Implementation of Okun's Law : The Effect of Economic Growth on The Unemployment Rate in Asian Countries

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ABSTRACT

This study aims to determine the implementation of Okun's Law, namely the effect of economic growth on the unemployment rate in 30 countries on the Asian continent in the period 2016-2022. The independent variable in this study is economic growth while the dependent variable is the unemployment rate and in this study has control variables namely foreign direct investment, inflation and trade openness. This research uses secondary data obtained from the World Bank. The analysis method in this study uses the panel data regression analysis method on 30 countries on the Asian continent in 2016-2022 using the Stata application. The best model at this stage of the research is the Random Effect Model (REM). Based on the results of the research conducted, it can be seen that (1) the economic growth variable shows a negative and significant relationship with the unemployment rate, (2) the foreign direct investment variable shows a negative relationship and has no significant effect on the unemployment rate, (3) the inflation variable shows a positive and significant relationship with the unemployment rate, (4) the trade openness variable shows a negative and significant relationship with the unemployment rate.

Keyword: *Okun's Law, Unemployment Rate, Economic Growth and Panel Data Regression*

INTRODUCTION

The progress or decline of a country can be reflected in macroeconomic indicators that are used as an assessment of economic performance. These indicators include economic growth, unemployment rate, foreign direct investment, inflation and trade openness. Economic growth is an indicator to see how successful a country's economic development is and determines the next development policy. A country is said to experience economic growth if there is an increase in national income and increased output. Factors that influence economic growth include available capital, available skilled labor and the use of technology. Economic growth can be defined as the development of activity in the economy that makes the goods and services produced in the community increase in Gross Domestic Product (GDP). Gross Domestic Product (GDP) is the value of et final goods and services produced in a country within a certain period (Mankiw, 2007).

The unemployment rate is one of the main concerns in macroeconomic studies, always analyzed for its development. Based on random data, Asian countries that are members of ASEAN, such as Indonesia with 5.9% in 2022, Malaysia with 3.9% in 2022, the Philippines with 5.4% in 2022, and Brunei with 5.2% in 2022 have higher unemployment rates compared to other ASEAN countries such as Cambodia with 1.0% and Thailand with 1.3% in 2022 (Figures Asian Secretary, 2023). The higher the unemployment rate, the higher the poverty rate in a region. The chance of falling into poverty will increase if interest decreases due to unemployment (Choirur *et al*., 2021).

Economic growth shows how far economic activity is, high economic growth is the expected performance of all countries. The economic activity of a country can be reflected in the conditions of economic growth, where economic growth is positive or negative. Positive economic growth can indicate an increase in economic activity in the current period compared to the period before that. Meanwhile, negative economic growth indicates a decrease in economic activity in the current period compared to the period before that (Aprillia, 2014). Economic growth in Asian countries has also increased significantly since 2022. Tajikistan with the highest economic growth rate with an average of 7.26%. In 2021 China ranked 10th with an economic growth rate of 2.99% in 2022.

Previous research Donald G. Freeman (2001), conducted a previous study on Okun's Law by analyzing panel data from ten industrialized countries. This study found that Okun's Law applies in these countries, but the effect of changes in the unemployment rate in the economic growth cycle has a lower impact due to the bias between the labor force and the model. Not only that, it was revealed that most countries in Asia and Europe have higher structural unemployment rates than cyclical unemployment (Febryani, 2017).

Ferhat Pehlivanoglu & Tanga, (2016) examined several developing countries (Brazil, Russia, India, China, South Africa and Turkey) with the OLS method. The findings of this study indicate that Okun's Law may not be applicable to a number of developing countries. Empirical evidence suggests that the interpretation of Okun's Law may not be applicable in some developing countries. Cointegration tests show that there is a long-run relationship between unemployment and economic growth, with the exception of Brazil. The study shows that Okun's Law does not apply to Turkey, South Africa and Brazil.

Another study, Rubcova (2010), found that there is no correlation between output and the unemployment rate in the Baltic countries. This is due to the unreliability of the data, small sample size, and rigid labor market structure, which results in the unemployment rate not responding to changes in output. The positive relationship between economic growth and unemployment rate was also revealed in the research of Edward S. Knotek (2007), Knotek analyzed the model in proving the effectiveness

of Okun's Law in each country using the dynamic version of Okun's Law due to the difference in the optimal lag (Iswanto, 2013).

After seeing the research gap described above, this study is interesting to review because it discusses how economic growth affects unemployment. Previous research has shown mixed results regarding this relationship, so further research is needed to obtain more accurate and up-to-date findings. This study is different from previous studies because it includes additional control variables. Previous studies that discussed Okun's Law only used economic growth and unemployment variables, while this study adds other relevant control variables to isolate the relationship between economic growth and unemployment. By including additional control variables, this study can provide a more comprehensive and accurate analysis of the relationship between economic growth and unemployment.

From the background of the research previously described, the problem can be formulated as a research barrier to be more focused. The following problem formulations have been found: Does economic growth affect the unemployment rate in 30 countries on the Asian continent in 2016-2022 Is there a significant relationship between economic growth and unemployment rate, as proposed by Arthur Okun

LITERATURE REVIEW

Okun's Law

Zagler, (2003) conducted research on Okun's Law analyzing the relationship between economic growth and unemployment in four major European economies: France, Germany, Italy and the UK from 1968 to 1999. Economic growth and unemployment rate as the variables. In his research, he used the VECM analysis model. The results show that economic growth and unemployment are integrated. According to Okun's Law theory, the relationship between economic growth and unemployment is positively correlated in the long run. In contrast, in the short term, there is a negative relationship between unemployment and economic growth.

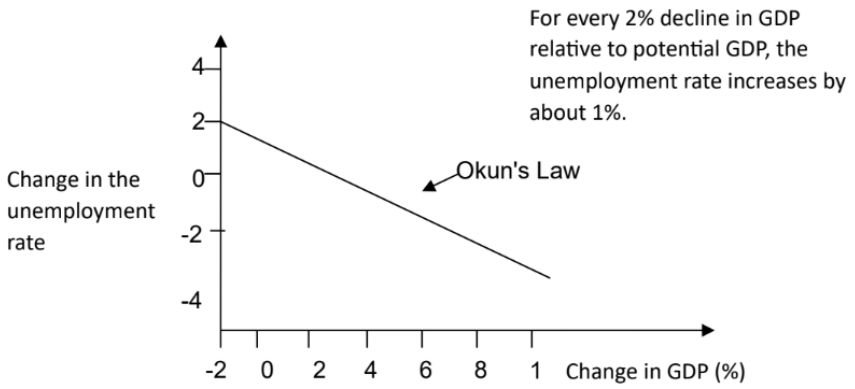
Yahia, (2018) in this study examines the estimation of Okun's Law in Algeria from 1970 to 2015, his research uses economic growth and unemployment variables. With the Autoregressive Distribuuted Lag (ARDL) method. This study found that there is a negative correlation between economic growth and unemployment. This finding can be used to show that the labor market in Algeria can have a significant impact on the reduction in both the long run and the short run.

Arthur Okun's theory is known as Okun's law. Okun's law shows that there is a negative relationship between economic growth and unemployment. Higher output growth will lead to lower unemployment. Constant unemployment has a relationship with population, hence the labor force, which will increase over time, so employment must grow to keep the unemployment rate constant. As for pre-labor output, it will also

increase with the passage of time, it can be said that economic growth is much higher than employment growth. As income increases, the expectation to increase production will also increase, which will require more labor (Blanchard, 2014).

Picture 1. Okun's Law

Picture 1. Okun's Law



Source: Blanchard, (2014)

Okun's law implies that if output growth is high, the unemployment rate will decline. Blanchard states that the labor force grows by 1% and worker output grows by 2%. Thus, output growth must equal 3% (1% + 2%) to keep the unemployment rate constant. This relationship was stated by Okun after observing that when the production of goods or services increases in the economy, it will create an increase in labor demand (Blanchard, 2014).

Unemployment

Keynes' theory says that low aggregate demand causes unemployment, contrary to the classical theory. So, it is not low production that causes stunted economic growth, but low consumption. Keynes argued that this cannot be blamed on the free market mechanism. As labor increases, wages may decrease. This can be loss-making and unprofitable because declining wages indicate a decline in people's purchasing power for goods. Ultimately, producers will incur losses and will not be able to employ more people. In order for the event sector to create jobs, Keynes advised the government to take action to maintain the level of aggregate demand (Qadrunnanda, 2017). The classical theory argues that the temporary location of resources causes unemployment, which can be handled by the price mechanism in the free market to guarantee that demand can absorb all supply (Qadrunnanda, 2017).

According to Mankiw (2007), unemployment is the most significant macroeconomic problem that has a direct impact on people. For some people, job loss means

psychological distress and a decline in their standard of living. Political debates often discuss unemployment. Every politician will also generally claim that their policies can help employment.

Economic growth

Adam Smith's theory of economic growth argues that people should be given wide freedom to exchange and control their own economy. According to Smith, the economy will grow when the population increases, markets develop and specialization increases. The process of specialization can increase worker productivity, which will then encourage technological progress and economic growth. In contrast to David Ricardo's theory of economic growth, which states that economic growth is inversely proportional to the theory put forward by Adam Smith. David Ricardo, argues that increasing population growth will produce a lot of labor, causing a decrease in wages and the economy to experience economic stagnation or stability (Febryani, 2017).

Economic growth can be interpreted as the development of activities in the economy that make an increase in goods and services in the community. The economic growth rate is a very popular macro performance indicator and in its calculation is a derivation of GDP (gross domestic product). This opinion is in line with Mankiw, in macro analysis the measurement in a country's economy is GDP (Karlina, 2017). Economic growth can come from growth in aspects of aggregate demand and aggregate supply.

1. Aggregate Demand Side (AD)

Based on the aggregate demand side, a rightward shift of the AD curve reflecting an increase in demand within the economy can take place as national income consisting of consumer, corporate and government demand rises. The aggregate demand side (GDP usage) consists of four components: household consumption (C), gross domestic investment (fixed capital formation and stock changes) from the private sector and government (I), government consumption or expenditure (G), and net exports, which are exports of goods and services (X) minus imports of goods and services (M) (Blanchard, 2014). The aggregate demand side of an economy can be described in a simple macroeconomic model as follows:

$$Y = C + I + G + (X - M)$$

2. Aggregate Supply Side (AS)

There are two schools of thought on aggregate supply-side economic growth: the neoclassical theory and the modern theory. In the neoclassical theory, a number of factors of production that are considered to have a significant influence on output growth are capital and labor. Capital can be in the form of capital goods. An increase in the amount of labor and capital with other factors, for example, the level of productivity in each production or overall fixed, can increase the output produced.

METHODS

Type and Source of Data

This research is quantitative research. This research uses panel data, which is a combination of time series and cross section data. The time series data starts from 2016-2022 and cross section data as many as 30 countries in the Asian continent that will be studied by researchers. These countries are:

Table 1. 30 Countries in Asia

No	Country	No	Country	No	Country
1.	Afghanistan	11.	Indonesia	21.	Myanmar
2.	Armenia	12.	Iraq	22.	Nepal
3.	Azerbaijan	13.	Jordan	23.	Oman
4.	Bahrain	14.	Kazakhstan	24.	Pakistan
5.	Bangladesh	15.	Kiribati	25.	PapuaNew Guinea
6.	Bhutan	16.	Kuwait	26.	Philippines
7.	Brunei Darussalam	17	Lebanon	27.	Qatar
8.	Cambodia	18.	Malaysia	28.	Saudi Arabia
9.	China	19.	Maldives	29.	Sri Lanka
10.	India	20.	Mongolia	30.	Tajikistan

This study uses data on unemployment rates, economic growth, Foreign Direct Investment, Inflation and Trade Oppeness from the World Bank where the data is in the form of percent data. The data set published by the World Bank is a form of economic information for all countries in the world that can be accessed by the public.

Panel Data Regression Model Analysis Technique

Baltagi, (2005) provides several statements regarding the reasons for using panel data regression analysis techniques. These include because panel data has more variability, less collinearity between variables, has more informative data, more degrees of freedom and is more efficient. For example, in measuring unemployment, cross section data can provide what proportion of the population is unemployed at any one time. The general panel data model used in this study is as below:

$$Unem_{it} = \beta_0 + \beta_1 Ecgrowth_{it} + \beta_2 Zi_{it} + \beta_3 Z_{it} + \beta_4 Z_{it} + \varepsilon_{it}$$

In estimating regression models that use panel data, it can be done through three approaches used in panel models, namely Common Polled effect, Fixed Effect and Random Effect. An explanation of each of the three approaches includes (Savitri *et al*., 2021).

RESULT AND DISCUSSION

The discussion in this chapter is used to provide an overview of the data that has been obtained. To see the characteristics of the data we get. The data analysis of each variable that has been studied. The object of this research is 30 countries on the Asian continent in 2016- 2022. This study uses secondary data, namely time series data. The data used in this study were obtained from the World Bank.

The Chow test, Hausman test, and Lagrange Multiplier test are three types of tests that need to be carried out to determine the most appropriate estimation model for managing panel data. The Chow test is conducted to determine between techniques with the Polled Least Square (PLS) model or the Fixed Effect Model (FEM) which is most appropriate to use in estimating panel data. Based on Table 2, shows the results of the Chow test with Stata obtained a cross section F probability value of 0.000 or which value is <0.01, meaning that H0 is rejected and H1 is accepted. The results show that the Fixed Effect Model is the right model to use in testing the hypothesis. Furthermore, the Hausman test will be carried out to determine whether the Fixed Effect Model or Random Effect Model is the most appropriate. Then the model chosen is the Random Effect Model. From the results of these three tests, it can be concluded that this research is based on the Random Effect Model (Generalized Least Square). Therefore, the classic assumption test is not required (Napitupulu *et* al., 2021).

There are three methods of estimating regression models with panel data carried out through three approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). The following are the regression results using the three panel data estimation models:

Table 2. Panel Data Regression Test Results with Three Models

Panel Data Model: Dependent Variabel: Unem Periode: 2016 – 2022 Total panel observations: 210				
Variabel Independen		Model Estimasi		
		CEM	FEM	REM
Ecgrowth	*Coefficient*	-0,00709691	0,0563757	-0,0565682
	Std. Error	0,0483824	0,0107881	0,0107248
	t-statistic	-1,47	-5,23	-5,27
	Prob.	0,144	0,000	0,000*
FDI	*Coefficient*	-0,0874701	-0,015166	-0,0158588
	Std. Error	0,0608429	0,0164639	0,0163426
	t-statistic	-1,44	-0,92	-0,97
	Prob.	0,152	0,358	0,332
Inf	*Coefficient*	0,0352297	0,0086079	0,0088242
	Std. Error	0,0173685	0,0045134	0,0044813
	t-statistic	2,03	1,91	1,97
	Prob.	0,044	-4,17	0,049**
TO	*Coefficient*	-0,0204482	-0,0126856	-0,0128986
	Std. Error	0,0070193	0,0030425	0,0029973
	t-statistic	-2,91	-4,17	-4,30
	Prob.	0,004	0,000	0,000*
R-squared		0,2289	0,2289	0,2289
Adjusted R-squared		0,0740	0,0870	0,0871
Prob F-statistic		0,0005	0,0000	0,0000

Prob F-statistic		0,0005	0,0000	0,0000
Chow Test		0,0000 H₀ rejected: FEM		
Hausman Test			0,9671 H₀ accepted: REM	
Lagrange Multiplier				0,0000 H₀ rejected: REM

Source: Stata (Data processed, 2024)
* 1% error rate
**5% error rate

Table 3. Model Random Effect Model

Unem	Coefficient	Std. Error	t	P > t
Ecgrowth	-0,0565682	0,0107248	-5,27	0,000
FDI	-0,0158588	0,0163426	-0,97	0,332
Inflasi	0,0088242	0,0044813	1,97	0,049
TO	-0,0128986	0,0029973	-4,30	0,000
Cons	6,659781	819891	8,12	0,000

Source: Stata (Data processed, 2024)

The Table above shows the results of the significance test estimation as follows:

1. In the test estimation results that have been carried out in Table 3, the t-statistic value obtained is -5.27 smaller than the t Table 1.960. While the probability value is 0.000, which is smaller than the error rate of 1% (0.000 < 0.01), it can be concluded that the economic growth variable has a negative and significant effect on the unemployment variable in 30 countries in Asia. The economic growth variable has a coefficient of -0.0565682, when economic growth increases by 1%, unemployment will decrease by 0.056%. Vice versa, if the economic growth variable decreases by 1%, then unemployment will increase by 0.056%.
2. In the test estimation result that has been done in Table 3, the t-statistic value obtained is -0.97 which is smaller than t Table 1.960. While the probability value is 0.332, which is smaller than the error rate of 5% (0.332>0.05), it can be concluded that the foreign direct investment variable has a negative and insignificant effect on the unemployment variable in 30 countries on the Asian continent. The foreign direct investment variable has a coefficient of -0.0158588, when foreign direct investment increases by 1%, unemployment will decrease by 0.015%. Vice versa, if the foreign direct investment variable decreases by 1%, unemployment will increase by 0.015%.

3. In the test estimation results that have been conducted in Table 3, the t-statistic value of 1.97 is greater than the t Table of 1.960. While the probability value is 0.049 which is smaller than the error rate of 5% (0.049 < 0.05), it can be concluded that the inflation variable has a positive and significant effect on the unemployment variable in 30 countries in Asia. Inflation variable has a coefficient of 0.0088242, when inflation increases by 1%, unemployment will decrease by 0.0088%. Vice versa, if inflation decreases by 1%, unemployment will increase by 0.0088%.

4. In the test estimation result that has been done in Table 3, the t-statistic value of -4.20 is smaller than t Table 1.960. While the probability value is 0.000, which is smaller than the error rate of (0.000 < 0.01), it can be concluded that the trade openness variable has a negative and significant effect on the unemployment variable in 30 countries on the Asian continent. The trade openness variable has a coefficient of -0.0128986, when trade openness increases by 1%, unemployment decreases by 0.012%. Vice versa, when trade openness decreases by 1%, unemployment will increase by 0.012%.

This research is conducted to find out how the application of Okun's Law as an effort for economic growth in Asia and to find out the relationship between the economic growth of countries in the Asian region and the unemployment rate of countries on the Asian continent. Therefore, it will be discussed in detail in the research activities, as follows:

The Effect of Economic Growth and Unemployment (Okun's Law)

Based on the results of the panel data regression test using the Random Effect Model in Table 3, it is known that the t-test result of the economic growth variable shows that the tcount value is smaller than the Table (-5.27 < 1.960) and the probability value is 0.000 and the significance level is 0.01, so H0 is accepted, which means that economic growth has a negative and significant effect on unemployment in 30 countries in the Asian continent in 2016-2022.

While Okun's Law has been proven correct at certain times throughout history, there are also conditions where it does not apply. The Federal Reserve Bank of Kansas City, conducted a review of Okun's Law in 2007 by looking at quarterly unemployment changes and comparing the data to quarterly real output growth. According to their findings, Okun's Law was mostly accurate, although there were many periods of instability where unemployment did not change as predicted by the formula. The study concluded that "Okun's Law is not a tight relationship" but "predicts that a slowdown in growth usually coincides with a rise in unemployment". The review found a negative correlation between quarterly employment changes and productivity, although the coefficient of the relationship tends to vary (Furhmann, 2023).

Arshad, (2010) provides an explanation of the relationship between economic growth and the unemployment rate, which shows a significant negative relationship between economic growth and unemployment in the short term. Therefore, an increase in economic growth in a region shows that economic growth is increasing, which results in reduced unemployment because many people are absorbed by available job vacancies.

Huang & Yeh, (2013) in their research showed that the relationship between unemployment and economic growth was found to be negative and highly significant both in the long run and in the short run. Therefore, the validity of Okun's Law

relationship remains valid not only for overall state-level data but also for regional data. Lal *et* al. (2012) in their research discussed the validity of Okun's Law in several Asian countries with a cointegration approach in the period 1980 to 2006. economic growth and unemployment rate are the variables used. With the Error correction model (ECM) method to analyze the short term using the Engel Granger analysis method. The results of this study indicate that Okun's Law does not apply in some developing Asian countries. However, some developing countries in Asia including Malaysia, Singapore, and China, have successfully overcome the unemployment problem. Testing the Engel Granger method shows that there is cointegration, thus there is an equilibrium relationship between variables in the long run.

This result is in line with research conducted by Lal *et* al. (2012), Huang & Yeh (2013), and Keynes' theory that low aggregate demand actually causes unemployment problems. In addition, Okun's law, Arthur Okun's theory of the relationship between the rate of real growth and changes in the unemployment rate, is in line with these findings. Mankiw, (2007), a prominent economist argues that long-run economic growth of 2-3% is necessary to significantly reduce unemployment. Growth at this rate allows the labor market to absorb new workers entering the market and reduce unemployment.

By nominal gross domestic product (GDP) value, Asia is the world's largest continental economy and the fastest growing economic region. Accelerated economic growth is often accompanied by the creation of more jobs, which helps to reduce the unemployment rate. For example, countries such as China and India have shown how rapid economic expansion can significantly lower unemployment rates through increased industrial activity, services and investment. With strong growth, Asia's economy is projected to expand at a rate of 5.6% this year and 5.5% in 2018. Many countries in the region have strong economies, which provides an opportunity to push through some important reforms that can amplify and accelerate their effects and help improve everyone's living standards. Over the past fifty years, Asian economies have made tremendous progress. This is in accordance with Okun's Law that when economic growth in a country is high, the unemployment rate will fe, thereby alleviating poverty. In Asia, hundreds of millions of people have been lifted out of poverty, and several countries are moving towards becoming developed and middle-income countries. Some countries are now at the forefront of technological advancement, while previously they were almost completely dependent on foreign knowledge. This has only been happening for a few generations due to global economic integration through trade and foreign direct investment (FDI), high savings rates, and sound macroeconomic policies (IMF, 2018).

Economic growth creates new jobs and increases the demand for labor. As the economy grows, it hires more workers, and offers higher salaries. This leads to a decrease in the unemployment rate and an increase in wages. By promoting economic growth. The government and other policy makers are advised to deliver quality economic growth as well as increased economic growth. Economic growth is expected

not only to achieve a high value but also to improve people's welfare so that the labor force can be absorbed properly and can reduce unemployment. The government and other policy makers are expected to attract investors, both foreign and domestic investors, with the increasing value of investment realization will reduce the number of unemployed. The existence of investment allows the creation of new goods and capital so that it will absorb new production factors, namely creating new jobs or employment opportunities that will absorb labor so that it will reduce unemployment.

CONCLUSION

The results of this study can be concluded as follows: Economic growth has a negative and significant influence on unemployment in 30 countries in the Asian continent in 2016-2022. In this case, it can be interpreted that this research supports Okun's law which shows that economic growth plays a role in reducing unemployment in developing countries in 30 Asian continent countries. This research is in line with Arthur Okun's theory or known as "Okun's Law" which states that the economic growth variable has a negative and significant effect on the unemployment variable in 30 countries on the Asian continent. The economic growth variable has a coefficient of -0.0565682, when economic growth increases by 1%, unemployment will decrease by 0.056%. Vice versa, if the economic growth variable decreases by 1%, then unemployment will increase by 0.056%.

SUGGESTIONS

Based on the results of the research that has been done, the researcher has the following suggestions: This research is expected to provide in-depth insight into how factors affect economic growth and unemployment, so that it can help policy makers in designing effective strategies to create jobs and reduce unemployment. This research is expected to be continued using different methods and using different macroeconomic variables in different countries. So that the influence of other macroeconomic variables in other countries can be known, and steps can be taken to overcome the problems of economic growth and unemployment.

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