

# Article

by SusetyoDidik

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**Submission date:** 19-Apr-2023 11:44AM (UTC+0700)

**Submission ID:** 2069057461

**File name:** 22\_01\_Alrahman,\_Dikko\_et\_al\_ENG-Jurnal-Employment\_-\_edited-.pdf (660.87K)

**Word count:** 5721

**Character count:** 31354

THE EFFECT OF ECONOMIC GROWTH, INFLATION AND EDUCATION ON THE  
UNEMPLOYMENT RATE IN SUMATRA ISLAND

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**ABSTRACT**

This research aimed to empirically analyze and prove the effect of economic growth, inflation, and education on the unemployment rate in Sumatra Island. We used panel data with 154 regencies/cities in Sumatra Island for ten years (2011-2020). The data processing technique used was the econometric model of multiple linear equations (multiple regression) for panel data. We found that the variables of economic growth, inflation, and education were negatively and significantly correlated to the unemployment rate in Sumatra Island. This research had some limitations as it only used three independent variables (economic growth, inflation, and education), so other factors or variables outside the model could also affect the dependent variable (unemployment rate). This research contributed as input and evaluation for interested parties in making policies (the central and local government) to produce more targeted policies to reduce the unemployment rate, especially for the local governments in Sumatra Island.

**KEYWORDS**

unemployment, economic growth, Sumatra Island, COVID-19

In addition to creating the highest growth, the main goal of economic development efforts must also eliminate and reduce poverty, income inequality, and unemployment (Todaro & Smith, 2006). The unemployment phenomenon in this country has shown that Indonesia is still facing the problem of inequality in people's welfare. This phenomenon also indicates that economic development has not yet been completed. Djohadikusumo (1994) argues that open and covert unemployment is the main problem in the economic development of developing countries. The success or failure of an effort to overcome this significant problem will affect the socio-political stability in people's lives and the continuity of long-term economic development. According to Romer (2012), unemployment is one of the main macroeconomic subjects.

On the other hand, the Coronavirus Disease 2019 (COVID-19) pandemic has brought changes to the world with various challenges that were never imagined before. COVID-19 has infected more than 1.3 million people in Indonesia since the first case was announced in March 2020. At least 35,000 people have died since then. However, efforts to inhibit the COVID-19 spread have hampered economic activities. The pandemic has affected community social welfare much (SMERU, 2021). The government is taking concrete policy steps to deal with the COVID-19 pandemic, ultimately reducing community mobility and activities. The COVID-19 pandemic will impact public health and affect Indonesia's economy, education, and social life.

The Central Bureau of Statistics (2021) noted that Indonesia's open unemployment rate in mid-2020 reached 7.07%, increasing 1.84% compared to 2019. The unemployment rate in 2020 can be said to be relatively high even though it was still below 10%. In addition, the Central Bureau of Statistics (2020) also documents 29.12 million people (14.28%) of the working-age population affected by COVID-19, consisting of unemployed people due to COVID-19 (2.56 million people), Non-Labor force due to COVID-19 (0.76 million people), temporarily not working due to COVID-19 (1.77 million people), and working residents who experienced a reduction in working hours due to COVID-19 (24.03 million people). In line with Indonesia's increasing unemployment, it turns out that Indonesia's economic growth in 2020 experienced a significant decline to the level of -2.07%. This means the economy did not grow—it experienced a recession, which at a macro level was also triggered the COVID-19 pandemic.

Table 1 - Economic Growth and Unemployment Rate in Indonesia by Island 2020

Island	Economic Growth (%)	Unemployment Rate (%)
Sumatera	-1.19	6.14
Jawa	-2.51	8.09
Bali and Nusa Tenggara	-5.01	4.69
Kalimantan	-2.27	5.52
Sulawesi	0.23	5.45
Maluku and Papua	1.44	5.50
INDONESIA	-2.07	7.07

Source: Processed from the Central Bureau of Statistics, 2021

High unemployment rates and economic recession also occur at the regional level. Table 1 shows islands with a relatively high unemployment rate, namely Java Island with 8.09%. This figure is higher than the unemployment rate for other islands and even above the unemployment rate for Indonesia (7.07%). Meanwhile, the lowest unemployment rate is in Bali and Nusa Tenggara, 4.69% in 2020. On the other hand, the economic growth indicators show that in 2020, economic growth contraction occurred in almost all islands in Indonesia. Only two islands experienced positive economic growth, namely Sulawesi Island and Maluku and Papua Island, while the other islands did not experience economic growth.

Sumatra is one of the islands experiencing a relatively high unemployment rate and economic downturn. In 2020, the unemployment rate for Sumatra Island was relatively high, reaching 6.14%, while on average, in the 2016-2020 period, the unemployment rate for Sumatra Island was 5.38%, almost close to the average unemployment rate for Indonesia (5.74%). On the other hand, in line with the unemployment condition, the economic growth performance of Sumatra Island experienced a contraction of -1.19%, as shown in Figure 1. Thus, the unemployment and economic growth indicate that Sumatra Island is experiencing a slowdown in economic growth and is still facing unemployment problems.

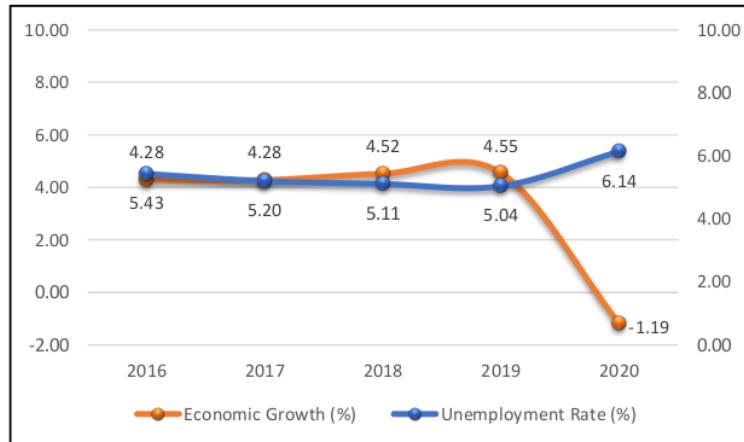


Figure 1 - Economic Growth and Unemployment Rate Sumatra Island 2016-2020  
Source: Processed from the Central Bureau of Statistics, 2021

Unemployment rates that are too high become a national concern, as this indicates that many people are unable to support themselves and do not contribute to national output simultaneously (Ehrenberg & Smith, 2012). High unemployment implies inefficient use of resources and wasted work (Castells-Quintana & Royuela, 2012). Moreover, unemployment is not only a mere economic problem but also a social and even political problem. The condition of not working (unemployment) can lead to vulnerability and crime in the community. Grönqvist (2011) and Fougère (2006) indicate that high unemployment is associated with increased crime cases in Sweden and France. Therefore, this condition will disrupt the stability of the economy.

Smit et al. (1996) argue that one of the factors that can contribute to the increase in the unemployment rate is inflation. Todaro & Smith (2006) suggest that getting a job in the modern sector is primarily determined by a person's level of education. Therefore, the level of demand for education will be very high. Several empirical studies that aim to analyze the effect of economic growth, inflation, and education on the unemployment rate have produced robust findings showing a relationship between the unemployment rate, economic growth, inflation, and education. Kizys & Pierdzioch (2009) and Ahmed & Wahid (2011) have found a negative relationship between economic growth and unemployment. Li & Liu (2012) and Thayaparan (2014) prove that the inflation rate has a negative effect on the unemployment rate. Núñez & Livanos (2010), Mirică (2014), and Qazi et al. (2017) confirm a long-term negative relationship between higher education and unemployment.

Unemployment is one of the most important macroeconomic indicators (Güçlü, 2017). The concepts of unemployment and economic growth are essential in economic and social policy formulation. Economic growth is the most crucial indicator of achieving macroeconomic targets for developed and developing countries. The concept of unemployment is a significant indicator in terms of social indicators. These variables are important because they both have the power to influence economic and social life (Soylu, 2018). That being so, the main objective of this research is to examine the effect of economic growth, inflation, and education on the unemployment rate in Sumatra Island.

### LITERATURE REVIEW

Unemployment is one of the components in the workforce, namely those who are not working, ready to work, and in an active effort to find work but have not found work for a specific time (International Labor Organization/ILO, 1982). Keynesian viewed that the labor market is not always in equilibrium. Unemployment is a phenomenon of market imbalance, a condition when there is an excess labor supply (Romer, 2012). Figure 2 shows the market in a state of disequilibrium when there is a decrease in demand from  $D_0$  to  $D_1$  the wage rate remains at  $W_0$  (above the market equilibrium wage, i.e.  $W^*$ ). At the wage rate  $W_0$ , the number of people who want to work is as much as  $L_0$ , while the market only requires as much labor as  $L_1$ . There is an excess supply of labor, and then unemployment appears equal to the distance of  $L_0 - L_1$ . The interaction of labor supply and demand cannot achieve a balance.

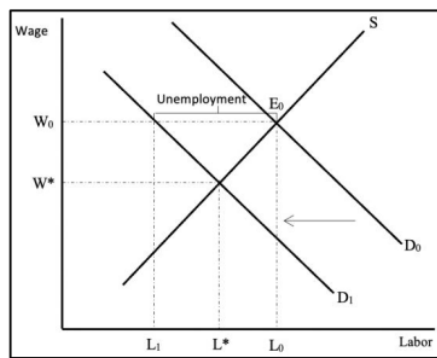


Figure 2: Wage Rigidity and Labor Market Imbalance  
Source: Case et al., 2012

The cause of the imbalance is wages determined by intervention from outside the market. This kind of wage is called wage rigidity. Intervention outside the market usually causes the wage level above the market equilibrium wage. There are four forms of wage intervention: employment contracts, minimum wage regulations, labor unions, and efficiency wage theory. Employment contracts and minimum wage regulations result in fixed wages at levels that have been agreed upon and set by the government. A labor union is a union formed by workers to strengthen their bargaining power in determining wages. The union represents workers to make an agreement on the amount of wage with the company, which is valid for a certain period. Because of these three things, wage rates cannot be immediately adjusted when changes occur in the labor market.

Wage efficiency theory states that a high wage level (above the market equilibrium wage) will increase labor productivity. This theory assumes that providing high wages is more profitable for the company when compared to the costs incurred by the company (Romer, 2012). Wages above market prices will increase the opportunity cost of the risk of losing jobs so that workers will work harder and the turnover rate will be lower. Hence, the company can save on the cost of recruiting and monitoring workers.

The pioneer of the relationship between economic growth and unemployment was Arthur Okun. In his study, Okun found that if GDP grows rapidly, there will be a decrease in the unemployment rate. In contrast, if GDP growth is very low or negative, the unemployment rate will increase, and if the growth is the same as potential, the unemployment rate will remain unchanged (Makaringe & Khobai, 2018). An increase in GDP growth is expected to increase employment, reducing unemployment. This is a widely accepted view in economic theory, hence the theoretical proposition related to output and unemployment known as Okun's Law (Kreishan, 2011).

Next, the relationship between inflation and unemployment becomes one of the central themes of macroeconomics. The research conducted by Professor A. W. Philips (1958) on the British economy for 1861-1957 showed a negative and non-linear relationship between the increase in wages/wage inflation and unemployment. Keynesian economists adopted Professor Philips' findings to explain the trade-off between inflation and unemployment. If you want to reduce the unemployment rate, the price you have to pay is rising inflation (Rahardja & Manurung, 2008). In line with this view, Dernburg & Muchtar (1992) suggest that the Philips curve provides an idea of the trade-off between unemployment and inflation. If the desired inflation rate is low, there will be a very high unemployment rate. Conversely, if the expected inflation is high, there will be a relatively low unemployment rate.

Based on the Philips curve, A.W. Philips (1958) described the relationship between the unemployment rate and the inflation rate based on the assumption that inflation was a reflection of an increase in aggregate demand. According to demand theory, if demand increases, prices will also increase. With high prices (inflation), producers increase their production capacity by adding more labor (labor is the only input that can increase output). As a result of the increase in demand for labor, unemployment is reduced (McEachern, 2000).

Meanwhile, Borjas (2013) argues that the higher a person's education level, the less likely they will become unemployed. Workers who have a higher education have more specific skills; when there is a reduction in the workforce, companies tend to be reluctant to fire educated workers. In addition, if educated workers decide to change jobs, the risk of becoming unemployed is more negligible because they have broad access to job vacancies information.

The demand for education is an "indirect demand" or derived demand, namely the demand for opportunities to obtain high-income jobs in the modern sector. This is because getting a job in the current sector is primarily determined by a person's level of education. Most people in developing countries (especially the poor) want education not because of non-economic reasons or benefits (reputation, prestige, influence, or inner satisfaction), but only as a means to "secure" the opportunity to get a job in the modern sector. Under such conditions, the demand for education will be very high. This is because the expected benefits of higher education are far greater than the benefits of lower levels of education or uneducated alternatives. Thus, it is inevitable that the demand for education will increase over time (Todaro & Smith, 2006).

Based on the theoretical basis proposed, the hypothesis formulated in this research is that economic growth, inflation, and education are thought to affect the unemployment rate significantly.

## METHODS OF RESEARCH

The data used for this research were secondary data sourced mainly from the Central Bureau of Statistics, which included data on unemployment rates, economic growth, inflation rates, and average duration of education at school as a proxy for education variable from all regencies/cities in Sumatra Island from 2011 to 2020. The data processing technique employed an econometric model of multiple linear equations (multiple regression) for panel data, a combination of cross-sections, namely 154 regencies/cities on Sumatra Island with a time series of ten years (2011-2020). Statistical data and models were processed using Stata 15 software to obtain an estimate of each variable and parameter.

According to Baltagi, Jung, & Song (2010), some advantages of using panel data are as follows:

- a. Able to control the heterogeneity of variables that are not included in the model (unobserved heterogeneity),
- b. Can provide intensive data, reduce collinearity between variables, increasing degrees of freedom and be more efficient,
- c. Better to study dynamics of adjustment,
- d. Able to identify and measure effects that cannot be overcome in only cross-section data or only time-series data, and
- e. Can minimize the bias generated by individual aggregation due to more data units.

The form of the multiple linear regression model used in this research was multiple linear regression with the dependent variable of the unemployment rate and the independent variables of the economic growth, inflation, and education (proxied by the average duration of education at school). The equation function that was formulated is as follows.

$$UNEMP = f(GROWTH, INF, MYS) \quad (1)$$

where:

*UNEMP* : Unemployment Rate

*GROWTH* : Economic Growth

*INF* : Inflation

*MYS* : Education

There are three commonly used approaches, namely the Common Effect Model (CEM) or also known as Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM) to estimate the panel data regression model (Widarjono, 2009). Statistical results obtained from data processing are used to test hypotheses. This hypothesis testing helps check whether the regression coefficient obtained is significant (significantly different). This significance means a regression coefficient value that is not statistically equal to zero. If the slope coefficient is equal to zero, it means that there is not enough evidence to state that the independent variable affects the dependent variable (Nachrowi, 2006). Thus, the criteria test is carried out in detail with the following stages.

- a. Economic criteria (signs and quantities) of the economic theory;
- b. Statistical measures consist of the following.

- T-test (individual parameter significance/partial test) to test each explanatory variable has a significant effect on the endogenous variable
- Fisher/F-test (simultaneous significance test) to test the explanatory variable together/as a whole to explain the variation of the endogenous variable
- R2 test (coefficient of determination test) to see the model's ability to explain the behavior of endogenous variable

## RESULTS AND DISCUSSION

Based on the data processing results, this research produces an equation model considered the best by using the variables of the unemployment rate, economic growth, inflation, and education (proxied by the average duration of education at school). Thus, the equation formulated is as follows.

$$UNEMP_{it} = \beta_0 + \beta_1 GROWTH_{it} + \beta_2 INF_{it} + \beta_3 MYS_{it} + \varepsilon_{it} \quad (2)$$

where:

*UNEMP* : Unemployment Rate (%)

*GROWTH* : Economic Growth Rate (%)

*INF* : Inflation Rate (%)

*MYS* : Average Duration of Education at School (Years)

After obtaining the equation of the model, then the right approach for panel data must be determined, namely using Pooled Least Square, Fixed Effect Model (FEM), or Random Effect Model (REM). Therefore, the first step is to choose between Pooled Least Square or Fixed Effect Model (FEM). Based on the results of the F-test conducted, the probability of the F-statistical equation of the model is 0.0000, which is smaller than the 5% absolute level, so  $H_0$  is Rejected, which means that the FEM approach is more appropriate to be chosen for the model equation.

The next step is to choose between FEM or REM, which was carried out with the Hausman test. Based on the Hausman test carried out on the equation, a p-value of 0.0000 was obtained. This indicates that the test results are significant (p-value < 5%) so that  $H_0$  is Rejected, which means that the correct approach to use is the Fixed Effect Model (FEM) for the model equation. The estimation results carried out on the model equation are briefly shown in Table 2.

Table 2 - Equation Estimation Results

Variable	Coef.	Std. Err.	t	P> t
<i>growth</i>	-.1462305	.0201708	-7.25	0.000 (***)
<i>inf</i>	-.0403116	.0165005	-2.44	0.015 (*)
<i>mys</i>	-1.488297	.1397124	-10.65	0.000 (***)
C	18.51368	1.21826	15.20	0.000 (***)
<i>R-squared</i>		0.0845		
<i>Prob &gt; F</i>		0.0000		



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Number of Observations 1.540

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Source: The data is processed using Stata version 15

Based on the tests carried out on the estimation of the model equation, the results of F-statistic probability are less than 1%, which means that the regression model used is good/significant or, in other words, the independent variables together have a significant effect on the dependent variable. Meanwhile, based on the test, the R-squared (R<sup>2</sup>) value is 0.0845, which indicates that the model obtained can explain the variation of economic growth of 8.45%.

### Analysis on the Effect of Economic Growth on the Unemployment Rate

This research's primary focus is analyzing the effect of economic growth on the unemployment rate. Based on the regression analysis results, it is known that economic growth significantly affects the unemployment rate. The coefficient of economic growth in the model equation is -0.146 and has shown a negative sign. This means that the economic growth variable has an effect on reducing the unemployment rate. If there is an increase in economic growth by one point, the unemployment rate will decrease by 0.146.

The economic growth variable that negatively affects the unemployment rate supports the theory and the previous research results, which indicates that economic growth has an impact on reducing the unemployment rate. The coefficient value obtained from the economic growth variable can be said to reduce the unemployment rate in Sumatra Island. This means that, for example, the average unemployment rate in Sumatra Island ranges from 6-7% per year, and if there is an increase in economic growth by two points, the unemployment rate in Sumatra Island will decrease to around 5.7% to 6.7%. Thus, if economic growth is accelerated in the coming years, it will undoubtedly result in a lower unemployment rate in Sumatra Island.

Increasing economic growth requires considerable attention from every local government in Sumatra Island to focus on efforts to encourage equitable economic growth through various policies that can increase the level of employment opportunities for the people, especially those targeting productive economic sectors. In this case, one of the policies that can encourage economic growth is in terms of fiscal policy (fiscal expansion) of the local governments through increased spending and directing local spending to provide assistance or stimulus to small and medium industries, as well as job training and entrepreneurship so that people can develop their skills. This policy aims to empower the community's economy and encourage increased production in the industrial sector to promote economic growth.

With fiscal policy, the local governments can also assist community groups working in the extractive sector (agriculture, plantations, livestock, and fisheries), which is one of the leading sectors in Sumatra Island. Thus, there is an increase in production in the agricultural sector to encourage economic growth in general. Other efforts taken to promote economic development are by creating regional investment through the issuance of local government regulations that stimulate and provide convenience for the entry of new investors. This, in turn, can encourage increased production in the trade sector and the services sector. To achieve more equitable economic growth to reach rural areas, the local governments, through fiscal policy interventions, assist by allocating village funds to autonomous villages. With the existence of village funds, the village governments, together with the community, can autonomously manage the village resources and create various developments so that the economy in the village can grow.

Economic growth reflects an increase in the economy's capacity, indicated by an increased production level. Therefore, a productive economic performance will be able to create jobs and absorb more labor to increase the number of people in the working force. In the end, with the increase in the working population, unemployment will decrease.

### **Analysis on the Effect of Inflation on the Unemployment Rate**

The inflation variable is a factor other than the economic growth variable thought to affect the unemployment rate in Sumatra Island. Based on the regression analysis results, it is known that inflation has a significant effect on the unemployment rate. In addition, the inflation coefficient obtained from the model equation is -0.040. The negative sign on the coefficient indicates that the inflation variable has an effect on reducing the unemployment rate in Sumatra Island. This means that the inflation variable has proven to have a negative and significant impact on the unemployment rate. The decline in the unemployment rate is also in line with similar theories and previous research.

The inflation variable coefficient of -0.040 can be interpreted if there is an increase in inflation by 1 point, the unemployment rate will decline by 0.040%. An increase of 1 point in the inflation rate and a decrease in the unemployment rate by 0.040% has shown that the inflation variable has quite an effect on the decline in the unemployment rate. This means that, for example, the average unemployment rate in Sumatra Island ranges from 6-7% per year, and there is an increase in inflation of 3%, the unemployment rate in Sumatra Island will decrease to around 5.88% to 6.88%.

Inflation is a generally continuous and persistent increase in the prices of an economy. For producers or business actors, inflation can provide benefits due to indications of rising product prices. The price increase can be assumed due to the rise in demand. Therefore, producers increase production to increase supply to compensate for the increase in demand. Meanwhile, to increase production, one of the producers' efforts is to increase production inputs, namely labor. The need for labor ultimately leads to an increase in the demand for labor in the labor market. This situation, in other words, creates job opportunities so that the productive workforce can be absorbed into the capacity of the economy. Thus, there is an increase in the working population and an indication of a decline in the unemployment rate.

On the other hand, local governments still need to control the inflation rate to stabilize. This is because inflation has a tremendous impact on public welfare and economic stability. If inflation is too high, it will cause a decrease in people's purchasing power. This will be exacerbated if the real income of the community is stagnant or low. People's low incomes make them unable to respond to fluctuations in price increases. Accordingly, it is difficult for the community to meet the needs of life, mainly if the price increase occurs in essential commodities such as food, which is included in the basic needs group. Concurrently, if inflation is too low or even deflation occurs, it will impact the weakening of production capacity, which is marked by a decrease in production levels, and the economy can experience a recession so that unemployment is sure to increase.

### **Analysis on the Effect of Education on the Unemployment Rate**

In this research, the education variable is thought to affect the unemployment rate in Sumatra Island. Based on the regression analysis results, it is known that education as a proxy for the average duration of education at school has a significant effect on the unemployment rate. The coefficient for the average duration of education from the model equation is -1.488.

The negative sign on the coefficient indicates that the education variable has an effect in reducing the unemployment rate in Sumatra Island. If there is an increase of 1 year in the average duration of education, the unemployment rate will decrease by 1.488%.

The finding that the education variable negatively affects unemployment is in line with the theories and previous research, which state that the higher the level of education, the lower the unemployment. The coefficient value obtained from the education variable (average duration of education) can be said to impact reducing unemployment in Sumatra Island. The average duration of education in Sumatra Island regencies/cities currently ranges between 8-9 years; in other words, they have reached the level of junior high school education grade 2 or 3. Thus, if there is an increase of one year in the average duration of education (to junior high school grade 3 or senior high school grade 1) and, for example, the average unemployment rate in Sumatra Island ranges from 6-7% per year, the unemployment rate will decrease by approximately 4.51% to 5.51%.

Nowadays, advances in information systems and technology are developing very quickly and in line with the strong flow of globalization. The production process requires reliable, professional, and educated workers in modern industries and services. Therefore, generally, workers who meet these criteria have higher education levels and have more specific skills. The relatively high level of education of the population in general in an area also shows the excellent quality of human resources (HR) to provide bargaining power for quality workers. This condition creates vast job opportunities for people with higher education levels because the demand for workers with higher education levels is also relatively high. The increase in labor absorption will lead to low unemployment in a region.

On the other hand, the issue of the urgency of higher education level that workers must own ultimately requires the population to be able to receive higher education level. This means that the population will try to gain access to education to a higher level. In this case, the local governments in Sumatra Island must focus on increasing access to education services for the community fairly and equitably along with the increase in population. This means that education is a regional development priority that needs to be continuously encouraged, considering that increasing the level of education completed by the population generally takes a long time. With the availability of quality human resources who are highly educated and following the needs of the work, it is expected that the business sector will continue to grow, and investment can increase in a region.

## CONCLUSION

This research concluded that economic growth had been proven to have a negative (decreasing) and significant effect on the unemployment rate in Sumatra Island. From the estimation results, the coefficient value of the economic growth variable is -0.146, which indicates the percentage change in the unemployment rate for each percentage change in economic growth. In addition, the research results have also proven that other variables also have a negative (decreasing) and significant effect on the unemployment rate in Sumatra Island, namely inflation and education (average duration of education). Thus, the three independent variables (economic growth, inflation, and education) significantly affect the dependent variable (unemployment rate). These three variables are relevant to be the focus of local governments in Sumatra Island as a determinant in suppressing the unemployment

rate amid regional economic conditions that are experiencing a recession due to the COVID-19 pandemic.

#### **Limitation and Future Research**

This research had limitations since it only used three independent variables (economic growth, inflation, and education), so other factors or variables outside the model could also affect the dependent variable (unemployment rate). This assumption is supported by the R-squared results obtained in the model equation, which is 8.45%. Further research is expected to be able to use or add variables other than those in this research model to see other variables that also affect the unemployment rate. In addition, the object of research being analyzed can be developed at another regional level or conducted on a broader scope.

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