflation Rate, Minimum Wage, and Economic Growth on Open Unemployment Rate in Bali Province: The Effect of Inflation Rate, Minimum Wage. *Emerging Statistics and Data Science Journal*, *1*(1), 97-104.
16. Tenzin, U. (2019). The Nexus Among Economic Growth, Inflation and Unemployment In Bhutan. *South Asia Economic Journal*, *20*(1), 94-105.
17. Suzana, A. J., Najmudin, N., Hariyono, B., & Masita, T. E. (2022). The Mediation Role of Customer Satisfaction On The Influence Of Price Perception, Product Quality, And Service Quality To Customer Loyalty. *EPRA International Journal of Multidisciplinary Research (IJMR)*, *8*(9), 144-153.
18. Trivanto, A., Najmudin, N., & Sulistyandari. (2015). Analysis of the Effect of Bank Indonesia Certificate Interest Rate, Inflation Rate, Composite Stock Price Index, Foreign Exchange Index and Rupiah Exchange Rate on the Rate of Return of Stock Mutual Funds in Indonesia. *Sustainable Competitive Advantage (SCA)*, *5*(1).

19. Triayuni, S., Najmudin, N., & Laksana, R. D. (2023). The Important Evidence of Leverage in Mediating the Effect of Sales Growth and Capital Intensity on Profitability. *Journal of Management and Social Sciences*, *2*(1), 200-217.
20. Rosid, A., Najmudin, N., & Suwarto, S. (2020). The Mediating Role of Job Satisfaction on the Relationship of Workplace Spirituality and Organizational Justice on Workplace Deviance Behavior. *Proceedings of the 2nd International Conference of Business, Accounting and Economics, ICBAE 2020, August 5-6, 2020, Purwokerto, Indonesia*.
21. Ghozali, I. (2006). *Structural Equation Modeling, Alternative Methods with Partial Least Square Second Edition*. Diponegoro University Publishing Agency.
22. Alper, F. O. (2017). Relationship between Inflation and Unemployment: The ARDL Bound Testing Approach for Turkey. *The 4th International Meeting of Sosyoekonomi Society in October 27-28, 2017 at Vienna, Austria*, 71-80.
23. Shiferaw, Y. A. (2023). An Understanding of How GDP, Unemployment and Inflation Interact and Change across Time and Frequency. *Economies, 11*(5), 1-15.
24. Sanchez, J. M., & Liborio, C. (2012). The Relationships among Changes in GDP, Employment, and Unemployment: This Time, It is Different. *Economic Synopses: Federal Reserve Bank of St. Louis, No. 13*, 1-2.
25. Abiad, A., Furceri, D., & Topalova, P. (2015). The Macroeconomic Effects of Public Investment: Evidence from Advanced Economies. *IMF Working Paper Research Department,* 1-26.