JURNAL CAHAYA MANDALIKA

P-ISSN: 2828-495X
E-ISSN: 2721-4796

HIGHER EDUCATION GRADUATES' UNEMPLOYMENT AND ITS DETERMINANTS

Angela Shinta Puspitasari
Department Economics, Faculty of Economics and Business, Universitas Indonesia, Kampus UI Depok 16424, Jawa Barat, Indonesia
Email: angelashintapuspitasari@gmail.com

Kata kunci:
Pengangguran Lulusan Perguruan Tinggi, Inflasi, Keterbukaan Perdagangan, PDB Per Kapita, Investasi Asing.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui determinan pengangguran lulusan perguruan tinggi di Indonesia dengan menggunakan faktor ekonomi makro seperti inflasi, keterbukaan perdagangan, PDB per kapita, dan investasi asing. Penelitian ini menggunakan data panel dari 33 provinsi di Indonesia antara tahun 2010 hingga 2020. Model fixed-effect digunakan untuk mengestimasi pengaruh variabel independen terhadap pengangguran lulusan perguruan tinggi. Hasil penelitian ini menunjukkan bahwa terdapat hubungan yang signifikan antara pengangguran lulusan perguruan tinggi dengan keterbukaan perdagangan, PDB per kapita, dan investasi asing langsung.

Keywords:
Graduate Unemployment, Inflation, Trade Openness, GDP Per Capita, Foreign Direct Investment

ABSTRACT

This study aims to capture the determinants of graduate unemployment in Indonesia by including macroeconomic factors such as inflation, trade openness, GDP per capita, and foreign direct investment. We utilize panel data used from 33 provinces in Indonesia between 2010 to 2020. The fixed effect model is employed to estimate the effect of these independent variables on graduate unemployment. The result shows a significant relationship between graduate unemployment and trade openness, GDP per capita, and foreign direct investment.

INTRODUCTION

The demographic bonus or demographic dividend is a circumstance in a nation with the potential for economic growth due to a population's age structure shift, as stated by United Nations Population Funds (2015). The population's age structure would change due to improvements in life expectancy, fertility rates, and infant and child mortality rates. The change showed that there were more people in the working age (15–64) group than in the non-working age group (under 14 years and above 65 years).

In population economics, the demographic bonus may also be interpreted as an economic gain (Maryati, 2013). This gain happens because a bigger population of working-age people leads to more savings, thus stimulating investment and economic growth (Nagar & Dhawan, 2018; Bappenas, 2015, see especially section 3.3). Because of this labour surplus, this scenario is often

described as "a window of opportunity" for a country to accelerate its economy by expanding the manufacturing industry, infrastructure, and Small and Medium Enterprises (SMEs). Many nations got wealthier because they were able to capitalize on this window of opportunity to boost per capita income and thus achieve economic growth, as happened in China, where economic growth before the demographic bonus was around 6%, increased to 9.2 %, South Korea from 7.3% to 13.2%, Singapore from 8.2 % to 13.6%, and Thailand from 6.6% to 15.5% (Maryati, 2013).

Even though there could be benefits to demographic bonus, there are still threat if the government does not adopt the appropriate policies (Nayab, 2017; Peng, 2013). They are unemployment and the unbearable strain on health, education, and retirement. For example, in India, excess supply is raised in the labour market because it has failed to generate new labour market opportunities (Sinha, 2013) and made the unemployment gap bigger (Islam, 2016).

As projected by United Nations Population Fund, Indonesia would probably reach a peak in demographic bonus around 2025 when 2.2 people of working age support each dependent, such as children and the elderly (Hayes & Setyonaluri, 2015). Following this line of reasoning, Professor Adioetomo (2005: 25-26, 2011, see figure 1) proposes that the "window of opportunity" is thus between the years 2020 and 2030. Based on this projection, Indonesia is likely to be exposed to one of the threat associated with the demographic bonus, namely unemployment.

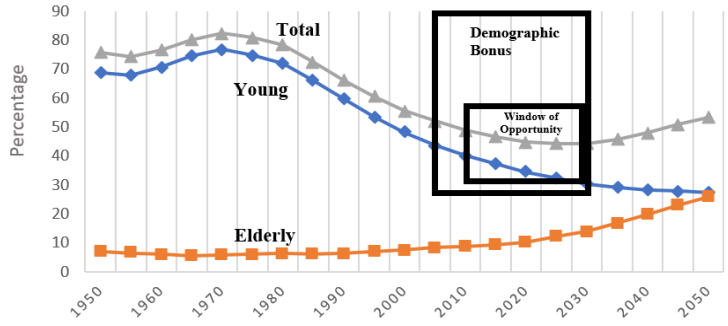

Figure 1. Demographic Bonus and Windows of Opportunity in Indonesia (1950-2050)
Source: Adioetomo, Sri Martiningsih (2011)

One significant threat Indonesia experiences is the unemployment of higher education graduates. Higher education graduates are those who graduated from the tertiary education level such as university or diploma. In order to simplify, graduated unemployment is used to refer to the term "unemployment among higher education graduates". Although the rate of graduate unemployment is stable every year, the growth of graduate unemployment from 2012 to 2019 is quite big, 49,45% (see figure 2).

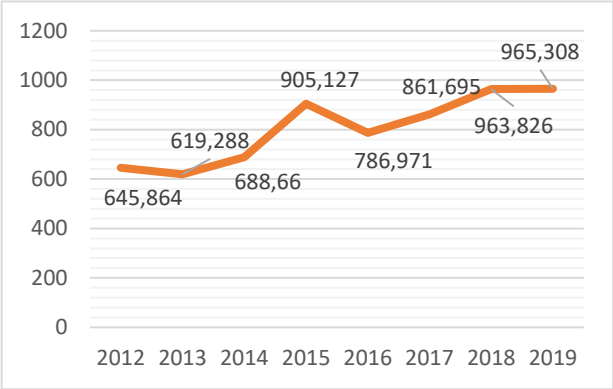

Figure 2. Graduated Unemployment in Indonesia (in Thousand)
Source: Processed by Author

On the other hand, between 2012-2019, Indonesia experiences the economic growth (measured by gross domestic product) as much as 5,26%. This circumstance is contradicted with the prevalent theory. Okun (1983) investigated the growth in output will directly cut the unemployment rate. As output, measured using the gross domestic product (Farsio & Quade, 2003; Bartolucci, 2018), increases, the amount of graduate unemployment should probably decline.

Moreover, even though in Figure 3, some years present a negative relationship between unemployment and inflation, in 2015-2017, the inflation rate in Indonesia shows a positive relationship with graduate unemployment. This positive relationship also opposed the Phillips Curve Theory. The short-run Phillips curve illustrates how changes in aggregate demand (output) cause a trade-off between inflation and unemployment.

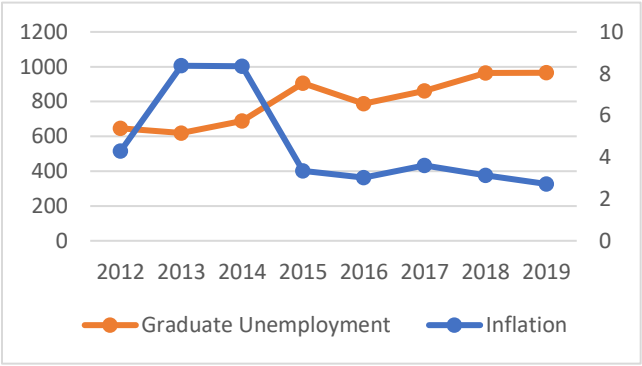

Figure 3. Graduate Unemployment and Inflation in Indonesia 2012-2017
Source: Processed by Author

An Overview of Previous Studies on Graduate Unemployment in Indonesia

Although extensive literature on unemployment in Indonesia has existed since the National Labor Force Survey (SAKERNAS) had released in 1976, the examination has been limited to the causes, rates, and characteristics of graduate unemployment and the associated implications in the

broader labour market issues. However, since 2017, two leading researchers have published studies of unemployment among higher education graduates, and these studies' results raise concerns that this may be an issue that deserves special attention. Pratomo (2017), on his study uses data from the 2016 National Labor Force Survey to examine how higher education graduates become unemployed. The result shows that labour demand and supply factors such as industrial and service sector labour absorption, minimum wage rates, and individual characteristics like age, marital status, and family economic background could affect educated unemployment in Indonesia. Uses binary logistic regression analysis to determine the factors that influenced the unemployment of tertiary education in 2018 (Astriani & Nooraeni, 2020). Based on this study, age, marital status, and KRT status significantly and negatively impact the unemployment rate among college graduates. Meanwhile, gender and the work sector substantially and positively affect college graduates' unemployment.

Why Prior Research Are Irrelevant to Interpret Current Graduate Unemployment in Indonesia?

There are various reasons why the published research on graduate unemployment tends to be more severe than the situation has already been justified. First, some researchers use a comprehensive definition of 'graduates' and include the secondary education level, such as senior high school and vocational schools. A non-specific definition of graduate could not represent the real situation of higher education graduates. Second, some research findings on graduate unemployment may overestimate the unemployment rate since they only used one data point to compare, such as the National Labor Force Survey 2016 and 2018 as the observed year, which has a very low graduate unemployment rate. Third, the previous research has looked at the graduate unemployment rate only through microeconomic rather than macroeconomic indicators. Having knowledge of both of these things would be beneficial to policy maker. Fourth, some researchers also find the determinant only in particular region in Indonesia such as Java Island (Anjarwati & Juliprijanto, 2021), (Kinasih & Nihayah, 2022) East Java (Aulia, 2017) ; Hidayatullah, 2018), Central Java (Prasaja, 2013), Padang (Rahmani et. al., 2019), South Sulawesi (Cahyani, 2014; Nur et. al., 2016), Jambi (Fitri & Junaidi, 2016), and Bengkulu (Aryati et. al., 2014).

Due the above reasoning, this study aims to capture the determinants of graduate unemployment in Indonesia by including macroeconomic factors such as inflation, trade openness, GDP per capita, and foreign direct investment. This study also This paper is organized into 5 sections. Following this introductory part, Section 2 provide a review of relevant theoretical and empirical literature. Section 3 discuss the data source and analytical method with model specification and estimation strategy, Section 4 provide result and discussion. Last but not lease, section 5 will provides conclusion.

METHOD

1. Theoretical Literature

There is an implicit consensus among economists that lowering the unemployment rate is necessary for reaching a high level of economic development. This consensus is supported by the framework created by Keynes (1936), Okun (1983), and Phillips (1958). Keynes theorizes that even if wages were flexible, inadequate aggregate demand would result in involuntary unemployment. Indeed, it seemed expected that wage rigidity would have a beneficial impact.

Keynes predicted that wage decreases would likely decrease aggregate demand and raise involuntary unemployment (Davidson, 1992).

Phillips (1958) discovered a persistent negative relationship between inflation and unemployment. Phillips deduced that as lower the unemployment level, the tighter the labour market, and hence the more quickly employers must increase wages to acquire scarce employees. Throughout the business cycle, Phillip's curve indicated the average relationship between unemployment and wage behaviour. It illustrated the rate of wage inflation that would follow if a specific unemployment rate maintained over an extended period of time. In order to know the effect of this gap and difference to the inflation, many researchers use annual inflation rate (Arslan & Zamar, 2014; (Herman, 2010); (Kinasih & Nihayah, 2022) but others use the consumer price index (Riba, 2003; Orji et. al, 2015 (Alisa, 2015), Pham & Sala, 2022).

On the other hand, Okun's law stated that an increase in output has a direct and negative effect on the unemployment rate. The gap version of Okun's rule demonstrates that a country's GDP will be around 2% below its potential GDP for every 1% rise in unemployment. On the other hand, the "difference version" describes the correlation between quarterly fluctuations in unemployment and quarterly fluctuations in real GDP. In order to evaluate this relationship, researchers have utilised a broad variety of output measurement. Some researchers have used real GDP as a proxy for output, whilst others have used real per capita GDP to measure real output per worker (Anyanwu, 2014); Goffman, 1968;).

2. Empirical Literature

There are several research that have been conducted to study the factors that cause unemployment from a macroeconomic factor. The existing literature has shown that unemployment caused by inflation (Onwioduokit, 2006, (Arslan & Zaman, 2014); Tenzin, 2019; (Kinasih & Nihayah, 2022), trade openness (Alcalá & Ciccone, 2004); Nanthakumar et al., 2011; Felbermayr, Prat, & Schmerer, 2011; Nwaka, Uma, & Taka, 2015; Hossain et. al., 2018; Raifu, 2017), gross domestic product per capita (Ola-David & Oluwatobi 2012; Rahman, 2013;(Abdul-Khaliq et al., 2014) (Adeyeye et al., 2017) and foreign direct investment (Morgan & Wright, 2002; Moraru, 2013; Hisarciklilar, Gultekin-Karakas, & Asici, 2014; Schmerer, 2014; Nasution, Tarigan, & Siregar, 2021).

Several studies in the literature have investigated theoretical and empirical relationships between inflation and unemployment but what we have learnt from the literature is that the argument is still ongoing. Onwioduokit (2006) investigated the relationship between unemployment and inflation in Nigeria and found that there is negative relationship between unemployment and inflation with the coefficient of -0.412, this validates the Philips hypothesis. Using OLS models find that foreign direct investment, gross domestic product rate and CPI based inflation rate has negative impact on unemployment (Arslan & Zaman, 2014). Tenzin (2019) investigate the dynamics of unemployment in Bhutan at a macro-level, this study has explored the association among economic growth, inflation and unemployment from 1998 to 2016. The autoregressive distributed lag (ARDL) model was applied to estimate the impact of economic growth and inflation on unemployment. The result shows that inflation had a negative association with unemployment rate in the short run and a positive association in the long run. In other words, an increase in the employment rate led to an increase in the inflation in the short run. However, the results of the causality test indicate no causality between unemployment and inflation in

Nigeria. Some researchers also find that there are several conflicting and contrasting results obtained by some of the studies (Kinasih & Nihayah, 2022).

Regarding developing economies, the question of the relationship between trade openness and unemployment has been explored with mixed results. In their Study of Malaysia, Nanthakumar et al. (2011) find that an increase in the trade balance had negative Granger non-causality effects on the rigidity of unemployment dynamics. This implies that trade liberalization is able to increase aggregate productivity in various sectors. Consequently, economic performance and efficiency raise the rate of labour utilization. Study of the trade balance and UNR in Jordan, using quarterly data for the 2000–2012 period, His results reveal that in the short-term, a trade balance deficit leads to unemployment and vice versa (Alawin, 2013). Kim and Sun (2009) find that indicators of trade openness significantly play a role in labour market churning in most industries affected by the North American Free Trade Agreement (NAFTA) such as the automobile, chemicals and apparel sectors. This result buttresses the argument that trade openness promotes export and ushers in restructuring by some firms, often resulting in the decline of labour use in some sectors and its increase in others. The results of the Study of India show no evidence of unemployment decrease due to trade reforms; on the other hand, urban unemployment falls with trade liberalization in states with flexible labour markets and increases the employment share in net exporter industries (Hasan et al., 2012). Felbermayr, Prat, & Schmerer (2011) found that a 10 percent increase in total trade openness reduces unemployment by about one percentage point. The study show that openness affects unemployment mainly through its effect on TFP and that labor market institutions do not appear to condition the effect of openness.

Numerous studies have linked unemployment to economic development. Abdul-Khaliq et al. (2014) utilized the Pooled EGLS to show that economic development in Arab nations has a negative and substantial influence on unemployment. Ola-David & Oluwatobi (2012) investigated in their study about the existence of an Okun-type relationship for the Nigerian economy during the period 1970 to 2009. The results showed that a long run inverse relationship exists between unemployment and output in Nigeria. The Okun coefficient was 1.75 percent indicating that a one percent decrease in unemployment rate is accompanied by a 1.75 cent increase in GDP. Discovered there is no correlation between unemployment and economic development in Nigeria using the Toda-Yamamoto Granger non-causality and Generalized Method of Moments (Adeyeye et al., 2017).

Foreign direct investment or FDI is accepted to assist developing economies create new jobs, reduce unemployment, and improve work quality (Moraru, 2013). Using Feasible Generalized Least Squares with Seemingly Unrelated Regression (FGLS-SUR), study conducted by Nasution, Tarigan, & Siregar (2021) finds that both foreign and domestic direct investments give a significant effect in reducing unemployment. Examination led demonstrates the beneficial impact of FDI in non-industrial nations, including the creation of new jobs for the unemployed in agricultural nations (Greenaway et al., 2002). According to Schmerer (2014), FDI can create new jobs to reduce the unemployment rate. However, study conducted by Hisarciklilar, Gultekin-Karakas, & Asici (2014) shows that FDI is frequently incapable of directly influencing the unemployment rate

Data and Analytical Method

a. Data Source

This study is a descriptive quantitative study using data in the form of numbers and processed using analytical methods. The results will be described using descriptive analysis, whether it follows the theory or deviates from the existing theory. This study used macro data from Indonesia as a case study to determine the determinants of unemployment among higher education graduates. The graduate unemployment rate is the only dependent variable in this study. There are four dependent variables, inflation rate, trade openness, gross domestic product per capita, and foreign direct investment. Two independent variables, gross domestic products per capita, foreign direct investment are used in natural log form.

The panel data used in this study was obtained from Biro Pusat Statistik (BPS) Statistics Indonesia which include a combination of annual time series data from 2010 to 2020 and cross-section data from 33 provinces in Indonesia. North Kalimantan was excluded due to data unavailability since it was an independent province and was separated from West Kalimantan in 2012 (Law No. 20/2012).

b. Model Specification

From the previous theoretical framework, Phillips (1958) and Okun's Law (1983), researcher commenced the modelling procedure in equation used the reduced from Ogbeide, Kawanye, and Kadiri (2016) as follows:

$$UNEMP_{it} = \emptyset_0 + \emptyset_1 INF_{it} + \emptyset_2 OPEN_{it} + \emptyset_3 \ln GDP_{it} + \emptyset_4 \ln FDI_{it} + \varepsilon_{it} \quad \text{(Equation 1)}$$

Where:

$UNEMP_{it}$ = The graduate unemployment rate in province *i* year *t* (%)

INF_{it} = The annual inflation rates in province *i* year *t* (%)

$OPEN_{it}$ = The proportion of the total amount of export and total gross domestic regional product in province *i* year *t* (%)

GDP_{it} = the amount of gross domestic regional product per capita in province *i* year *t* (Thousand Rp)

FDI_{it} = the total amount of real foreign direct investment in province *i* year *t* (Million US$)

The model variable can be explained as follows. $UNEMP_{it}$ represents the graduate unemployment rate. The graduate unemployment is measured by the number of graduated in Diploma, Bachelor, Master, and Doctoral Degree who are unemployed (BPS, 2021). To get graduate unemployment rate, the total graduate unemployment is divided by the amount of higher education graduates in labour force both those who employed and unemployed. The measurement follows previous research (Kinasih & Nihayah, 2022).

INF_{it} represents the measurement of the inflation rate. The annual inflation rate is calculated from the change in consumer price index over the whole year. For example, to get inflation in 2020, this study uses the change in consumer price index in January 2020 to December 2020. The

formulation is shown in equation 2. This measurement follows the previous study (Kinasih and Nihayah, 2022). The relationship between inflation and graduate unemployment rate is assumed to be negative meaning that if the inflation increase, the graduate unemployment would decrease. (Philips, 1958; Onwioduokit, 2006; Arslan & Zaman, 2014; Tenzin, 2019).

$$Inflation\ Rate_{2020} = \frac{CPI_{December,2020} - CPI_{January,2020}}{CPI_{January,2020}} x\ 100 \qquad \text{(Equation 2)}$$

$OPEN_{it}$ represent the measure the trade openness. This variable presents the transfer of ownership (economic) transactions of goods and services between residents of an economy and non-residents. Trade openness is measured as the sum of total export and import as a share of GDP per capita as this measure used by Hossain et. al. (2018) and Raifu (2017), Alcala and Ciccone (2004). The relationship between trade openness and graduate unemployment rate is assumed to be negative (Nanthakumar et al., 2011; (Alawin, 2013) ; Kim and Sun, 2009). The biggest share export and import in a country, the more it would create job opportunities. As a result, graduate students would have more opportunities to work.

GDP_{it} represents the measures of economy growth. The real gross domestic regional product per capita is examined in this study. According to Badan Pusat Statistik (BPS) Statistics Indonesia (2020), gross domestic regional products are domestic products plus income from production factors received from outside the region minus income from production factors paid to outside the region. This measurement is following the previous study conducted by Ogbeide, Kanwanye, & Kadiri (2016). The relationship between gross domestic product and graduate unemployment rate is also assumed to be negative (Ola-David & Oluwatobi, 2012; Abdul-Khaliq et al., 2014; Ogbeide, Kanwanye, & Kadiri, 2016).

FDI_{it} represents the measurement of the foreign direct investment (FDI). The amount used for this variable is the real foreign direct investment in Million US$. FDI refers to foreign payment instruments that are not part of Indonesia's foreign exchange wealth and with government financing are used to finance Indonesian companies, including new inventions belonging to foreigners from abroad into Indonesian territory, as long as these tools are not from Indonesia's foreign exchange wealth. This data excludes the upstream oil and gas, banking, non-bank financial institution, insurance, home industry, micro and small enterprise and projects in units. This measurement is following the previous study conducted by Ogbeide, Kanwanye, & Kadiri (2016) and Nasution, Tarigan, & Siregar (2021). The relationship between FDI and graduate unemployment rate is assumed to be negative (Greenaway, Morgan & Wright, 2002; Schmerer, 2014; Nasution, Tarigan, & Siregar, 2021)

Table 1. Variable and Data Description

Variable	Description
Graduate Unemployment Rate (%)	Provincial-level data on unemployment among higher education graduates
Inflations (%)	Provincial-level data of annual inflation rate

Trade Openness (% of GDP)	Provincial-level data of the total amount of import and export as a share of GDP
Gross Domestic Product (GDP) per capita (in Thousand Rupiah)	Provincial-level data of gross domestic regional per capita based on current prices
Foreign Direct Investment (in Million US$)	Provincial-level data of the amount of foreign direct investment

c. Estimation Strategy

This study uses panel data to determine what factors contributed to graduates' unemployment. According to Eom, Lee, & Xu (2007), a panel dataset is a cointegration between cross-sectional and time-series datasets. The panel data ideally offers repeated measurements of a certain number of variables over some period on observable units, such as individuals, households, enterprises, cities, and states. Some benefits are using panel data (Hsiao, 2003; Klevmarken, 1989). First, panel data could control individual heterogeneity. As mentioned earlier, the previous literature only uses one point of time, such as the National Labour Survey 2016 and 2018 (Astriani & Nooraeni, 2020) . This cross-section data could probably produce a biased result. With panel data, we can get more information about all individuals across the year over time. Second, panel data provide more useful data, greater variety, less collinearity across variables, greater degrees of freedom, and greater efficiency. Third, panel data is better for investigating adjustment dynamics. For instance, in this study, multiple cross-sections taken at different times can illustrate how graduate unemployment shifts over time. However, panel data can estimate what proportion of these unemployed graduates from one period will remain unemployed in another period. Fourth, panel data can discover and quantify impacts not observable in cross-section or time-series data. Fifth, because macro panel data in this study have a longer time series, the unit roots test due to the elimination of non-standard distribution does need to be examined.

The fixed effects model is widely used when we want to control for omitted variables that are constant over the period and vary across the units; that is called unobserved heterogeneity. When we estimate Equation 1 using the fixed effects model, it is assumed that the unobserved heterogeneity ($\emptyset_0$) is correlated with the explanatory variable ($OPEN_{it}$, ln GDP_{it}, and ln FDI_{it}). Another critical assumption is that the idiosyncratic error (ε_{it}) is independent of the explanatory variable ($OPEN_{it}$, ln GDP_{it}, and ln FDI_{it}) (Baltagi & Baltagi, 2021) ; Kmenta, 1997; Wooldridge, 2006). By eliminating the unobserved effect ∅_0, which implies reducing omitted variables biases, we can have more robust estimates.

The random effects model, also known as the variance components model, regards the unobserved heterogeneity ($\emptyset_0$) as random variables rather than fixed ones (Baltagi & Baltagi, 2021) ; Greene, 2003; Maddala, 2001). It shows that the random effect assumes that each variable has a different intercept. Therefore, the random effects model is appropriate when the cross-sectional units are randomly selected from a large population (Baltagi & Baltagi, 2021).

The statistical significance of the differences in the coefficients on the time-varying explanatory variables is examined for both models, Fixed Effect and Random Effect. Then, this

study does the specification developed by Hausman. The Hausman test is generally used to choose between fixed and random effects models. The Hausman test compares the fixed versus random effects under the null hypothesis that the individual effect is independent of the other explanatory variables in the model (Baltagi & Baltagi, 2021). If the null hypothesis is not rejected, it is preferred to use random effects because it produces more efficient estimators. On the other hand, if rejected, the fixed effects model is better than the random effects. However, the Hausman test is not an absolute standard for selecting the two models.

In panel data, because the cross-sectional units may be of varying size and exhibit different variations, statistical issues might occur when we estimate the model (Equation 1). Therefore, we must check whether the model has passed the heteroskedasticity test. This study examined the Laplace Likelihood Ratio Test (LR Test) to find this heteroskedasticity issue. The likelihood ratio test is very sensitive to any deviation from normality, especially when the observations are from a distribution with fat tails (van Zyl, 2011).

RESULTS AND DISCUSSION

The data used in this study were collected from 33 different provinces during the 11 years between 2010 to 2020. Table 2 presents the results of the summary statistics of the raw dataset before the log transformation. It also shows that different provinces have complete observed variables across the year. Table 2 shows a large gap between minimum and maximum value, such as foreign direct investment (FDI) with a minimum of 0.2285 and a maximum of 7124.881. Some variables have relatively high standard deviations. For instance, the standard deviation for Gross Domestic Product per capita is 29088.19, which indicates that it varies greatly across countries over the years. High disparities across data also occur in Foreign Direct Investment (FDI) as much as 1232.537. Therefore, two variable, GDP per capita and FD are transformed into log-normal to minimise the standard deviation.

Table 2 Summary Statistics of Main Regression Variables

Variables	Obs	Mean	Std. Dev.	Min.	Max.
(1)	(2)	(3)	(4)	(5)	(6)
Unemployment (%)	363	6.751	2.801	1.254	19.527
Inflation (%)	363	3.758	2.306	-0.5767	10.001
Trade Openness (% of GDP)	363	0.686	4.256	0.006	81.179
Gross Domestic Product per capita (Thousand Rp)	363	36786.400	29088.190	9316.790	173918.500
Foreign Direct Investment (Million US$)	363	806.795	1232.537	0.229	7124.881

Sources: Author's calculation, data from BPS Statistic Indonesia

Equation (1) is estimated using two models: fixed effect and random effect. The result for equation (1) estimation of these two models is shown in Table 3.

Table 3 Estimation Result Summary

Independent Variable	Fixed Effect	Random Effect
(1)	(2)	(3)
Inflation Rate (INF)	0.067	1.770***
	(0.584)	(0.054)
Trade Openness (OPEN)	–0.0116	–0.017
	(0.029)	(0.029)
Log GDP per capita (ln GDP)	–5.055***	–0.886
	(1.146)	(0.563)
Log FDI (ln FDI)	–0.347**	–0.349
	1.151	(0.127)
R^2	0.019	0.043
Number of observations	363	363

Notes: ***, **, * indicate significant levels 1%, 5%, and 10%, respectively; standard error in parentheses.

This study used the Hausman (1978) test to determine the model appropriateness between fixed and random effect models. The rejection of the null hypothesis is shown in Table 4, indicating that the fixed effect model is more appropriate than the random effect model.

Table 4 Hausman Test

	Coef.
Chi-square test value	21.43
P-value	0.0003

In order to identify the linear estimator that is free from bias, the heteroscedasticity test is examined in the model using Laplace Likelihood Ratio Test. The other tests for the classical assumption are not considered to be tested regarding the nature of panel data which gives more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency (Baltagi, 2021). The result of the heteroscedasticity test showed that the model has heterogeneity issues. An issue in heterogeneity indicates that standard error is bias and would produce an invalid coefficient test as shown in Table 3 In order to use the coefficients of fixed effect model in Table 3 robust standard errors are estimated. These standard errors can be used to test the model coefficients. Table 4 presents the coefficient and robust standard errors for fixed effect model.

Table 5 Fixed Effect Model and Robust Standard Error Estimation

Independent Variable	Coefficient	Sig
(1)	(2)	(3)
Inflation Rate (INF)	**0.067**	
	(0.064)	
Trade Openness (OPEN)	**-0.012**	**
	(0.004)	
Log GDP per Capita (ln GDP)	**-5.055**	***
	(1.202)	
Log FDI (ln FDI)	**-0.347**	*
	(0.174)	
R-squared	0.0187	

Notes: ***, **, * indicate significant levels 1%, 5%, and 10%, respectively; robust standard error in parentheses.

As seen in Table 3 there are only two significant variables in this model, namely Gross Domestic Product per capita and Foreign Direct Investment. However, after robust standard errors are examined, the significant variables in this model are added with Trade Openness.

1. The Effect of Trade Openness on Graduate Unemployment

Column 2 in Table 5 shows that there is a negative relationship between trade openness and graduate unemployment. The effect of trade openness is -0.0115733. It indicates that a one unit increase in the ratio of total amount import and export to GDP may decrease the graduate unemployment rate as much as 0.0115733. The result drawn from this study are consistent with the previous hypothesis. This study result support study conducted (Alawin, 2013). This result also supports the the finding of this study (Awad-Warrad, 2018). It is also conceivable for trade liberalisation to raise aggregate productivity in the various sectors and boost economic performance efficiency, hence expanding career prospects for both skilled and unskilled employees (Nanthakumar et al, 2011)

2. The Effect of GDP Per Capita on Graduate Unemployment

Table 5 above shows that gross domestic product (GDP) per capita negatively affects the graduate unemployment rate. This result aligns with our hypothesis that increasing in GDP per capita can reduce the graduate unemployment rate. The effect of GDP per capita on graduate unemployment is indicated by p-value from fixed effect model edtimation which is significant at -5.505, meaning that a 1% increase the GDP per capita might be followed by a reduction of around 5% in the graduate unemployment rate. This finding is also in line with the hypothesis. Previous studies obtain the same result (Abdul-Khaliq et al., 2014; Ogbeide, Kanwanye, & Kadiri, 2016). As Ola-David & Oluwatobi (2012) focused on the question of whether Okun's law are existed between the Nigerian economy during the years 1970 and 2009. The findings indicated that over that period of time, there is inverse connection between unemployment and output in Nigeria. The value of the Okun coefficient was 1.75 percent, which indicates that an increase of one cent in GDP is associated with a one percent drop in the unemployment rate.

3. The Effect of Foreign Direct Investment on Graduate Unemployment

Similar to GPD per capita, the coefficient of foreign direct investment suggests that foreign direct investment growth. In Table 5, the sign of foreign direct investment is negative, indicating a higher FDI growth may reduce the graduate unemployment rate which supports our hypothesis. The interpretation is that 1% increase in foreign direct investment growth may reduce the graduate unemployment rate by 0.3474074. The results on this model confirm the earlier hypothesis. It also supports the theory of Keynes (1936) which looked at the investment as one of the labour demands driven. The other theory which supports in this finding is Schumpeter's (1942) theory. Schumpeter emphasises the significance of business owners playing an active role in investment will reduce unemployment. Moreover, high levels of investment will stimulate a high demand for labour, resulting in the creation of additional jobs and a reduction in unemployment (Mankiw, 2020). An increase in foreign direct investment may also help boost the competitiveness of domestic businesses in international markets (Gamariel and Hove, 2019). In addition, this finding is in line with study conducted in Indonesia (Sjöholm et al., 2010) OECD countries (Schmerer, 2014), and developing countries (Greenaway et al., 2002). As Ministry of Investment or Indonesian Investment Coordinating Board has plan to give the relaxation on foreign investment policy in higher education and hospital sector this policy is expected to grow the employment opportunities that would probably help open the employment opportunities.

4. The Effect of Inflation on Graduate Unemployment

Surprisingly, the inflation rate has no effect on graduate unemployment. However, the sign is different from the previous hypothesis. This result is in line with study conducted (Kinasih & Nihayah, 2022).

CONCLUSION

This study aims to capture the determinants of graduate unemployment in Indonesia by including macroeconomic factors such as inflation, trade openness, GDP per capita, and foreign direct investment. We utilizes panel data used from 33 provinces in Indonesia between 2010 to 2020.

The main finding in this study shows that graduate unemployment is affected by trade openness, gross domestic, regional product per capita, and foreign direct investment. Trade openness has a negative and significant effect on graduate unemployment; similarly, gross domestic product per capita also has a negative and significant impact on graduate unemployment. In addition, graduate unemployment is negatively affected by foreign direct investment. However, the result shows that inflation is not significant.

In order to create employment opportunities, the government should ensure the environment for business improvement. For example, the government could probably build a centralized system for all permission related to investment, export, and imports of goods and services. Moreover, the government should make a trade agreement with other developed countries, especially for investments that require skille d labour rather than labour-intensive.

There are several limitations in this study. First, this study only utilizes investment from other countries and does not take into account domestic investment. Second, inflation is measured by calculating the consumer price index changes within a year. Using other inflation

measurements, such as the consumer price index, the average inflation rate would lead to a different result.

DAFTAR PUSTAKA

Abdul-Khaliq, S., Soufan, T., & Shihab, R. A. (2014). The relationship between unemployment and economic growth rate in Arab Country. *Journal of Economics and Sustainable Development*, *5*(9), 56–59.

Adeyeye, P. O., Odeleye, A. T., & Aluko, O. A. (2017). Investigating Okun's law in Nigeria through the dynamic model. *Journal of Economics and Behavioral Studies*, *9*(6 (J)), 39–46.

Alawin, M. (2013). Trade balance and unemployment in Jordan. *European Scientific Journal*, *9*(7).

Alcalá, F., & Ciccone, A. (2004). Trade and productivity. *The Quarterly Journal of Economics*, *119*(2), 613–646.

Alisa, M. (2015). The Relationship between inflation and unemployment: a theoretical discussion about the Philips Curve. *Journal of International Business and Economics*, *3*(2), 89–97.

Anjarwati, L., & Juliprijanto, W. (2021). Determinan Pengangguran Terdidik Lulusan Universitas di Pulau Jawa. *Jurnal Ekonomi Pembangunan*, *10*(3), 178–187.

Anyanwu, J. C. (2014). Does intra-African trade reduce youth unemployment in Africa? *African Development Review*, *26*(2), 286–309.

Arslan, M., & Zaman, R. (2014). Unemployment and its determinants: a study of Pakistan economy (1999-2010). *Journal of Economics and Sustainable Development*, *5*(13), 20–24.

Astriani, V., & Nooraeni, R. (2020). Determinan Pengangguran lulusan perguruan tinggi di Indonesia Tahun 2018. *Jurnal Pendidikan Ekonomi (JUPE)*, *8*(1).

Aulia, M. F. (2017). Determinan Pengangguran Terdidik di Jawa Timur. *Universitas Brawijaya. Malang*.

Awad-Warrad, T. (2018). Trade openness, economic growth and unemployment reduction in Arab Region. *International Journal of Economics and Financial Issues*, *8*(1), 179–183.

Baltagi, B. H., & Baltagi, B. H. (2021). Unbalanced Panel Data Models. *Econometric Analysis of Panel Data*, 229–257.

Greenaway, D., Morgan, W., & Wright, P. (2002). Trade liberalisation and growth in developing countries. *Journal of Development Economics*, *67*(1), 229–244.

Hasan, R., Mitra, D., Ranjan, P., & Ahsan, R. N. (2012). Trade liberalization and unemployment: Theory and evidence from India. *Journal of Development Economics*, *97*(2), 269–280.

Herman, E. (2010). Inflation And Unemployment In The Romanian Economy. *Annals of the University of Petrosani Economics*, *10*(2).

Kinasih, P. S., & Nihayah, D. M. (2022). Determinants of The Unemployment University Graduates in Java Island. *Efficient: Indonesian Journal of Development Economics*, *5*(1), 1505–1519.

Sjöholm, F., Lipsey, R. E., & Sun, J. (2010). *Foreign Ownership and Employment Growth in Indonesian Manufacturing*.

van Zyl, J. M. (2011). The laplace likelihood ratio test for heteroscedasticity. *International Journal of Mathematics and Mathematical Sciences*, *2011*.