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Open Unemployment Rate in 35 Indonesian Provinces During Covid-19 Affected by Population Growth Rate per Year, School Participation Rate, Life Expectancy Rate, and Classification of Javanese-Non-Java Regions

Achmad Thoiful Romdhani[1*], Putri Novalina Manik[2], Nafilatun Nabilah[3], Alfilia Mafiroh[4], Fatina Nabila[5], Ramdhani Diamond Oktaviyuda[6]
[1,2,3,4,5,6]Development Economics, Universitas Trunojoyo Madura
*corresponding author e-mail: 230231100088@student.trunojoyo.ac.id,

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Abstract

This study aims to test and analyze the extent to which the open unemployment rate is influenced by several social factors, such as the rate of population growth per year, school participation rate, and life expectancy rate, and add a dummy variable, namely the classification of Javanese and non-Javanese regions in 35 provinces in Indonesia during the covid-19 pandemic, namely in 2021. This analysis was carried out using cross-section data obtained from the Indonesian Central Statistics Agency. Then, it was tested using statistics research methods, namely multiple linear regression tests and classical assumption test approaches. In addition, the purpose of this study is to prove Myrdal's theory of regional imbalance and regional unemployment theory. ***Theoretical Framework:*** *This study covers several factors that can affect the open unemployment rate in 35 provinces in Indonesia during the COVID-19 period, such as population growth rate, school participation rate, life expectancy rate, and regional classification.* ***Method:*** *The research methodology used is quantitative where, starting with data collection and data processing from the central statistical agency, then determining independent and dependent variables, and then being tested for multiple linear regression least squares and classical test approaches including residual normality test, heteroskedasticity test, and multicollinearity test.* ***Results and Discussion:*** *From the results of the statistical test carried out, it can be concluded that every 1% increase in the open unemployment rate will be followed by a rise of 0.78% in the population growth rate, 10.9% in life expectancy, -0.046% in school participation, and -1.60% in the classification of Java and non-Javanese regions. Meanwhile, when viewed from R-squared, it can be concluded that 28.30% of variables such as population growth rate, life expectancy, school dropout rate, and classification of Java and Non-Java regions during the COVID-19 pandemic can be explained in the model.*

INTRODUCTION

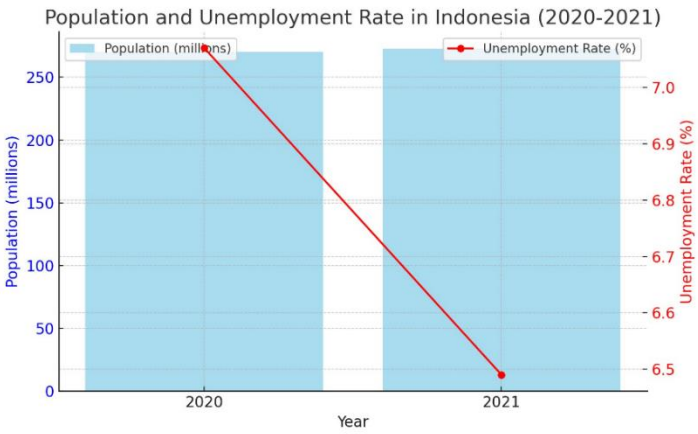
Unemployment is a condition that describes a person who has not found a job, even though they belong to the labor force (Sutirno, 1994). According to BPS (2023), open unemployment is an economic phenomenon in which a person in the age range of 15-64 years (labor force) does not have a job, is looking for a job, or is waiting for a better job. This condition is often motivated by an imbalance between the demand and supply of labor in an economy. The open unemployment rate can be measured by the percentage of unemployment in the labor force, which is the number of unemployed people divided by the total labor force and then multiplied by 100%. The result of this calculation is called the open unemployment rate (TPT) (ILO, 2023).

Economically, open unemployment has an impact on reducing national productivity because part of the workforce is not optimally utilized. In addition, the country's fiscal burden increases because the government has to allocate more funds for social protection programs such as unemployment assistance or job training (BPS, 2023). In the long run, if the unemployment rate remains high, economic growth may be hampered as people's purchasing power declines, which in turn weakens aggregate demand (Mankiw, 2021). As explained by Murphy, Shleifer, and Vishny (1991), mismatches in the allocation of human resources can hinder economic growth, with reduced productivity, as labor is not used optimally.

The population growth rate has a significant influence on the open unemployment rate in Indonesia. When the population grows rapidly, the new labor force entering the labor market increases, but job creation does not always keep pace. This condition enlarges the gap between supply and demand for labor, especially in the formal sector. In addition, the pressure on education and job training systems due to population growth often leads to skill mismatches in the labor market, which contributes to high open unemployment, especially among the young (Todaro & Smith, 2015). This is also supported by the findings of Arroyo and Prat (2020), who explain that globalization and changes in economic structure can exacerbate such gaps, making it difficult to create jobs that match the needs of the labor market.

Indonesia is a country with a large population that continues to grow from year to year. In addition, employment issues, such as the unemployment rate, are important indicators for assessing the country's economic and social development. The following graph displays data on the total population (in million) and unemployment rate (in percentage) in Indonesia for 2020 and 2021. This data illustrates how the dynamics between population growth and unemployment rate change over the two years.

Graph of population growth and unemployment rate in Indonesia in 2021



Source: BPS Indonesia

This graph illustrates the relationship between population growth and the unemployment rate in Indonesia in 2021. Indonesia's population continues to increase, reaching around 272.68 million people, an increase of 1.13% compared to the previous year. On the other hand, the open unemployment rate (TPT) showed a decrease from 7.07% in 2020 to 6.49% in

2021. This decline indicates an improvement in the employment sector even though the economy is still in the process of recovering from the impact of the COVID-19 pandemic. This graph illustrates that although the population continues to grow, effective job market management is able to reduce the unemployment rate gradually.

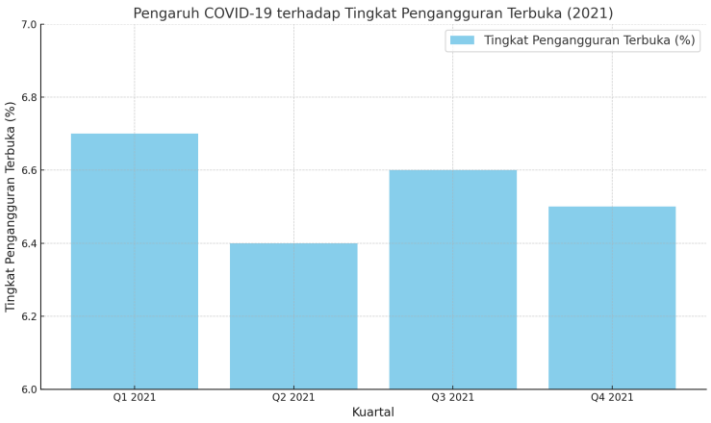
The COVID-19 pandemic that hit the world in early 2020 had an extraordinary impact on various aspects of life, including the employment sector in Indonesia. One of the most striking impacts is the increase in the Open Unemployment Rate (TPT), especially in 2021. The increase in the Open Unemployment Rate (TPT) in 2021 caused by the COVID-19 pandemic was influenced by various factors. One of the main causes is social restrictions, such as the Enforcement of Community Activity Restrictions (PPKM), which limit mobility and economic activities. This policy forced many businesses, especially in the service, tourism, and trade sectors, to close temporarily or even permanently, causing many workers to lose their jobs. In addition, the declining purchasing power of the public reduces the demand for goods and services, causing companies to reduce the recruitment of new workers and even terminate employment (PHK) (Ministry of Cooperatives and SMEs, 2021).

The COVID-19 pandemic that has hit the world since late 2019 has had a major impact on various sectors, including the labor sector. In the context of Indonesia, this impact is reflected in the fluctuation of the Open Unemployment Rate (OURR) throughout 2021. The chart below shows the changes in the TPT from the first quarter to the fourth quarter of 2021. This data provides an insight into the dynamics of the labor market during the pandemic, and how economic recovery efforts affect the unemployment rate.

Graph of the influence of COVID-19 on the open unemployment rate in 2021

Source: BPS Indonesia

The open unemployment rate (TPT) throughout 2021 showed fluctuations reflecting the impact of the COVID-19 pandemic on employment. In the first quarter, TPT was recorded at 6.7%,



indicating a significant impact of social restrictions and slow economic recovery. Entering the second quarter, this figure fell to 6.4%, which is in line with the easing of economic activities and the beginning of increasing adaptation to pandemic conditions. However, in the third quarter, there was a slight increase to 6.6%, which is likely due to the surge in COVID-19 cases and the reinforced policy of restricting community activities (PPKM). In the fourth quarter, the TPT figure was stable at 6.5%, indicating that the economic recovery process is starting to run again. This data illustrates how the pandemic affected workforce dynamics throughout 2021, with recovery efforts gradually improving the situation.

Overcoming the high open unemployment rate in 2021 due to the COVID-19 pandemic requires an integrated approach involving various sectors. One of the main steps is to expand labor-intensive programs to create temporary jobs, especially in the infrastructure, agriculture, and manufacturing sectors. This kind of program is effective in absorbing workers affected by the pandemic, as well as accelerating economic development. In addition, the government needs to intensify

job training to upskill and create new skills. (reskilling) for workers who have lost their jobs, especially in sectors affected by automation and digitalization during the pandemic (World Bank, 2021).

In 2021, Indonesia's life expectancy was recorded at 71.57 years, according to data from the Central Statistics Agency (BPS). However, the ongoing COVID-19 pandemic has had a significant impact on public health, especially through the increasing death rate due to the virus, which affects demographic dynamics. The elderly group is most vulnerable to the fatal impact of COVID-19 so that the pandemic can slow down the rate of increase in life expectancy. In addition, disruptions to health services, such as delays in immunization programs and treatment of chronic diseases, also have a long-term impact on the quality of public health.

The indirect impact of the life expectancy affected by the pandemic is its effect on the open unemployment rate (TPT). During 2021, Indonesia's TPT reached 6.49%, a figure that is still high compared to the pre-pandemic period. COVID-19 triggered a decline in economic activity, resulting in job losses in various sectors, especially the informal sector, tourism, and manufacturing. Although the life expectancy rate shows an improvement in the quality of life in general, the high unemployment rate indicates that the productive-age population is not fully absorbed in the job market.

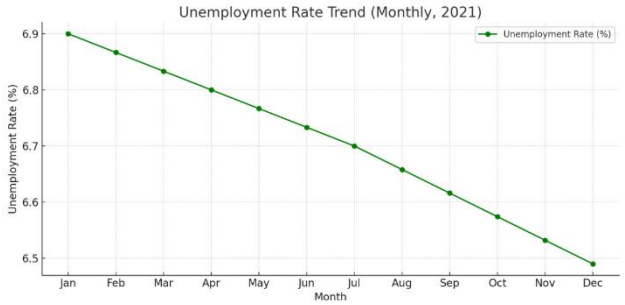
Research conducted by Bappenas (2021) shows that the impact of COVID-19 on the unemployment rate is uneven throughout Indonesia. Urban areas, especially on the island of Java, experienced higher unemployment rates due to the high concentration of formal sectors affected by the pandemic. On the other hand, rural areas show relatively better resilience, although they are still affected by a decline in economic activity, especially the open unemployment rate.

Rahmawati (2020) identified that the COVID-19 pandemic had a significant impact on the unemployment rate in the informal sector, especially in urban areas. This study shows that informal sector workers are more vulnerable to losing their jobs due to decreased market demand during the pandemic. Meanwhile, Nugroho et al. (2021) revealed that the surge in COVID-19 cases directly affected labor dynamics through reduced working hours, mass layoffs, and reduced productivity. This study also emphasized the importance of digital skills training for workers affected by the pandemic.

In addition, Siregar and Mulyani (2022) highlighted the relationship between life expectancy and unemployment inequality across different regions in Indonesia. This research shows that higher life expectancy in urban areas is not always followed by adequate employment, creating a significant gap compared to rural areas. Research conducted by Bappenas (2021) also reveals that the impact of COVID-19 on the unemployment rate is uneven across Indonesia. Urban areas, especially in Java, experienced higher unemployment rates due to the high concentration of formal sectors affected by the pandemic. In contrast, rural areas have shown relatively better resilience, although they remain affected due to the decline in economic activity.

The COVID-19 pandemic has had a major impact on the employment sector in Indonesia. The chart below shows the trend of the Open Unemployment Rate (OER) on a monthly basis throughout 2021. This data provides an overview of how the unemployment rate slowly declined from January to December 2021, reflecting the impact of economic recovery policies as well as the adaptation of the workforce to pandemic conditions. This graph is an important indicator in evaluating the success of measures taken to minimize the impact of the pandemic on employment.

Graph of the Open Unemployment Rate in Indonesia in 2021



Source: BPS Indonesia

The graph above illustrates the unemployment rate in Indonesia throughout 2021 based on monthly data. The unemployment rate experienced a consistent decline from January to December 2021. In January, the unemployment rate stood at 6.9%, then gradually declined to 6.5% in December. This trend reflects an improvement in employment conditions, which may be caused by economic recovery after the COVID-19 pandemic, increased economic activity, or the success of government programs in creating jobs. This decrease indicates a reduction in the number of unemployed individuals during the period, although the percentage remains showing challenges in fully overcoming unemployment (BPS 2021).

School participation rate (APS) is one of the important aspects of addressing the unemployment rate. In theory, a high APS can lower the TPT by improving individuals' competencies and preparing them to enter the workforce. However, data in Indonesia in 2021 shows that the relationship between APS and TPT is not always linear. Some regions with high APS, such as Bali (93.4%), have low TPT (3.2%), reflecting the positive link between education and employment opportunities, especially in the tourism sector. In contrast, West Java shows a high APS (91.5%) but a relatively high TPT (8.5%), indicating a mismatch between the number of educated workers and available job opportunities. In addition, regions such as Papua, with low APS (82.3%) and high TPT (6.7%), reveal limited access to education, which contributes to high unemployment. This is in line with Saputra and Purnamasari's (2018) research, which found that regions with higher APS tend to have more educated labor. However, unemployment remains high if the quality of education is not relevant to labor market needs. This study concludes that inclusive education needs to be accompanied by economic policies that create jobs to absorb education graduates.

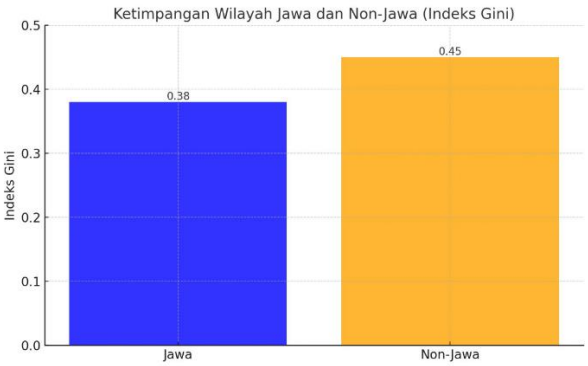
According to research conducted by Rahmawati (2020), disparities in the quality of education in different regions are also a factor influencing the relationship between APS and TPT. For example, regions with high APS but high unemployment, such as West Java, reflect that education that is not relevant to labor market needs is a major challenge. In addition, Nugroho et al. (2021) revealed that the low growth of employment in the formal sector is an obstacle to solving the unemployment problem, even though the APS level continues to increase in some regions.

The Ministry of National Development Planning (2022) explained that regional disparities are one of the factors causing Open Unemployment in Indonesia. Employment opportunities that are only centralized in Java and Sumatra are neglected in other regions, such as Papua and Maluku, due to the lack of access to infrastructure services in the labor market. As a result, there is a pattern of massive migration to urban areas, which actually exacerbates the condition of economic inequality. Previously, Siregar and Mulyani (2022) also highlighted the importance of infrastructure access and equitable development to reduce unemployment in the outermost regions, indicating that reducing TPT must be done through comprehensive and integrated policies.

This suggests that in addition to increasing APS, it is necessary to improve the quality of education to make it more relevant to the needs of the labor market. Inclusive economic development is also an important factor in ensuring the provision of employment for education graduates in various regions. This relationship reflects that a high APS must be accompanied by efforts to create suitable and equitable employment opportunities throughout Indonesia to reduce unemployment effectively.

Economic inequality between regions in Indonesia is one of the most important issues in national development. The following graph shows a comparison of the Gini index between Java and non-Java regions. The Gini index, which is an indicator of income distribution inequality, shows that the Non-Java region has higher inequality (0.45) than the Java region (0.38). This data underscores the need for special attention to equitable development outside Java to reduce economic disparities between regions.

Graph of Regional Inequality in Java and Non-Java.



Source: BPS Indonesia

Based on the graph above, the level of regional inequality between Java and non-Java regions is illustrated based on the Gini Index. From this graph, it can be seen that inequality in the Non-Java region (0.45) is higher than in Java (0.38). This reflects significant differences in the distribution of income or welfare between the two regions. Higher inequality in non-Java could indicate greater challenges in equitable development and access to economic opportunities in the region.

LITERATURE REVIEW

Becker's Human Capital Theory (1964) states that investment in education increases the skills and productivity of individuals, thereby contributing to economic growth and decreasing the unemployment rate. This theory emphasizes the importance of the quality of education as the main capital that prepares the workforce to meet the needs of the labor market. However, suppose there is a mismatch between the competencies obtained from education and the demands of the business world. In that case, investment in education will not have an optimal impact, as seen in the high Open Unemployment Rate (TPT) despite the increasing School Participation Rate (APS) in some regions.

RESEARCH METHOD

This study combines two studies, namely (Azaludin, 2021) on life expectancy, which has a significant effect on the open unemployment rate, and (Arianto et al., 2015), which examines the effect of the population growth rate on the open unemployment rate. Through regression analysis with the Ordinary Least Squares (OLS) method and the classical test approach using E-Views software, a model was obtained that describes the linear relationship between dependent and independent variables as follows:

$$TPTt_i = \alpha + \beta_1 LPP_i + \beta_2 \ln AHH_i + \beta_3 APS_i + \beta_4 \ln KLSF_i + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Description :

TPTt = Open Unemployment Rate
LPP = Population Growth Rate
APS = Dropout Rate

AHH = Life Expectancy
KLSF = Classification of Java/Non-Java Regions
α = Intercept
$\beta_{1\ldots}\beta_4$ = Coefficient
ε = Error term
ln = Natural logarithm

HYPOTHESES OF THE STUDY

H_1 : Stated that the annual population growth rate, life expectancy rate, school participation rate, and classification of Java and non-Java regions influenced the open unemployment rate in Indonesia during the COVID-19 pandemic.

RESULTS AND DISCUSSION

Least Squares Regression Approach Analysis

Result of Nonlinear Estimation of Least Square Multiple

Variable	Coefficient	Std.Error	t-statistic	Prob.
KLSF	-1,606777	0,815183	-1,971063	0,0580**
APPS	-0,046795	0,038206	-1,224831	0,2302
AHH	10,99901	8,32727	1,320842	0,1965
LPP	0,78584	0,506230	1,552339	0,1311
C	-39,38534	35,54548	-1,108027	0,2767
R-Squared	0,283024	Mean dependent Var		5,526
Adjusted R-squared	0,187428	S.D. dependent Var		1,706524
F-statistic	2,960608	Durbin-Watson stat		2,025308
Prob(F-statistic)	0,035673**			

Description: (***),(**),(*) are significant at 1%, 5%, or 10% =∝

$$TPTt_i = -39.3853368878 + 0.785839886788.LPP + 10.999008576.AHH + 0.0467954949434.APS + 1.60677731554.KLSF + \varepsilon_i \ldots\ldots\ldots\ldots (2)$$

RESULTS

Based on the table of nonlinear estimation results, the KLSF variable has a coefficient of -1.606777 with a probability value of 0.0580, which is significant at the 10% level. This shows that KLSF has a negative relationship with the dependent variable, where an increase in KLSF actually decreases the value of the dependent variable. Meanwhile, the APS variable with a coefficient of -0.046795 and a p-value of 0.2302, the AHH variable with a coefficient of 10.99901 and a p-value of 0.1965, and the LPP variable with a coefficient of 0.78584 and a p-value of 0.1311 are all statistically insignificant. However, the direction of influence of each variable can still be seen from the coefficient values. The constant (C) with a value of -39.38534 is also insignificant, with a p-value of 0.2767.

In terms of the model, the R-squared value of 0.283024 indicates that this model is able to explain 28.3% of the variation in the dependent variable. In contrast, the Adjusted R-squared of 0.187428 indicates that this model is not fully fit to explain the relationship between variables. However, the model is overall significant, as indicated by the F-statistic value of 2.960608 with a p-value of 0.035673. In addition, the Durbin-Watson stat value of 2.025308 indicates that there is no autocorrelation problem in the residuals.

Overall, the analysis results show that only the KLSF variable is statistically significant, while the other variables do not show a significant influence on the dependent variable. However, this model has limitations, especially in its ability to explain the relationship between variables, as seen from the low Adjusted R-squared value. This suggests the need for further evaluation, both through the addition of more relevant variables and the use of more accurate estimation methods.

DISCUSSION

The results of regression analysis using the least squares method show that the open unemployment rate (Y) is influenced by several independent variables, namely population growth rate per year (X1), life expectancy per year (X2), school participation rate (X3), and regional classification (X4, with 1 for Java and 0 for Non-Java). From the test results, it was obtained that the population growth rate (x1) has a coefficient of 0.785, which can be interpreted that every 1% increase in the population growth rate will be followed by an increase in the open unemployment rate of 0.78% assuming that other variables are constant. The probability is 0.131 out of a significance level of 5%, so statistically, the effect of the growth rate on the open unemployment rate does not show significance even though it shows a positive relationship. >

The life expectancy as a variable (x2) has a coefficient of 10.99, meaning that for every 1% increase in life expectancy per year, there will be an increase in the open unemployment rate by 10.99%, assuming other variables that affect constants. The probability is 0.195 out of a significance of 5%, so the effect of the life expectancy per year has no significance on the open unemployment rate. However, the coefficient that has a positive value shows that the higher the life expectancy per year, the higher the open unemployment rate. >

The dropout rate (X3) has a coefficient of -0.046795, meaning that for every 1% increase in the dropout rate, there will be a decrease in the open unemployment rate with an average of 0.046, assuming that other variables remain fixed. Probability of 0.230 5% or significance, so it can be concluded that there is no significance between the dropout rate and the open unemployment rate; the effect of the dropout rate shows a negative relationship, Where a high dropout rate tends to have a bad impact on the open unemployment rate. >

The classification of Java and Non-Java regions has a coefficient of -1.60, where a negative coefficient shows that Java tends to have a lower average open unemployment rate of 1.60% compared to non-Java regions, assuming that other variables that affect are constant. The probability of 0.058 is close to the significance value of 5%, so it can be said that the influence of the regional classification variable on the open unemployment rate is marginally significant. This implies that the Java vs Non-Java region has the possibility of affecting the open unemployment rate.

CONCLUSIONS BASED ON VARIABLES

Based on the results of the analysis, the LPP (Population Growth Rate) variable is not statistically significant. However, it shows a positive trend toward variable Y. This is due to the low population growth rate during the Covid-19 period, which was influenced by high mortality due to disease and restrictions on various social activities that reduced birth and migration rates (Ramadan & Nurwati, 2021). Furthermore, the AHH (Life Expectancy) variable is also insignificant despite showing a strong positive trend. This is due to the low life expectancy during the pandemic, which is influenced by the large number of fatalities due to the disease outbreak (Yusuf Qamaruddin & Rajiman, 2023).

Meanwhile, the APS (School Dropout Rate) variable is insignificant. It has a negative relationship with variable Y. During the pandemic, many schools had to be closed, and learning was transferred to online media, so the school dropout rate does not have a big influence on the open unemployment rate (Ghora Vira Handy Putra & Nur Hidayah, 2023). On the other hand, the KLSF variable (Java and Non-Java Regional Classification) has marginal statistical significance. The Java region has a lower value of variable Y than Non-Java. This is because the Java region has more infrastructure development and employment providers compared to Non-

Java, thus exerting a significant influence even during the pandemic (Br. Saragih & Usman, 2022).

In terms of model suitability, the R-squared value of 0.2830 shows that 28.30% of variables, such as population growth rate, life expectancy, school participation rate, and classification of Java and non-Java regions, can explain the dependent variables of the open unemployment rate. Nonetheless, the Prob(F-statistic) value of 0.0356 (<0.05) indicates that overall, the model is significant at a confidence level of 95%. There was no indication of autocorrelation in the residuals, with a Durbin-Watson value of 2.

Based on these results, it can be concluded that the geographical location variable (Javanese/Non-Javanese) has a significant effect on the open unemployment rate. However, this model still has weaknesses due to the low R-squared value, so it needs to be improved, for example, by adding other independent variables that are more relevant or using alternative regression approaches to improve the model's ability to explain the open unemployment rate.

From the estimation results, the KLSF variable shows a coefficient of -1.606777 with a probability level of 0.0580, which is significant at the 10% level. This indicates that an increase in KLSF has the potential to decrease the value of the dependent variable, although this relationship is only significant at a certain level. The APS variable has a coefficient of -0.046795 with a probability of 0.2302. In contrast, AHH has a coefficient of 10.99901 with a probability value of 0.1965, and LPP has a coefficient of 0.78584 with a probability of 0.1311. These three variables are not statistically significant in influencing the dependent variable.

The constant value (C) of -39.38534 is also insignificant, with a probability of 0.2767. At the model level, the R-squared value of 0.283024 indicates that this model is only able to explain about 28.3% of the variability of the dependent variable. In contrast, the Adjusted R-squared value of 0.187428 indicates that this model is not strong enough to explain the relationship between the variables tested. However, the F-statistic value of 2.960608 with a probability of 0.035673 indicates that the model is significant overall at the 5% confidence level. The Durbin-Watson stat value of 2.025308 indicates that there is no autocorrelation problem in the model.

Referring to previous research, this finding is in line with the study conducted by Barro (1990), which states that an increase in capital (represented by KLSF) without being accompanied by efficiency can have a negative impact on economic performance. This is also supported by the study of Mankiw, Romer, and Weil (1992), which emphasizes the importance of the quality of capital rather than just its quantity. On the other hand, the insignificant APS result is in line with the findings of Hanushek and Woessmann (2008), who emphasize that access to education does not have a major impact if the quality of education itself is not improved. The study by Bloom et al. (2004) also supports the results of the AHH variable, showing that public health, despite having a positive impact in theory, is often insignificant, especially in developing countries. For the LPP variable, the insignificant result is consistent with the findings of Todaro (2006), which states that creating jobs will only have a positive impact if an increase in labor productivity accompanies it.

Overall, this model has limitations with a low Adjusted R-squared, making it less able to explain the relationship between variables thoroughly.

Residual normality test results

Residual analysis showed that the residual mean was very close to zero (), with a visible distribution close to normal.

Based on the histogram. The skewness value (0.567493) shows a slight asymmetry to the right, while the kurtosis (2.119251) shows a distribution that is close to normal but slightly flatter. The standard residual deviation is 1.444989, indicating a moderate mean deviation. The Jarque-Bera test yielded a statistical value of 3.009871 with a probability of 0.222032, greater than the significance level of 5%, so the null hypothesis that the normally distributed residuals failed to be rejected. Overall, the model meets the assumption of residual normality, but some outliers need to be examined further. This regression model may be considered valid for statistical analysis, although additional tests such as heteroskedasticity or autocorrelation tests are recommended for 1.59×10^{-15} Check for other assumptions.

F-statistic	1,636159	prob. F(4,30)	0,191
obs *Required	6,268014	prob. Chi-square (4)	0,18
scaled explained SS	2,577116	prob. chi-square (4)	0,6309

variable	coefficient	std. error	t-Statistic	prob.
C	35,97262	48,52516	0,741319	0,4643
KLSF	-1,508474	1,112853	-1,355502	0,1854
APPS	0,095564	0,052157	1,832245	0,0769
AHH	-8,756695	11,36803	-0,770291	0,4472
LPP	0,971861	0,691083	1,406287	0,1699
R-squared	0,179086	mean dependent var		2,028337
adjusted R-squared	0,069631	S.D. Dependent var		2,177201
S.E. Of regression	2,100033	Akaike info criterion		4,453347
sum squared resid	132,3041	Black Criterion		4,675539
log-likelihood	-72,93357	Hannan-Quinn criteria		4,530048
F-statistic	1,636159	Durbin-Watson stat		1,893904
prob(F-statistic)	0,191009			

Heteroskedasticity Test Results

The heteroscedasticity test using the Breusch-Pagan-Godfrey method shows that the regression model has satisfied the assumption of homoscedasticity. This is evidenced by the probability value (p-value) in the F-statistic of 0.1910, Obs*R-squared of 0.1800, and Scaled Explained SS of 0.6309, all of which are greater than the significance level of 5% (0.05). Thus, the null hypothesis stating the absence of heteroscedasticity cannot be rejected, suggesting that the residual variance in the regression model is constant. In addition, based on the test equation, no significant influence was found from the independent variables (X1: population growth rate, X2: life expectancy per year, X3: school participation rate, and X4: classification of Java and non-Javanese regions) on the residual variance, because all p-values were greater than 0.05. An R-squared value of 0.179086 indicates that only 17.91% of the variation in the residual variance can be explained by the independent variables, so the overall test model is insignificant. In conclusion, this regression model is free from heteroscedasticity issues, but evaluation of other assumptions is still necessary to ensure the overall validity of the model.

Multicollinearity test results

The results of the *Variance Inflation Factors* (VIF) analysis showed that there was no significant indication of multicollinearity among the independent variables in the regression model. VIF is used to identify potential multicollinearity that can affect the accuracy of regression coefficient estimation. Based on common standards, a VIF value less than 10 indicates the absence of serious multicollinearity problems. The X1 variable (population growth rate) has a VIF value of 1.1017, which indicates a very low level of multicollinearity. Furthermore, the variable X2 (life expectancy per year) has a VIF of

1.3385, which indicates that this variable is also free from the problem of multicollinearity. For the X3 variable (school participation rate), the VIF value of 1.006981 confirms that this variable is highly independent of other variables. Meanwhile, the X4 variable (classification of Java and non-Javanese regions) has a VIF of 1.396062, which is still within the safe range below the value of 10. As for the constant (C), the value of VIF is irrelevant to calculate because it is not related to multicollinearity between independent variables. Overall, the low VIF values in all independent variables ensure that the regression model is free from multicollinearity problems. Therefore, variables such as population growth rate, life expectancy rate, school participation rate, and regional classification can be used and interpreted accurately in this regression model.

CONCLUSION

This study reveals that the open unemployment rate (TPT) in Indonesia during the COVID-19 pandemic was influenced by various social factors. The population growth rate shows a positive relationship with the TPT, meaning that an increase in population tends to be accompanied by an increase in the unemployment rate. However, this effect is not statistically significant. In addition, life expectancy has a fairly strong positive correlation with the TPT, indicating that an increase in life expectancy can have an impact on increasing the TPT. This may be due to the challenge of absorbing the productive age workforce, although this relationship is also not statistically significant. Conversely, the school participation rate (APS) has a negative relationship with the TPT, indicating that education can help reduce the unemployment rate. However, like the two previous variables, this relationship is not statistically significant. The Java and Non-Java regional classification variables are the only factors that show a significant effect. The Java region tends to have a lower unemployment rate than the Non-Java region, reflecting the gap in access to infrastructure and economic opportunities between the two regions. This study also reveals new findings regarding the significant influence of geographic disparity on the unemployment rate. However, the low significance of most variables suggests that there are other more complex factors influencing TPT in Indonesia. Factors such as urbanization, investment, and minimum wage policies may have a stronger influence but have not been explained in this study. Therefore, further research that includes additional variables is needed to enrich the understanding of TPT dynamics. As a concrete step, the government is advised to increase infrastructure development in non-Java areas, align the education system with labor market needs, and expand job training programs to improve the skills of workers affected by the pandemic. These efforts are expected to reduce the open unemployment rate while reducing disparities between regions in Indonesia.

Suggestions

Based on the results of the analysis, several recommendations can be given to reduce the open unemployment rate (TPT) in Indonesia. First, the education sector needs to be directed to be more in line with the needs of the labor market. Skills-based curricula and vocational training programs must be strengthened to improve the ability of the workforce so that they are better prepared to face competition in the world of work. Second, accelerating infrastructure development outside Java Island is important to reduce the gap between regions. The provision of transportation access, communication technology, and production facilities in non-Java regions can open up new economic opportunities that will allow for the influx of local workers. Third, the implementation of labor-intensive programs needs to be improved in strategic.

Sectors such as agriculture, manufacturing, and construction, in order to create jobs for groups affected by unemployment. Fourth, the government can encourage investment in priority sectors outside Java by providing incentives for investors who open businesses in areas with high unemployment rates.

In addition, inclusive economic policies need to be designed to ensure equal distribution of employment opportunities in various regions. This policy must also pay attention to vulnerable groups such as recent graduates and workers in the informal sector. Further research is also needed to refine the analysis model by including additional variables, such as the impact of digitalization, urbanization rates, and minimum wage policies. More in-depth analysis methods, such as the use of panel data or non-linear regression, can provide more accurate results. Furthermore, the government needs to strengthen job training programs that focus on developing new skills (reskilling) and improving existing skills (upskilling), especially for workers who have lost their jobs due to the pandemic. This training program should be directed to emerging sectors, such as information technology, digital economy, and creative industries.

Finally, the government needs to improve the monitoring and evaluation mechanism for unemployment alleviation programs. The results of the evaluation can be used as material to improve future policies. With these integrated measures, it is hoped that the open unemployment rate can be significantly reduced, the gap between regions can be minimized, and the national economy can become stronger and inclusive.

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