Journal of Mathematics and Mathematics Education
https://jurnal.uns.ac.id/jmme

p-ISSN 2089-8878; e-ISSN 2715-8276
Vol. 14, No. 01, june 2024

FACTORS AFFECTING OPEN UNEMPLOYMENT RATE IN BANTEN PROVINCE USING PANEL DATA REGRESSION

Annisa Qurrota Ayu[1,*], Sri Subanti[1], Sugiyanto[1]

[1]Name 1Statistics Department, Fakulty of Mathematics and Natural Science, Sebelas Maret University

* Correspondence purposes, email: annisaqurrota02@student.uns.ac.id

Abstrak: Pengangguran merupakan permasalahan umum yang dihadapi negara berkembang seperti Indonesia. Pada tahun 2022-2023 Provinsi Banten menduduki peringkat pertama persentase Tingkat Pengangguran Terbuka (OUP) tertinggi di Indonesia. Sehingga, diperlukan penelitian lebih lanjut mengenai faktor-faktor apa saja yang mempengaruhi Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten. Penelitian ini bertujuan untuk menganalisis pengaruh rata-rata lama sekolah (X_1), upah minimum kabupaten/kota (X_2), tingkat partisipasi angkatan kerja (X_3), dan laju pertumbuhan PDRB (X_4) terhadap Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten tahun 2013-2022. Metode analisis yang digunakan dalam penelitian ini merupakan regresi data panel. Hasil dari penelitian ini menunjukkan bahwa model terbaik yang digunakan adalah uji Chow dan uji Hausman adalah fixed effect model. Kemudian diperoleh hasil akhir bahwa rata-rata lama sekolah (X_1) berpengaruh negatif dan signifikan terhadap persentase Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten, upah minimum kabupaten/kota (X_2) berpengaruh positif dan signifikan terhadap persentase Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten, tingkat partisipasi angkatan kerja (X_3) berpengaruh negatif dan signifikan terhadap persentase Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten, dan laju pertumbuhan PDRB (X_4) berpengaruh negatif dan signifikan terhadap persentase Tingkat Pengangguran Terbuka (OUP) di Provinsi Banten.

Kata kunci : *Pengangguran, Pendidikan, Upah Minimum, Angkatan Kerja, Laju Pertumbuhan PDRB, Regresi Data Panel*

Abstract: Unemployment is a common problem faced by developing countries such as Indonesia. In 2022-2023 Banten Province ranked first in the percentage of the highest Open Unemployment Rate (OUR) in Indonesia. Thus, further research is needed on what factors affect the Open Unemployment Rate (OUR) in Banten Province. This study aims to analyze the influence of average years of schooling (X_1), district/city minimum wage (X_2), labor force participation rate (X_3), and GRDP growth rate (X_4) on the Open Unemployment Rate (OUR) in Banten Province in 2013-2022. The analysis method used in this research is panel data regression. The results of this study indicate that the best model selected after going through the Chow test and Hausman test is the fixed effect model. The final result shows that the average years of schooling (X_1) has a negative and significant effect on the percentage of Open Unemployment Rate (OUP) in Banten Province, the district/city minimum wage (X_2) has a positive and significant effect on the percentage of Open Unemployment Rate (OUP) in Banten Province, labor force participation rate (X_3) has a negative and significant effect on the percentage of Open Unemployment Rate (OUP)

Accepted: January 31, 2024 Approved: June 01, 2024 Published: June 31, 2024
DOI: https://doi.org/10.20961/jmme.v14i1.83790

in Banten Province, and GRDP growth rate (X_4) has a negative and significant effect on the percentage of Open Unemployment Rate (OUP) in Banten Province.

Keywords: *Unemployment, Education, Minimum Wage, Labor Force, GRDP Growth Rate, Panel Data Regression*

INTRODUCTION

Labor plays an important role in the Indonesian economy. According to Adam Smith's classic theory, an increase in population will have an impact on economic growth and development. However, the increase in population actually provides its own problems in the aspect of employment. A very high population gap, not matched by the availability of jobs, will result in various problems such as poverty and unemployment. These problems have various social impacts that are quite serious in society. Basically, the various labor problems that arise boil down to the availability of adequate and quality employment. Job creation needs to be one of the main focuses in solving labor problems.

One very important indicator to see the employment condition in a region is the population who are unemployed. The high number of the labor force that is not accompanied by a large number of job opportunities can have an impact on the increase in unemployment. The number of unemployment in Indonesia has fluctuated in the last 10 years, the lowest number of unemployment in the last 10 years occurred in 2016, amounting to 7.03 million people and the highest number of unemployment occurred in 2020, amounting to 9.77 million people, of course this is due to the emergence of the co-19 pandemic. However, the population with unemployment status was successfully suppressed so that it decreased in

2021 to 9.10 million people and in 2022 the number of unemployed people was successfully suppressed again to 8.43 million people BPS (2022).

The number of labor force in Indonesia continues to increase every year from 2013-2022. The number of labor force in 2013 amounted to 120.17 million people and continued to increase every year until in 2022 the number of labor force in Indonesia amounted to 143.72 million people. The large number of labor force can be a source of capital to encourage economic development. However, the high number of workers must be balanced with the availability of employment. Optimal labor absorption can have a positive impact on the economy and community welfare BPS (2022).

Another indicator that also describes the employment condition in a region is the Open Unemployment Rate (OUR). OUR is the percentage of the unemployed population to the total workforce. This indicator shows the ability of the economy to create jobs that can absorb the existing labor supply. The percentage of OUP in the last 10 years has a fluctuating value, the lowest percentage of OUP was in 2018, which amounted to 5.23% and the highest percentage of OUR occurred in 2020,

p-ISSN 2089-8878; e-ISSN 2715-8276

which amounted to 7.07%, this was due to the emergence of the covid-19 outbreak in Indonesia. However, the percentage of OUR continued to decline in 2021 until now in 2023 OUR managed to fall to 5.32% in Indonesia. Banten Province is the province that has the highest OUR value in Indonesia in February 2023. Banten is one of the provinces in Indonesia which has an area of 9,662.92 km² and has 8 regencies/cities. According to BPS, the national OUR value in February 2023 was 5.45%, while the percentage of OUP in Banten Province was 7.97% in February 2023. This shows that the OUP value in the province is above the national average value BPS (2022).

According to data on the Central Bureau of Statistics (BPS) website, the OUP value of Banten Province is the highest value compared to other provinces in Indonesia in February 2022-2023, which is 8.53% in 2022 and 7.97% in 2023. Fluctuations in the OUP value from time to time are influenced by several factors. Therefore, research is needed that is designed to determine the factors that affect the OUP value in Banten Province.

Previous research conducted by Setiawan and Yulianti (2019) has modeled the OUP with the Fixed Effect Model (FEM) approach. The results of this study were that the GRDP and population variables had a negative and significant effect on the unemployment rate in East Java Province. Researcher Helvira and Rizki (2020) also modeled the OUP with the Fixed Effect Model (FEM) approach. The result of this research is that investment has a positive and insignificant effect on the open unemployment rate. Minimum wage has a positive and significant effect on open unemployment. Meanwhile, the Human Development Index (HDI) has a negative and insignificant effect on open unemployment in West Kalimantan Province. Furthermore, research conducted by Misbahuddin and Hasan (2013) modeled the OUP with the Random Effect Model (REM) approach. The results of this study are the minimum wage has a negative relationship and has no significant effect on the OUP variable, the labor force has a negative relationship and has a significant effect on the OUP variable, economic growth has a negative relationship and has no significant effect on the OUP variable, and education has a positive relationship and has a significant effect on the OUP variable in the Regency / City in East Java Province. And Badria (2022) conducted research to model OUP with the Fixed Effect Model (FEM) approach. The result of this study is that economic growth has a positive and significant effect on the open unemployment rate. The labor force participation rate has a negative and significant effect on open unemployment. Meanwhile, the provincial minimum wage has a negative and insignificant effect on open unemployment in Indonesia.

Based on the description above, research will be conducted on the percentage of Open Unemployment Rate (OUP) which is analyzed using panel data regression. This research covers Banten Province which consists of 10 districts/cities that are cross section in the 2013-2022 time period as time

series data. The expected research objective is to provide an overview for the government and the community regarding the condition of unemployment in Banten in order to minimize the number of Open Unemployment Rate (OUP) in Indonesia, especially in Banten Province.

RESEARCH METHOD

The data used in this study are secondary data in the form of the Open Unemployment Rate (OUP) of districts/cities in Banten Province along with influencing factors with the time period 2013-2022 obtained from the Central Bureau of Statistics (BPS) of Banten Province. The data used in this study is panel data consisting of a combination of cross section data of 8 districts / cities and time series data from 2013-2022. The variables used in this study consist of the dependent variable, namely the Open Unemployment Rate (OUP) expressed in units of percent and three independent variables, namely the Average Years of Schooling (RLS) expressed in units of years, the Regional Minimum Wage (UMR) expressed in units of rupiah, and the Growth Rate of Gross Regional Domestic Product (GR GRDP) expressed in units of percent.

The stages of analysis carried out in this study are describing data and exploring data on the Open Unemployment Rate (OUP) in Banten Province in 2013-2022. Furthermore, estimating with the common effect model, fixed effect model, and random effect model approaches, then determining the best model with the Chow test and Hausman test. Furthermore, the F test and t test were conducted to identify significant variables, as well as to obtain the coefficient of determination. After that, conduct assumption tests in the form of normality tests, autocorrelation tests, heteroscedasticity tests, and multicollinearity tests. The last step is to interpret the model obtained.

Regression Data Panel

Panel data is a combination of time series and cross-sectional data observations. Time series data is data on one or more variables that will be observed in one observation unit within a certain period of time. Meanwhile, cross-section data is data observed from several observation units at one point in time. Thus, panel data is data consisting of several observation units observed in several time periods Gujarati (2009). The general panel data regression equation is as follows:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + u_{it} \; ; \; i = 1,2,\ldots,N; \quad t = 1,2,\ldots,T \tag{1}$$

where:

Y_{it} = dependent variable for the i-th individual and the t-th time.

p-ISSN 2089-8878; e-ISSN 2715-8276

α = intercept coefficient.

β_k = regression coefficient of the k-th variable.

$X_{k,it}$ = the k-th independent variable on the i-th individual and the t-th time.

u_{it} = leftover component.

k = many explanatory variables.

Based on the parameter estimation method, there are three approaches used in estimating panel data regression models, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) Gujarati (2009). The CEM model is referred to as the simplest model in regression models with panel data. The CEM model does not pay attention to the specific influence of individuals (μ_i) and time (λ_t) in the model so that it assumes constant regression coefficients (intercept and slope) between individuals and time. The model equation used follows the form of a linear regression with the leftover component u_it which only comes from the estimation bias component (ε_it). The CEM equation can be written as follows:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (2)$$

The FEM model is based on the assumption that intercepts between individuals are different but regression coefficients are constant for all individuals. The form of the parameter estimation equation in FEM is as follows:

1. FEM of one-way lumped components

$$Y_{it} = \alpha + \mu_i + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (3)$$

$$Y_{it} = \alpha + \lambda_t + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (4)$$

2. FEM of two-way lumped components

$$Y_{it} = \alpha + \mu_i + \lambda_t + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (5)$$

The REM model incorporates the lagged component of both individual and time-specific effects into the lagged. This model assumes that there is no correlation between individual-specific effects (μ_i) and time-specific effects (λ_t) with independent variables. REM parameter estimation uses Generalized Least Square (GLS) Baltagi (2005). The REM equation can be written as follows:

1. REM components of one-way residuals

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \mu_i + \varepsilon_{it} \quad (6)$$

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \lambda_t + \varepsilon_{it} \quad (7)$$

2. REM component of two-way error

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \lambda_t + \mu_i + \varepsilon_{it} \quad (8)$$

Among the three approaches of common effect model, fixed effect model, and random effect model, one will be selected as the best model that is most suitable in estimating panel data regression

parameters. The best model selection is done using the Chow test and Hausman test. The Chow test is conducted to choose whether the common effect model or fixed effect model is the most appropriate Baltagi (2005). The hypothesis used in the Chow test is as follows:

H_0 : common effect model is better than fixed effect model

H_1 : fixed effect model is better than common effect model

With the test criteria, namely H_0 rejected if $F\_hitung > F\_\alpha:(N-1,NT-N-K)$ or $p-value < \alpha$, where F_hitung can be calculated by the formula:

$$F_{hitung} = (SSE_1 - SSE_2) / (N - 1) \div (SSE_2 / (NT - N - K)) \quad (9)$$

With SSE_1 is the sum square error of CEM, SSE_2 is the sum square error of REM, N is the number of cross section units, T is the number of time series units, and K is the number of independent variables. When the Chow test selected the fixed effect model, then proceed with the Hausman test Helvira and Rizki (2020) where the test aims to select the most appropriate model used between the random effect model and the fixed effect model. The hypothesis used in the Hausman test is:

H_0 : The random effect model is better than the fixed effect model.

H_1 : The fixed effect model is better than the random effect model.

With the test criteria, namely H_0 rejected if $W > \chi^2\_\alpha,K$ or $p-value < \alpha$, where W can be calculated by the formula:

$$W = (b - \hat{\beta})^2 [var(b) - var(\hat{\beta})]^{-1} \quad (10)$$

With b is the vector of FEM parameter estimates and $\beta\hat{}$ is the REM parameter estimation vector.

Assumption Test

The assumption tests carried out in this study are normality test, autocorrelation test, heteroscedasticity test, and multicollinearity test. The normality test is carried out to test whether in the regression model, confounding variables or residues are normally distributed or not Ghozali (2018). The following hypothesis is used:

H0 : Normally distributed remainder

H1 : The remainder is not normally distributed

p-ISSN 2089-8878; e-ISSN 2715-8276

with the test criteria, namely $H0$ rejected if the Jarque-Bera value > $X2$ or $p - value < \alpha$. where JB can be calculated by the formula:

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \quad (11)$$

where n is the number of data, S is the skewness coefficient, and K is the kurtosis coefficient.

The Autocorrelation test aims to test whether in a linear regression model there is a correlation between confounding errors in period t and confounding errors in period t-1 (previous). The regression model is said to be good if there is no autocorrelation. Autocorrelation detection can be done by calculating Durbin- Watson statistics (DW Test) (Ghazali, 2006). The hypothesis used is as follows:

H0 :mutually independent (no autocorrelation)

H1 : the residuals are not independent of each other (there is autocorrelation)

Table 1. Possible Autocorrelation Regions

Null hypothesis ($\mathbf{H_0}$)	Decision	If
No positive autocorrelation	Reject	$0 < d < d_L$
No positive autocorrelation	No decision	$d_L < d < d_u$
No negative correlation	Reject	$4 - d_L < d < 4$
No negative correlation	No decision	$4 - d_u < d < 4 - d_L$
No autocorrelation, positive or negative	Not rejected	$d_u < d < 4 - d_u$

with d is the Durbin-Watson (DW) value, du is Durbin-Watson upper (upper limit of DW), and dL is Durbin-Watson lower (DW lower limit).

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residuals of one observation to another Ghozali (2006). One method of detecting the presence of heteroscedasticity is the Glejser test. The Glejser test is performed by creating a regression equation of the absolute value of the residuals with the independent variables. If there is at least one independent variable that significantly affects the absolute value of the residuals at a certain level, the model obtained is said to experience inhomogeneity in the variance of the residuals.

The multicollinearity test aims to test whether the regression model found a correlation between independent variables. A good regression model in which there is no correlation between independent variables Ghozali (2018). There is mulkolinearity if the correlation coefficient value is more than 0.85 Sukirno and Sadono (2008).

Parameter Significance Test

Hypothesis testing aims to test the truth of a hypothesis statement statistically so that a conclusion is obtained. Based on statistical procedures, hypothesis testing is carried out after model estimation Wahyudi (2020). Hypotheses are used to test the estimated values of parameters. Testing is done simultaneously and partially.

Simultaneous hypothesis testing is carried out to determine the effect of all independent variables together on the dependent variable Misbahuddin and Hasan (2013). Meanwhile, partial hypothesis testing is carried out to determine the effect of each independent variable on the dependent variable Gujarati (2009).

Coefficient of Determination

The coefficient of determination aims to show the ability of the independent variable to explain the behavior of the dependent variable. 2The greater the R value of a model, the higher the ability of the independent variable to explain the dependent variable. The equation for calculating the coefficient of determination is:

$$R^2 = \frac{SSR}{SST} = \frac{\sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2} \quad (12)$$

RESULTS AND DISCUSSION

This section contains descriptive statistical analysis of dependent variables and independent variables, estimation model approaches (CEM, FEM, REM), selection of the best estimation model using the Chow test and Hausman test, simultaneous and partial model feasibility tests, as well as testing the assumptions of the residuals, calculating the coefficient of determination of the model obtained.

Descriptive Statistics and Data Exploration

The character of the variables used in this study can be known using descriptive statistics, which include the average, minimum value, and maximum value. Descriptive statistics of the dependent variable and the independent variable can be seen in Table 2.

Table 2. Descriptive Statistics Of Dependent Variables And Independent Variables

Variables	Average	Minimum Value	Maximum Value
Y	9,217222	4,560000	14,80000
X_1	8,650139	5,810000	11,84000
X_2	3.058.542	1.182.000	4.340.254

p-ISSN 2089-8878; e-ISSN 2715-8276

X3	62,81181	36,76000	71,40000
X4	6,002500	3,420000	8,810000

Open Unemployment Rate (Y)

The percentage of open unemployment rate in the regencies/cities in Banten Province shows that the average value of OUP is 9.217222 or 9.22%. While the highest (maximum) OUP value was 14.8 or 14.8% of the total population, this value occurred in Serang Regency in 2015 and the lowest (minimum) OUP value was 4.56 or 4.56% of the total population, this value occurred in South Tangerang City in 2013.

Average Years of Schooling (X_1)

The average length of schooling in the regencies/cities in Banten Province shows that the average value of RLS is 8.650139 or 8.65 years. While the highest (maximum) RLS value is 11.84 years, this value occurs in South Tangerang City in 2022 and the lowest (minimum) RLS value is 5.81 years, this value occurs in Lebak Regency in 2013.

District/City Minimum Wage (X_2)

The amount of district / city minimum wages in Banten Province shows that the average value of MSEs is 3,058,542. While the highest (maximum) MSE value is 4,340,254, this value occurs in Cilegon City in 2022 and the lowest (minimum) MSE value is 1,182,000, this value occurs in Pandeglang Regency in 2013.

Labor Force Participation Rate (X3)

The percentage of the labor force participation rate of districts/cities in Banten Province shows that the average value of OUP is 62.81181 or 62.81%. While the highest (maximum) OUP value was 71.4 or 71.4% of the total population, this value occurred in Lebak Regency in 2014 and the lowest (minimum) OUP value was 36.76 or 36.76% of the total population, this value occurred in Cilegon City in 2014.

GRDP Growth Rate (X4)

The percentage of district / city GRDP growth rate in Banten Province shows that the average value of GRDP growth rate is 6.002500 or 6%. While the highest (maximum) GRDP growth rate value is 8.81 or 8.81%, this value occurs in South Tangerang City in 2021 and the lowest (minimum) GRDP growth rate value is 3.42 or 3.42% of the population, this value occurs in Pandeglang Regency in 2022. Data exploration was carried out to see the movement of OUP every year in the districts/cities in Banten Province. The form of data exploration in the research results is in the form of a development graph every year. The following is the result of the OUP development graph for districts/cities in Banten Province from 2013 to 2022 presented in Figure 1.

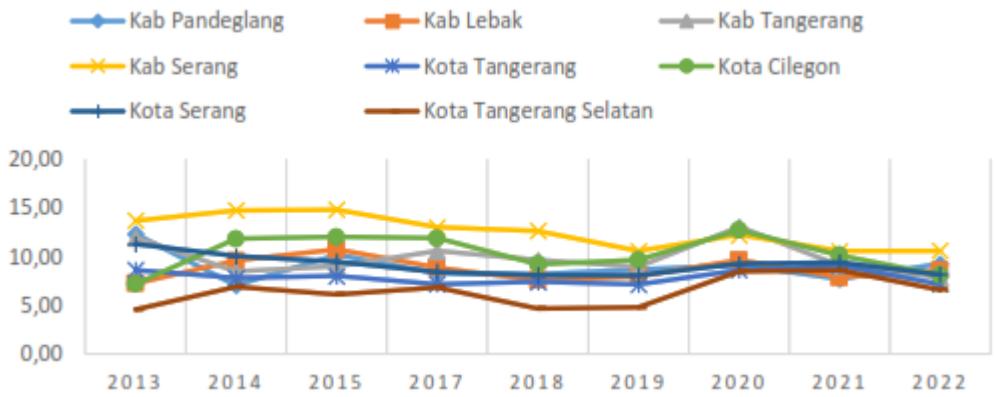

Figure 1. OUP Development In Banten Province 2013-2022

Data exploration was carried out to see an overview of the data on the OUP value of districts/cities in Banten Province. Based on the figure, it can be seen that the development of OUP in regencies/municipalities in Central Java from 2013 to 2022 generally fluctuates. It can be seen Serang Regency has the highest open unemployment rate in Banten Province from the beginning of 2013 to 2022. Similarly, South Tangerang City has the lowest. The difference between cities and regencies is not significant because Kabupaten Lebak is still in the middle of all regencies/cities in Central Java.

Panel Data Regression Analysis Results

Parameter estimation of panel data regression models is carried out through three model approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM).

Table 3. CEM, FEM, AND Brake Estimation

Variables	Common Effect Model		Fixed Effect Model		Random Effect Model	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
C	24,78287	0,0000	23,31729	0,0000	23,45015	0,0000
X_1	-0,715854	0,0000	-1,151018	0,0000	-0,850870	0,0000
X_2	$8{,}36 \times 10^{-7}$	0,0062	$3{,}20 \times 10^{-6}$	0,0000	$1{,}81 \times 10^{-6}$	0,0000
X_3	-0,163554	0,0041	-0,173642	0,0001	-0,156224	0,0002
X_4	-0,275953	0,2311	-0,506177	0,0006	-0,430245	0,0300

The estimates in Table 3 show that the p-values of the three model approaches are different, indicating that each model has a different significance value. The best model selection can use the Chow test and Hausman test. The Chow test is conducted to choose whether the Common Effect
Model or Fixed Effect Model is the most appropriate. The hypothesis testing is:

$H0$: the common effect model is better than the fixed effect model.

$H1$:The fixed effect model is better than the common effect model.

p-ISSN 2089-8878; e-ISSN 2715-8276

The probability value or p-value obtained from the Chow test is 0.0000 where the value is less than 0.0000, which means that the fixed effect model is better than the common effect model. α = 0,05 which means H0 is rejected, meaning that the fixed effect model is better than the common effect model. Because the fixed effect model was chosen as the most appropriate model to use, the next test was carried out to select the model between the fixed effect model or the random effect model as the most appropriate model to use by conducting the Hausman test. The hypothesis testing is:

$H0$:The random effect model is better than the fixed effect model.

$H1$: The fixed effect model is better than the random effect model.

Based on the results of the Hausman test, a p-value of 0.0000 is obtained where the value is less than α = 0,05. So it can be concluded that $H0$ rejected, meaning that the right model to use is the fixed effect model.

The selected model will be tested for parameter significance, namely by simultaneous test and partial test. Based on the simultaneous test or F-test, the Prob (F-statistic) or p-value of 0.0000 is obtained, where the value is less than α = 0,05Therefore, it can be interpreted that all independent variables, namely RLS, UMR, TPAK, and GR GRDP together have a significant effect on the dependent variable, namely the Open Unemployment Rate (OUP). Furthermore, it will be continued with a partial test or t test to see the effect of each independent variable on the dependent variable. The p-values shown in table 1 in order are RLS of 0.0000, UMR of 0.0000, TPAK of 0.0001, and GR GRDP of 0.0006. All of the p-values of each independent variable are less than α = 0,05 then it can be that RLS, UMR, TPAK, and GR GRDP have a significant effect on OUP.

After that, the goodness of fit test is checked to show how well the selected model is able to produce an appropriate estimation using R2 (R square). The R 2 value obtained from the fixed effect model is 0.826071, meaning that the dependent variables (RLS, UMR TPAK and GRDP growth rate) can explain the percentage of open unemployment rate by 82.61 percent, while the other 17.39 percent is explained by other variables outside the four independent variables in the study.

Next, assumption testing is carried out in the form of normality test, autocorrelation test, heteroscedasticity test, and multicollinearity test. The normality assumption test is carried out with the Jarque-Bera Test. The hypothesis used is:

$H0$: Normally distributed remainder

$H1$: The remainder is not normally distributed

The probability value or p-value obtained from the normality test is 0.307593 where the value is greater than the value of 0.0766 > 0.05. α = 0,05 or 0.0766 > 0.05, so that $H0$ accepted, which means that the residuals are normally distributed. Then the autocorrelation test is carried out.

Hypothesis testing and its critical areas are:

$H0$: sisaan saling bebas (tidak ada autokorelasi)

$H1$: sisaan tidak saling bebas (ada autokorelasi)

1) If $0 < d < dL$ or $4 - dL < d < 4$, then $H0$ rejected if $0 < d <$ 1,5029 or 2,4971 $< d < 4$
2) If $du < d < 4 - du$, then $H0$ fails to be rejected if 1,7366 $< d <$ 2,2634
3) If $dL < d < du$ or $4 - du < d < 4 - dL$, which means if 1,5029 $< d <$ 1,7366 or 2,2634 $< d <$ 2,4971 then there is no conclusion.

The Durbin-Watson value obtained from the autocorrelation test is 1.692456 where the value is in the range of dL < d < du (1,5029 < d < 1,7366) then there is no conclusion. In panel data regression analysis, the autocorrelation test does not affect the model because the autocorrelation test only affects linear regression and time series. Next proceed with the Heteroscedasticity test. Heteroscedasticity test is one of the requirements that must be met in panel data regression. In this study using absolute residuals to find the p-value of the dependent variable. The hypothesis testing is:

$H_0: \sigma_1^2 = \sigma_2^2$ (residual variance is homoscedasticity)

$H_1: \sigma_1^2 \neq \sigma_2^2$ (residual variance is heteroscedasticity)

Table 4. Heteroscedasticity Test Results

Variables	p-value
C	0,7217
$X1$	0,9428
$X2$	0,1079
$X3$	0,7605
$X4$	0,5086

independent variable $X1$, $X2$, $dan\ X3$ has a p-value > α = 0,05 then $H0$ fails to be rejected so that it can be interpreted that the residual variance is not heteroscedasticity. Finally, amulticollinearity test was conducted where the results obtained are shown in Table 5. Data is said to be free from multicollinearity problems if the correlation value is <0.85.

p-ISSN 2089-8878; e-ISSN 2715-8276

Table 5. Multicollinearity Test Results

	X_1	X_2	X_3	X_4
X_1	1,000000	0,521586	-0,166463	0,519865
X_2	0,521586	1,000000	0,095177	0,322214
X_3	-0,166463	0,095177	1,000000	-0,131187
X_4	0,519865	0,322214	-0,131187	1,000000

Based on Table 4, the correlation value between independent variables is less than 0.85, so it means that there is no multicollinearity problem.

Model Interpretation and Discussion

Based on the stages of analysis that have been carried out, the estimation of the selected panel data regression model is a fixed effect model for districts/cities in Banten Province, one of the models in 2022 (t=10) with the following equation:

$$\hat{Y}_{i10} = -1{,}640822 - 1{,}151018X_{1,8t} + 3{,}20 \times 10^{-6}X_{2,8t} - 0{,}173642X_{3,8t} - 0{,}506177X_{4,8t} \quad (13)$$

Where Y is the open unemployment rate, $X1$ is the average years of schooling, $X2$ is the district/city minimum wage, $X3$ is the labor force participation rate, and $X4$ is the GRDP growth rate. Equation 13 shows that the average years of schooling ($X1$) has a negative and significant effect on the open unemployment rate. This is indicated by the coefficient value of the Open Unemployment Rate (OUP) which is -1.151018 and the probability value is 0.0000 where the value is less than the minimum wage. α = 0,05, so it can be interpreted that every 1 year increase in the average years of schooling ($X1$) can reduce the percentage of Open Unemployment Rate (OUP) by 1.151018 percent. Vice versa, every 1 year decrease in the average years of schooling ($X1$) will increase the percentage of Open Unemployment Rate (OUP) by 1.151018 percent. The results of the test in this study are in line with research conducted by Misbahuddin and Hasan (2013) with the conclusion that the average length of schooling has a positive and significant effect on the Open Unemployment Rate (OUP) in Indonesia. The length of time looking for work for the labor force with a high education is longer than for those with a low education. This is due to the educated labor force being more selective in choosing a job; the expected wage level is higher than the labor force with a lower level of education. Employment in the formal sector is also the preference of the educated labor force because the wage level and job prospects are considered more promising. District/city minimum wage ($X2$) has a positive and significant effect on the open unemployment rate. This is indicated by the coefficient value of the Open Unemployment Rate (OUP) which is 0.0000032 and the probability value is 0.0000 where the value is less than

0.0000032. α = 0,05, so it can be interpreted that every Rp.1 increase in the district/city minimum wage ($X2$) can increase the percentage of Open Unemployment Rate (OUP) by 0.0000032 percent. Vice versa, every 1 year decrease in the district/city minimum wage ($X2$) will decrease the percentage of Open Unemployment Rate (OUP) by 0.0000032 percent. The results of the test in this study are in line with the research conducted by Helvira and Rizki (2020) with the conclusion that the minimum wage partially has a positive and significant effect on the Open Unemployment Rate (OUP) in West Kalimantan Province. This happens because the high level of wages does not always have a positive impact on labor demand because not all companies are able to pay according to certain wage levels. This theory explains that wages are inflexible; the minimum wage is always above the market equilibrium level. When the minimum wage set by the government increases, the labor supply will also increase. However, when the real wage rate is above the market equilibrium rate, firms will no longer absorb labor and this will lead to an increase in unemployment.

Labor force participation rate ($X3$) has a negative and significant effect on the open unemployment rate. This is indicated by the coefficient value of the Open Unemployment Rate (OUP) which is equal to −0,173642 and the probability value is 0.0001, which is less than the value of α = 0,05, so it can be interpreted that every 1 percent increase in the labor force participation rate ($X3$), it can increase the percentage of Open Unemployment Rate (OUP) by 0,173642 percent. Vice versa, every 1 percent decrease in the labor force participation rate ($X3$) will decrease the percentage of Open Unemployment Rate (OUP) by 0,173642 percent. The results of the test in this study are in line with the research conducted by Badria (2022) with the conclusion that the labor force participation rate has a negative and significant effect on open unemployment in Indonesia. The relationship between labor force and OUP can be explained by the theory of discouraged worker effect and additional worker effect. The labor force from the age group of 25-60 years has a demand to be more productive because of the dependents to support their families. However, when the age of the labor force group reaches more than 60 years, they no longer have the same demands due to their age. Therefore, the labor force participation rate of the 25-60 age group is higher and relatively stable compared to the older age group. According to the second theory, one family member no longer working will encourage other family members of productive age to join the labor market. Workers who bear the burden of providing for their families will tend to work harder in order to earn enough income to support their families. That is what attracts companies to hire these workers, and that is how the unemployment rate can be reduced.

The growth rate of GRDP ($X4$) has a negative and significant effect on the open unemployment rate. This is indicated by the coefficient value of the Open Unemployment Rate (OUP) which is equal

p-ISSN 2089-8878; e-ISSN 2715-8276

to −0,506177 and the probability value is 0.0006 where the value is less than α = 0,05. Therefore, it can be interpreted that every 1 percent increase in GRDP growth rate ($X4$), it can increase the percentage of Open Unemployment Rate (OUP) by 0,506177 percent. Vice versa, every 1 percent decrease in the GRDP growth rate ($X4$) will decrease the percentage of Open Unemployment Rate (OUP) by 0,506177 percent. The results of the test in this study are in line with the research conducted by Setiawan and Yulianti (2019) with the conclusion that GRDP has a significant negative effect on the unemployment rate in East Java province. In accordance with the classical growth theory, there is a relationship between economic growth and unemployment, the mechanism is that the performance of the population is minimal and an area has abundant natural resource potential, the return on investment is high so that the profit received by entrepreneurs also increases and triggers the growth of new investment which creates economic growth, but when population growth is high, economic activity will decrease because population productivity is high, economic activity will decrease because population productivity also decreases so that it will trigger a decrease in per capita income so that the unemployment rate will increase Sukirno and Sadono (2008).

CONCLUSIONS AND SUGGESTIONS

Based on the results of the data analysis that has been carried out, namely the influence of the average length of schooling, district/city minimum wage, labor force participation rate, and GRDP growth rate, it can be concluded that the model selected after conducting the Chow test and Hausman test is a fixed effect model. The variables of average years of schooling ($X1$), labor force participation rate ($X3$), and the rate of GRDP growth ($X4$) have a negative and significant influence on the Open Unemployment Rate (OOP) in Banten Province while the district/city minimum wage ($X2$) has a positive and significant influence on the open unemployment rate in Banten Province.

Therefore, it is hoped that especially the government in Banten Province can follow up on the problem of unemployment by considering the factors that influence it, such as increasing the average length of schooling, labor force participation rate, and GRDP growth rate. Future researchers can use other variables that are thought to have an influence on the percentage of the Open Unemployment Rate (OUP) such as inflation, population density, and other variables.

REFERENCES

Badria, F. A. (2022). Pengaruh Pertumbuhan Ekonomi, Tingkat Partisipan Angkatan Kerja, dan Upah Minimum Provinsi terhadap Pengangguran di Indonesia Tahun 2011-2020. Ekonomi Dan Bisnis: Percikan Pemikiran Mahasiswa Ekonomi Syariah IAIN Ponorogo, 2, 58.

Baltagi B. 2005. Econometric Analysis of Data Panel. Ed ke-3. England: John Wiley and Sons. BPS. 2022. Laporan Perekonomian Indonesia 2022. BPS, Jakarta.

Ghozali, Imam. 2006. Aplikasi Analisis Multivariate dengan Program IBM SPSS. Badan Penerbit Universitas Diponegoro: Semarang.

Ghozali, Imam. 2018. Aplikasi Analisis Multivariate dengan Program IBM SPSS 25. Badan Penerbit Universitas Diponegoro: Semarang.

Gujarati, D.N. 2009. Basic Econometrics. Tata McGraw-Hill Education, New Delhi.

Helvira, R., & Rizki, E. P. (2020). Pengaruh investasi, upah minimum dan IPM terhadap tingkat pengangguran terbuka di Provinsi Kalimantan Barat. JIsEB, 1(1), 53-62.

Misbahuddin dan Hasan, I. (2013). Analisis Data Penelitian dengan Statistik. Edisi Ke-2. Bumi Aksara, Jakarta.

Prayogo, S. A. (2020). Analisis faktor–faktor yang memengaruhi tingkat penganguran terbuka kabupaten/kota di provinsi jawa timur tahun 2014-2018. Jurnal Ilmiah Mahasiswa FEB, 8(2).

Setiawan, J., Saleh, M., & Yuliati, L. (2019). Analisis Faktor-Faktor yang Mempengaruhi Tingkat

Pengangguran di Provinsi Jawa Timur Tahun 2009-2015. Jurnal Ekuilibrium, 1(1), 31-37. Sukirno, Sadono. 2008. Makro Ekonomi Teori Pengantar. Jakarta : PT. Raja Grafindo Persada.

Wahyudi, S. T. 2020. Konsep dan Penerapan Ekonometrika Menggunakan E-views, Edisi Kedua. Depok: Rajawali Pers.