TIME SERIES DATA ANALYSIS IN FORECASTING EDUCATED UNEMPLOYMENT RATE IN ACEH PROVINCE

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ABSTRACT

Educated unemployment is the most important problem that must be solved by the government. Studies related to unemployment are very interesting to study. This study examines the relationship between educated unemployment in Aceh Province. The purpose of this study is to examine the modeling of educated unemployment in Aceh Province using secondary data. Forecasting was carried out to predict unemployment in Aceh Province in the period until 2030. The results of this study show that Aceh's educated unemployment rate continues to increase. The recommendations of this study are expected by the government to make improvements in various development sectors, especially programs that rely on improving human resources in order to change the labor recruitment system in Aceh Province to avoid a decrease in the unemployment rate in Aceh Province.

Keywords: Educated, Unemployment, Forecasting.

INTRODUCTION

Aceh is a province granted special autonomy to manage an independent system of government. With abundant funds, Aceh should be dubbed as a prosperous province. The problem that occurs today is that the management of human resources is a problem that cannot be ignored by all provinces in Indonesia, including Aceh.

Human resources are the most important factor in the development process in an area. The thing that cannot be solved at this time is unemployment. Unemployment is a term for people who are not working at all, are looking for work, work less than two days a week, or are trying to get a decent job (BPS, 2021).

The government must be wise in solving the current unemployment problem. The policies taken must be beneficial to the community and equitable. Educated unemployment is an interesting phenomenon to study today. The studies carried out are not enough just to know the factors that affect unemployment, but to prepare for the conditions that will occur in the future. Many statistical methods can be used to predict the current number of educated unemployed in Aceh. One of the methods that is often used is the ARIMA method. The ARIMA method is a method that can manage data over time and predict the possibility of it happening in the future. The advantage of the ARIMA method is that the value of the goodness of the model is obtained so that how trustworthy the resulting model is.

METHOD

The data used in the study was secondary data sourced from BPS Aceh Province. The data used is in the form of data on educated unemployment in Aceh Province. The software used in this research is R. This moving average autoregressive method is carried out in four stages:

1. Looking at the stationariness of the data which is an assumption that must be met in the use of the ARIMA method.
2. Checks for models that are worth using for prediction of AR, MA, ARMA, or ARIMA models.
3. Diagnose models with ACF and PACF graphs that are independent of each other in the test.
4. Perform ARIMA modeling predictions. Forecasting is used to obtain predictive models with the smallest error (Sungkawa & Megasari, 2011).

$$MAPE = \frac{1}{n} \sum_{t-1}^{n} \frac{|Y_t - \hat{Y}_t|}{Y_t} \ x \ 100 \tag{1}$$

5. Testing the benefits of the model by using AIC values (Ho et al., 2002).

LITERATURE REVIEW

Unemployment is a problem faced by all countries in the world due to the gap between the number of working-age people entering the labor force and the availability of job opportunities. The definition of educated unemployment is a labor force that has an upper middle education and does not work or work but does not meet their basic needs (Todaro, 2003). The level of educated unemployment rate is a comparison of the age of job seekers who are educated in high school and above (as an educated group) compared to the size of the labor force in that group. High levels annually produce a large number of undergraduate graduates and increase every year. Some economists estimate that unemployment in developing countries is dominated by youth unemployment with generally having higher education (Ilahi, 2017).

The existence of the campus is a strategic place in education to foster human resources as a form of development agenda and shaping the future of a country. A well-run education will produce a professional workforce that can meet the needs of the world of work. Educated unemployment is often seen as a failure in education. This means that if the quality of human resources is getting higher, the absorption of educators must also be considered to produce superior seeds who are ready to enter the world of work (Sukirno, 2015).

RESULT AND DISCUSSION

Overview of Aceh's Educated Unemployment

Educated unemployment in Aceh is a bad record of development carried out by the government. Educated unemployment must be resolved immediately so that there is no social inequality in society. In connection with this problem, the purpose of this study is to determine the condition of educated unemployment in the 2030 period.

Educated unemployment is a condition where educated workers experience difficult conditions to get workers with the factor that causes no employment to accept them, but because the educated workforce is more selective in finding work (Rahmania, et al., 2018). Educated unemployment with 23 districts/cities in Aceh Province according to the completed education was an important variable in this study. The following is an overview of educated unemployment in Aceh Province.

Based on Figure 1, it can be seen that the district that has the highest number of educated unemployment is North Aceh Regency. It is because the most available jobs are the industrial sector which makes North Aceh Regency nicknamed the "Petro Dollar Country" so that it makes an exclusive impression for the people around the industrial area. Sabang City is an area that has the most educated unemployment due to the progress of the tourism sector which is well managed by the community and the government.
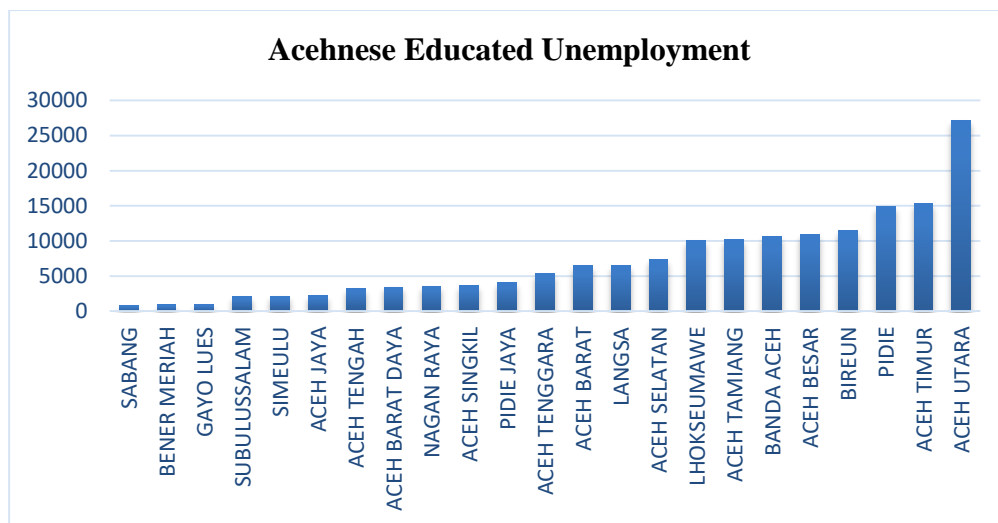
Figure 1. Acehnese Educated Unemployment

To reduce educated unemployment, the Aceh Government made good use of special autonomy funds and created a program focused on the labor force that has the potential to be educated unemployed to improve Aceh's current unemployment rate. Fiscal development policy can also be one of the solutions to overcome Aceh's unemployment rate. Fostering an entrepreneurial spirit among the productive age by reviving the creative economy by utilizing existing natural resources.

The condition of a region can also affect the high rate of educated unemployment. The influence of technology distribution and proficiency in using the internet are important issues that must be considered in dealing with unemployment. The reliability of the community in solving problems depends largely on how far public access is from where people live. Indonesia has categories of rural and urban areas that distinguish an area based on a certain code and also its conditions (Kose, 2013). The following is an overview of the distribution of unemployment by urban and rural areas (LeSage, 2009). This picture can be a reference for the government in equitable and equitable development so that the achievement of the goals of sustainable development is in accordance with the vision and mission of *Indonesia Emas 2045*.

Development in the city must be adjusted to the development in the village must be adjusted so that there are no gaps in development. Gaps in development will lead to problems such as uneven distribution of facilities, uneven economic growth, and unequal education.

The journey of village development program and activities carried out during the new order period. It appears that these programs and activities follow the policies from above which are designed with a blue print pattern. In reality almost all village development programs and activities are created uniformly for all villages in Indonesia. For the institutionalization of programs and activities up to the village level, whoever is involved in it whether he is a planner, facilitator,

implementer or consultant even including international donor agencies is more done with a tourism model. It means that village development programs and activities are carried out through visits to the village within a certain time according to the interests and objectives of the visit. The program is carried out in the form of socialization, dissemination, counseling, discussion, speech and other forms of visits to the village.
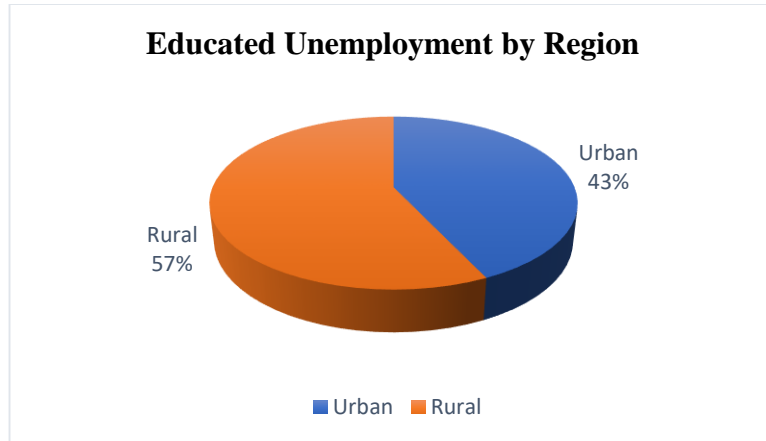

Figure 2. Educated Unemployment Distributed by Region in Aceh

Figure 2 shows that the educated unemployment rate in Aceh Province is more dominant in rural areas than in urban areas. Equitable development in rural areas can be done with well-managed population migration.

Identification of Stationary Test

Identification of assumptions of data stationariness was performed using ACF graphs and PACF plots (Prybutok et al., 2000). Stationariness is checked on two aspects, namely variance and mean. The following checks on the value of the variance and mean.
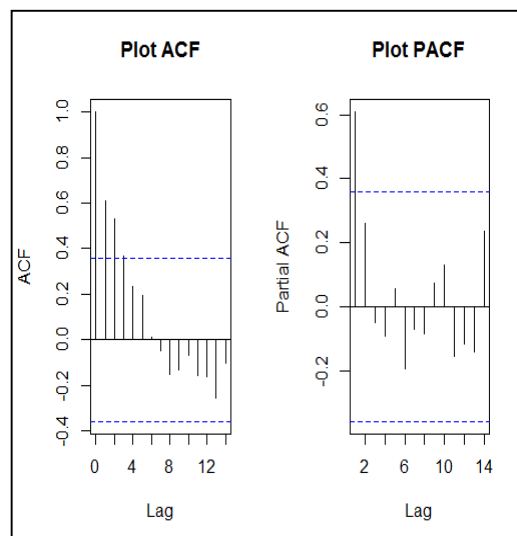

Figure 3. ACF and PACF plots of the variance and mean

Figure 3 the data stationarity test for variance using λ is a stationary test value that is equal to −0.4735. Because the value obtained is very far from 1, which means that the data is not stationary concerning the variant, it is necessary to carry out a transformation. After one transformation, namely using the ln y_t transformation once and y_t^2 twice, the λ value is obtained of 0. 9893 (∼ 1) so that the data can be said to have been stationary to the variance.

The next test is on the mean value which must be stable and meet the assumptions. The null hypothesis used is the data on the number of unemployed people who are not stationary and alternative hypothesis is the data on the number of educated unemployed Acehnese stationary. The null hypothesis will be rejected if the p-value < α. In contrast, the null hypothesis cannot be rejected if p-value > α—obtained *p*-value from the augmented dickey fuller test results of 0.0837. By using α = 0.05, a decision was obtained that could not reject H$_0$, and it could be concluded that the Aceh unemployment data were not stationary. Stationary assumptions are assumptions that must be met in time series data modeling.

Educated Unemployment Models in Aceh Province

Modeling of educated unemployment in Aceh Province was carried out based on the results of tests that have been carried out using ACF and PACF charts. Model selection based on the p and q parameters to be entered into the model. Figure 3 shows the AIC value for the forecasting model. The model selected based on the AIC in this study was 8 with the smallest AIC value of -367,548.
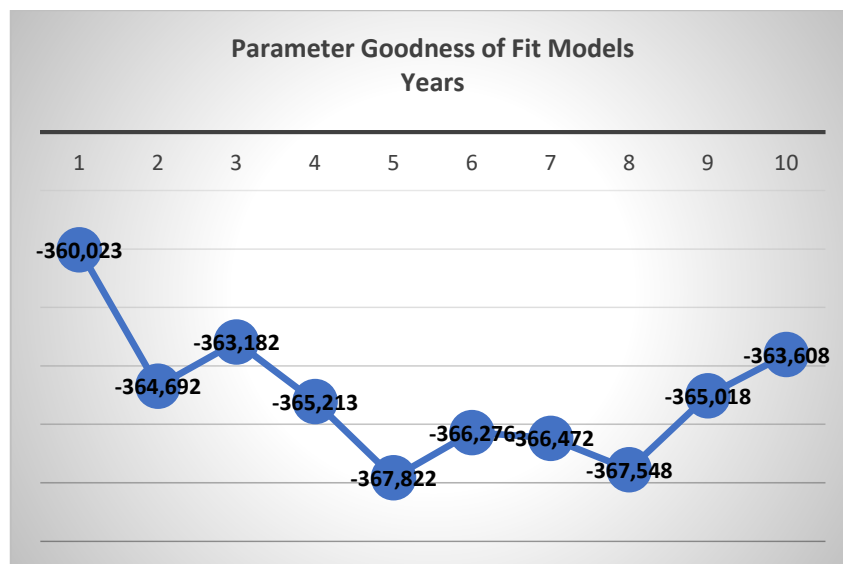

Figure 4. AIC Parameter Models

The best model used to predict educated unemployment in Aceh Province is the model 8. Diagnostic tests using White Noise need to be done because the White Noise requirement is an assumption that follows the stationarity test. The null hypothesis used is that the residual meets the White Noise requirements, and the alternative hypothesis is that the residual does not meet the White Noise

requirements. The null hypothesis is rejected if p-value $< \alpha$, whereas if p-value $> \alpha$, then the null hypothesis cannot be rejected (Azad & Mahsin, 2011). After testing using $\alpha = 0.05$, the p-value of model 8 is 0.5943. Because p-value $> \alpha$ for both models, it can be decided not to be able to reject H_0 so that the conclusion is that the residual values of both models meet the White Noise requirements. To choose which model is the best, it can be compared again to the AIC value obtained by each model. Based on the AIC value on the parameter significance test and diagnostic tests using White Noise, the models that can be used for forecasting this data are models 1, 2, 5, 7, and 8. To choose which model is the best, the AIC values of the five models can be compared again (Malikhova, 2014). The. The best model is the model that has the smallest AIC value so in this case the best model that can be used for forecasting is model 8, namely ARIMA (1, 2, 2) with an AIC of −367,548.

MAPE value for Acehnese educated unemployment forecasting for model 8 is 8.75. This value is included in the criteria for the MAPE value <10, which indicates that the accuracy of the forecasting results is outstanding. Model 8 has been able to predict data on the number of educated unemployed in Aceh in 2030 with exceptional results because the data expected is only one type of data. With a decrease in the number of unemployed in Aceh in 2030. The increase in the unemployment rate must be addressed properly, so that this forcasting can help the government deal with social problems in Aceh Province.It can be said that the problem of unemployment can be linked to the useless management of human resources caused by limited employment or lack of quality of human resources (Fadly, 2020). In order to achieve quality human resources, various efforts are needed, including by developing human resources including providing formally organized education

CONCLUSION

The conclusions obtained in this study are that educated unemployment in the Province continues to increase. This is obtained from the results of the ARIMA model obtained with ARIMA parameters (1,2,2). The recommendation of this study is for the government to be able to carry out strategic planning in managing unemployment in Aceh Province by educating the public to be financially independent by conducting creative economy trainings so that people do not depend on the formal sector alone in finding jobs. The management of abundant natural resources can also be used as a source of livelihood for the people in Aceh Province. The government needs to create people with reliable resources in order to reduce the number of educated unemployment in Aceh Province and equalize programs between rural and urban so that equal income of the community can be realized in order to achieve community welfare.

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