Okun's Law, Phillips Curve and Its Effect on The Growth of Income Tax Article 21 Payments During Covid-19 Pandemic

Galih Ardin

The National Graduate Institute for Policy Studies (GRIPS), Tokyo, Jepang. Email: mef19502@grips.ac.jp

*Coresponding Author: mef19502@grips.ac.jp

ABSTRACT

The Covid-19 pandemic has changed the macroeconomics indicators not only in Indonesia but also in other countries in the world. Restrictions on social activities, lockdowns, a decline in aggregate demand and supply as well as a drop in export and import activities have triggered a decrease in economic growth, increase unemployment rate, and stagnation of inflation rates leading to deflation. Logically, the turmoil in macroeconomic indicators will affect tax revenues, especially Article 21 Income Tax. Through the Okun's law and Phillips curve approach, this research tries to examine the relationship between unemployment rates, economic growth, and inflation rates during the pandemic on income tax payments Article 21. Based on the examination using the Ordinary Least Squares (OLS) method, it founds that the unemployment rate does not have a significant effect on economic growth and inflation rates in Indonesia. In addition, economic growth also does not affect the payment of Income Tax Article 21. However, there is an interesting finding where the inflation rate has a positive effect on the payment of Income Tax Article 21 in Indonesia.

Keywords: Okun's law, Phillips curve, Covid-19, Income Tax Article 21, macroeconomics

1. INTRODUCTION

1.1 Background

More than two years after the Covid-19 pandemic hit Indonesia and other countries worldwide. According to data from the Covid-19 Countermeasures Task Force (2022), until the end of June 2022, the number of positive confirmed cases of Covid-19 in Indonesia reached 6,06 million people. Of these, 5.89 million has cured, and 156,622 of them died.

Unfortunately, the Covid-19 pandemic does not only attack the health sector. The economic and financial sectors were also devastated due to the Covid-19 pandemic.

Statistics Indonesia (2022) noted that at the time of the Covid-19 pandemic, the country's growth rate contracted by 1.26%. In fact, in the same period the previous year, economic growth in Indonesia reached 5.06%.

The same condition happened in the employment sector. Statistics Indonesia (2022) reported that in August 2020, or the beginning of the entry of the coronavirus-19, the unemployment rate in the country reached 7.08%. Compared to the same period of the previous year, the unemployment rate in Indonesia in the first quarter of 2020 experienced a sharp increase. In the first quarter of 2019, Indonesia's unemployment rate was 5,23%.

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This condition continues in 2021. In the first and third quarters of 2021, the unemployment rate in Indonesia was still in the range of 6,26% and 6,49%. However, better results happened in 2022. In the first quarter of 2022, the unemployment rate in Indonesia is 5.83% (Statistics Indonesia, 2022).

According to the Ministry of Finance (2021), the slowdown in economic growth and the increase in unemployment during the pandemic has been caused by a decrease in aggregate demand and supply as well as social restrictions on community activities as an effort to prevent the spread of the Covid-19 virus. Although at this time, the Covid-19 pandemic conditions are relatively under control, the economic growth rate has begun to improve, and the unemployment rate has begun to decline, it is not guaranteed that similar conditions will not happen in the future.

Therefore, a study is needed to map the relationship between economic growth, unemployment rate, and tax revenue in Indonesia. However, the mapping is essential to give the shareholder perspective regarding Indonesia's economic topography.

Several studies have discussed the impact of the Covid-19 pandemic on the workforce and unemployment. Ngadi et al. (2020), for example, found that during the Covid-19 pandemic, the termination rate reached 15.6% of the total formal workforce in Indonesia. On the other hand, Kasnelly (2020) found that the Covid-19 pandemic impacts the unemployment rate.

Even though there are several studies on Covid-19 impact on the economy, research should explicitly discuss the effect of economic growth, unemployment rate, and inflation rate on tax revenues, especially Article 21 income tax revenues during the pandemic period.

Therefore, by employing Okun's law and Philips curve theory, this study tries to find out the relationship between economic growth and the unemployment rate in Indonesia and its effect on revenue growth of Income Tax Article 21.

This study consists of five parts. The first part discusses the background of the research. The second part talks about the theoretical framework and the development of hypotheses. The third part describes the research methodology. Furthermore, the discussion results are explained in the fourth part, and the conclusions and suggestions will be reviewed in the fifth part.

2. TEORETIS FRAMEWORK AND HYPOTHESIS DEVELOPMENT
2.1 Theoretical framework

Economists have long accepted Okun's law as one of the references discussing the relationship between economic growth and the unemployment rate. Okun's law states that there is a relationship between economic growth and the unemployment rate in the USA. Economic growth of 3% will decrease the unemployment rate by 1% (Prachowny, 1993).

On the other hand, the Phillips curve is generally used by economists to explain the relationship between the unemployment rate and the inflation rate. In other words, the lower the unemployment rate, the higher the inflation rate (Dritsaki & Dritsaki, 2013)

Okun's law and Phillips curve continued to undergo improvements and refinements in its developments. Soylu et al. (2018), for example, investigated the relationship between economic growth and unemployment in some Eastern European countries for the period 1992-2014 in the context of Okun's law. The results of research by Soylu et al. (2018) show that unemployment positively affects economic growth.

On the other hand, Yelwa et al. (2015) researched the same relationship by adding variables between 1987 and 2012. They found that the inflation rate have a negative impact on GDP.

Research conducted by Darman (2013) with the data analysis method using Ordinary Least Square (OLS) method found that Okun's law was invalid in the Indonesian economy. He argues that the degree of significance of the value of the Okun's law coefficient is quite small empirically. Therefore the unemployment rate in Indonesia is

not affected by changes in actual output (Darman, 2013).

Kanyarat (2010) analyzed the Phillips curve for Thailand using the OLS method using two categories of inflation (quarterly and annual). In his research, he showed that before the 1997 economic crisis, there was no relationship between inflation and unemployment. This negative relationship between inflation and unemployment only occurred after the 1997 economic crisis, which provided a strong structural shock to the capacity of the economy and financial sectors' capacity.

On the other hand, Amir (2007) analyzed the effect of inflation and economic growth on unemployment in Indonesia in the period 1980-2005 using graphical analysis and regression of the ANOVA method. The dependent variable is the unemployment rate, and the independent variable is inflation. In this research, he found a negative but insignificant relationship between inflation and economic growth, to unemployment both statistically and graphically (Amir, 2007). Amir (2007) argues that inflation in Indonesia is more likely to be caused by an increase in production costs, such as an increase in gasoline prices, rather than an increase in demand.

2.2 Hypothesis Framework

As the introduction explains, this paper examines the relationship between economic growth and inflation to the unemployment rate and its effect on the growth of Income Tax Article 21 payments.

Therefore, to fulfill the purpose of the study, three research questions were developed to be answered in this study: First, how does the unemployment rate affect economic growth? Second, how does the unemployment rate correlate with the inflation rate? Third, how do economic growth and inflation rate affect the growth of Income Tax Article 21 payments?

This research employs the Okun's law theory to answer the first research question. The null hypothesis that developed is that the unemployment rate does not affect economic growth (H0), and the alternative hypothesis (H1) is that Okun's law occurs in Indonesia.

Meanwhile, to answer the second research question, this research employs the Phillips curve theory with the unemployment rate hypothesis not affecting the inflation rate as the null hypothesis (H0) and the unemployment rate hypothesis not affecting the inflation rate as an alternative hypothesis (H1).

Furthermore, to answer the third research question, this research employs the hypothesis that economic growth and inflation rates do not affect the growth of Article 21 income tax deposits in Indonesia as the null hypothesis (H0) and the economic growth and inflation rates affect the growth of Article 21 income tax deposits in Indonesia as an alternative hypothesis (H 1)

3. RESEARCH METHODOLOGY

Four main data types will be used in this study: GDP growth, unemployment rate, inflation rate, and growth in Article 21 income tax payments. Data on GDP growth, inflation rate, and unemployment was taken from the World Bank data considering that the World Bank provides comprehensive historical data over a relatively long period. Therefore, it will help to make a regression analysis.

Moreover, World Bank's data also provides data on economic growth, inflation, and the level of other countries. Therefore, it will help to make a comparative analysis of Indonesia's economic conditions with other countries. For Income Tax Article 21 Payment Data, This research uses data officially published by DGT.

In order to examine the hypothesis of the first research question, this research use linear regression with a difference version approach as follows:

$$Yt - Yt - 1 = \alpha + \beta (Ut - Ut - 1) + \varepsilon t \quad (1)$$

Where Y t – Y t-1 is economic growth, α is intercept, β is the coefficient, (U t – U t-1) is the

change in the unemployment rate and ε is the term of error.

Furthermore, in order to examine the hypothesis of the second research question, this research used linear regression with the following equation:

$$Yi = \beta 0 + \beta 1 X 1 i + ui, \ i = 1,..n \qquad (2)$$

Where Yi is the inflation rate, β0 is the intercept, β1 is the coefficient, X1i is the unemployment rate and ui is the error term.

On the other hands, in order to examine the hypothesis of the third research question, this research used linear regression with the following equation:

$$Yi = \beta 0 + \beta 1 X 1 i + \beta 2 X 2 i + ui, i = 1,..n \qquad (3)$$

Where Yi is the growth of Income Tax payments Article 21 year on year, β0 is the intercept, β1 is the coefficient for the economic growth variable, X1i is the economic growth variable (GDP growth), β2 is the coefficient for the inflation variable, X2i is the inflation variable, while ui is a term of error.

In simple, the relationship between these variables can be described in the following figure:

Due to limited time and resources, the scope of this research is limited to the variables of economic growth, inflation, and unemployment rate from 1992 to 2021 in Indonesia.
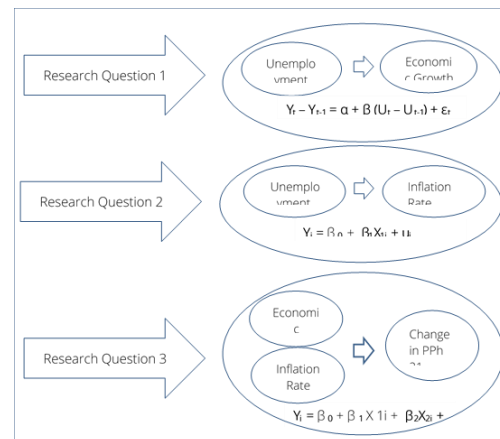

Figure 1: Relationship Between Variables in Research

4. RESULTS AND DISCUSSION
4.1 Overview of Economic Growth in Indonesia

According to World Bank Data (2022), economic growth in Indonesia is running quite well. The highest economic growth in Indonesia was achieved in 1968, at 10.92%. On the other hand, Indonesia experienced the lowest economic growth of -13.13% in 1998.

However, this drop in economic growth gradually increased in the following year as the trade balance improved to 0.79% in 1999 and 4.92% in 2000. When the subprime mortgage crisis occurred in 2009, economic growth in Indonesia could still grow by 4.63%. Details about economic growth in Indonesia can be seen in Figure 2 as follows:
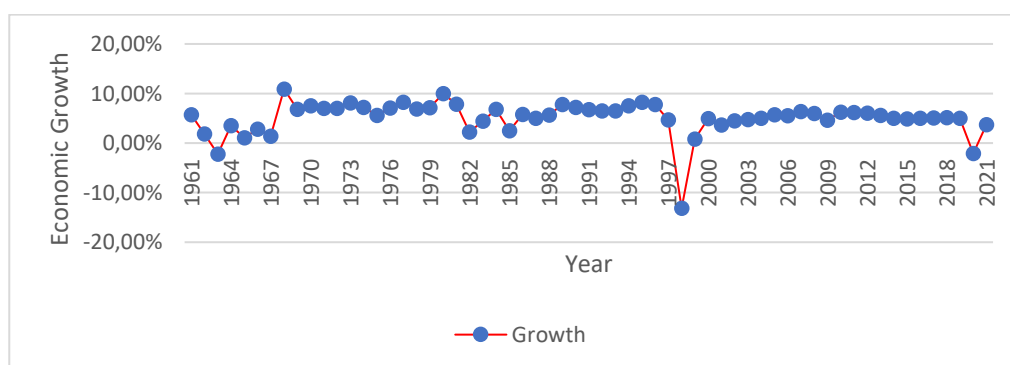

Figure 2 Economic Growth in Indonesia in 1961 – 2021
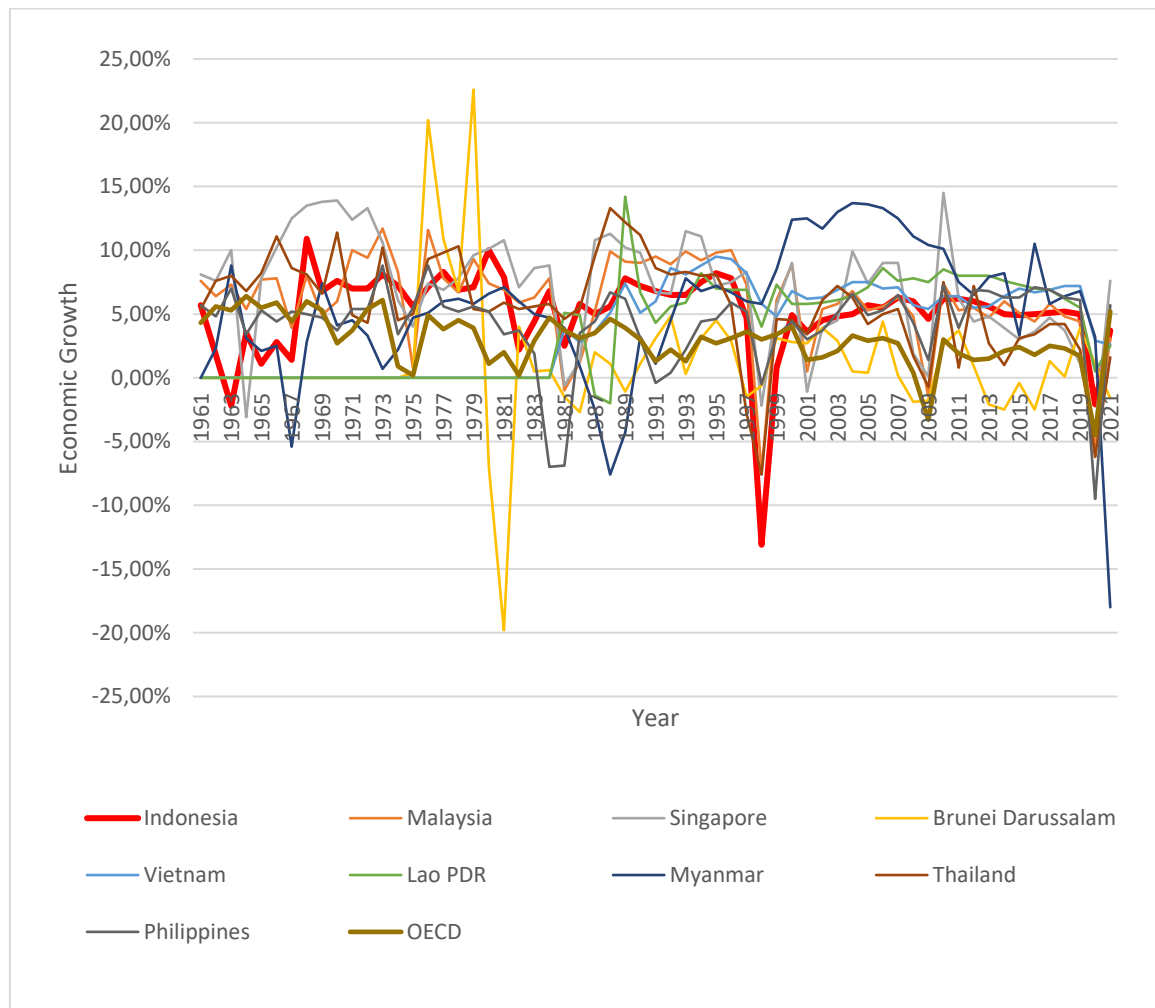Source: World Bank, 2022.

Figure 3 Economic Growth in ASEAN and OECD Countries in 1961 – 2021
Source: World Bank, 2022.

Compared to other ASEAN countries and OECD members, Indonesia's economic growth was relatively lower from 1961 to 1968. However, from 1968 to 1998, Indonesia's economic growth increased and was consistently in a higher position than the OECD countries and several ASEAN countries. In that period, only Singapore and Thailand had higher economic growth than Indonesia. However, when the economic crisis occurred in 1998, economic growth in Indonesia experienced the deepest contraction compared to other countries. In the following years after the economic crisis, economic growth in Indonesia was relatively more stable than in other countries. Details on the economic growth of ASEAN countries and OECD member countries can be seen in Figure 3.

4.2 Overview of The Unemployment Rate in Indonesia

The World Bank (2022) also shows that in 1991 the unemployment rate in Indonesia was generally low at 2.62%. The unemployment rate in Indonesia experienced a spike in 1994 and 1998. The unemployment rate in Indonesia experienced its peak in 2007 when at that time, the unemployment rate in Indonesia reached 8.06%. This unfavorable condition gradually improved in the next period so that Indonesia could reduce the unemployment rate to touch a level of 3.62% in 2019.
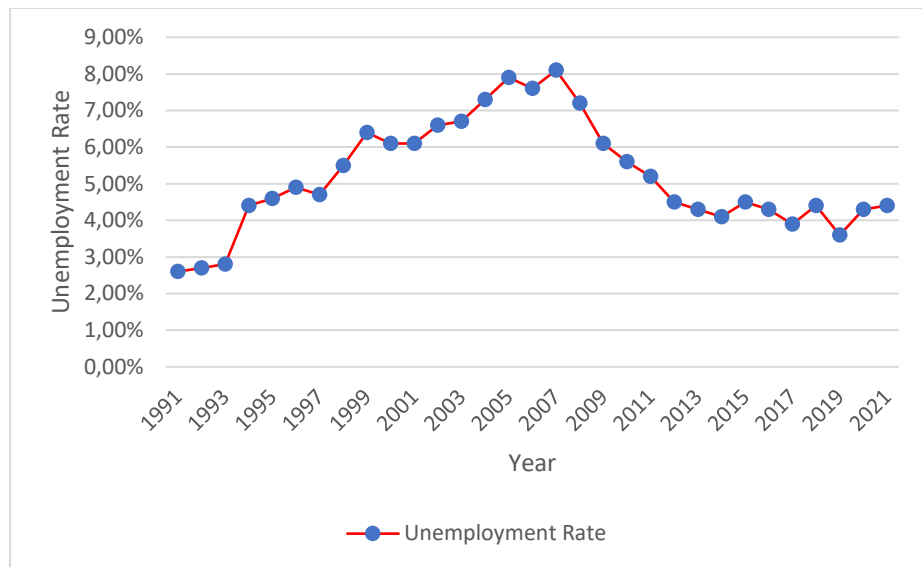
Figure 4 Unemployment Rate in Indonesia in the Period 1991 - 2021
Source: World Bank, 2022.

However, the unemployment rate in Indonesia increased 4.11% during the beginning of Covid-19 pandemic. The decrease in aggregate demand and supply had made many companies layoff their workers, The details of the development of the unemployment rate in Indonesia can be seen in Figure 4.

According to the World Bank (2022), it is known that the unemployment rate in Indonesia is generally higher compared to other countries in ASEAN. However, compared to OECD countries, the unemployment rate in Indonesia is relatively lower. The unemployment rate in Indonesia is higher than that of OECD countries only from 2004 to 2009. Details of the unemployment rate can be found in Figure 5.
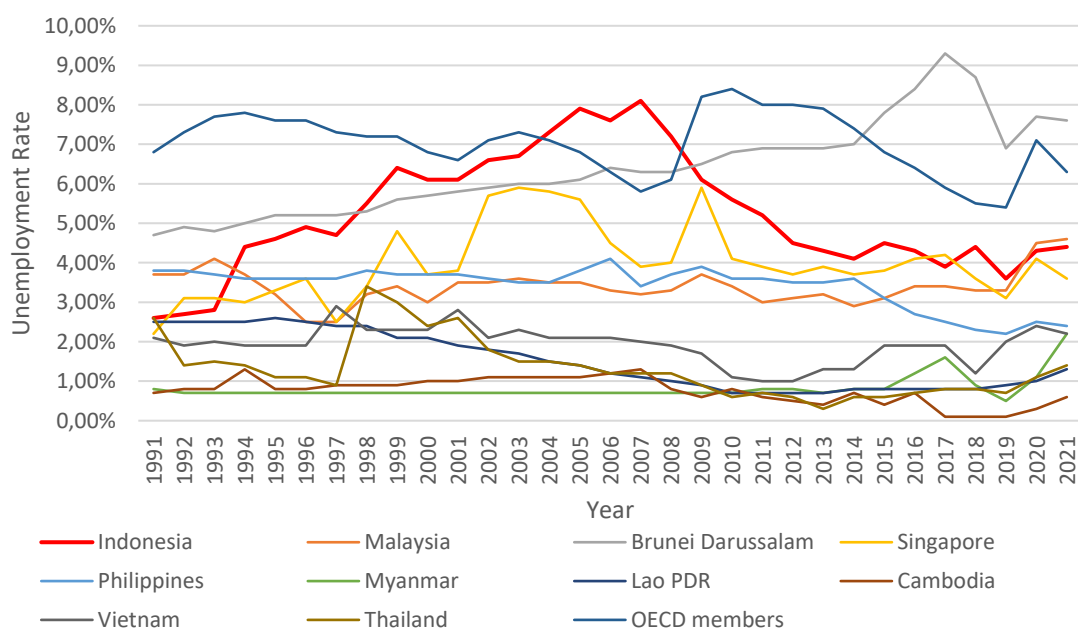

Figure 5 Unemployment Rate in ASEAN and OECD Countries in 1961 – 2021
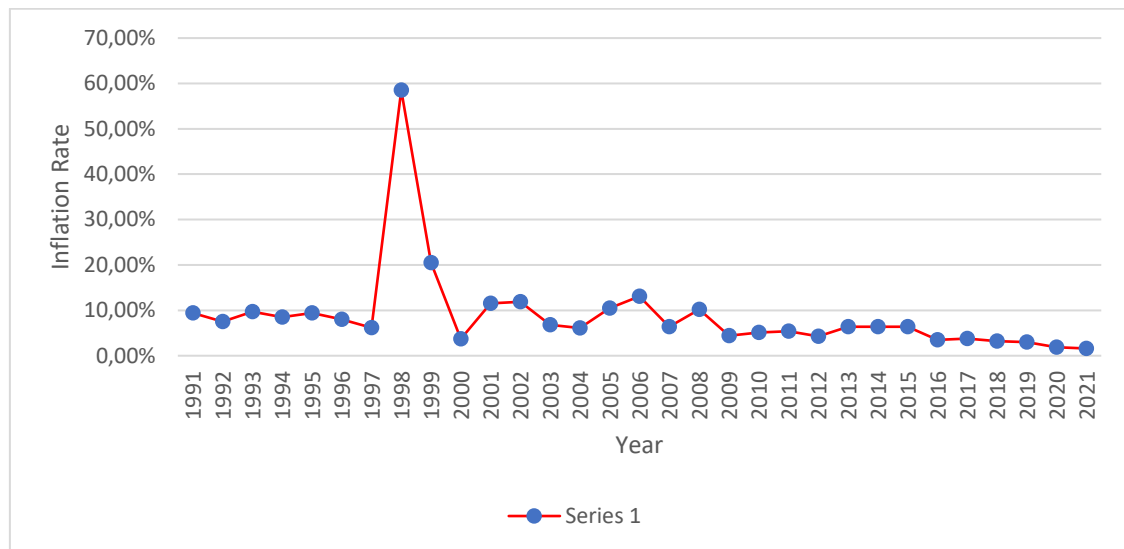Source: World Bank, 2022.

Figure 6 Inflation Rate in Indonesia in the Period 1991 – 2021
Source: World Bank, 2022.

4.3 **Overview of Inflation in Indonesia**

The World Bank (2022) inflation data show that from 1990 to 2020, inflation in Indonesia was generally less than 10%. However, in 1998 the inflation rate in Indonesia reached a peak of 58.45%, and in 1999 the inflation rate in Indonesia reached 20.48%. This high inflation rate gradually fell the following year until it touched 3.69% in 2020. The lowest inflation rate in Indonesia was experienced in 2019 at 3.03%. The turmoil of the inflation rate in Indonesia can be seen in Figure 6.

Compared to other countries, the inflation rate in Indonesia is generally higher than that of ASEAN countries and OECD countries. The inflation rate in Indonesia is generally lower than that of Laos and Myanmar, as illustrated in Figure 7.
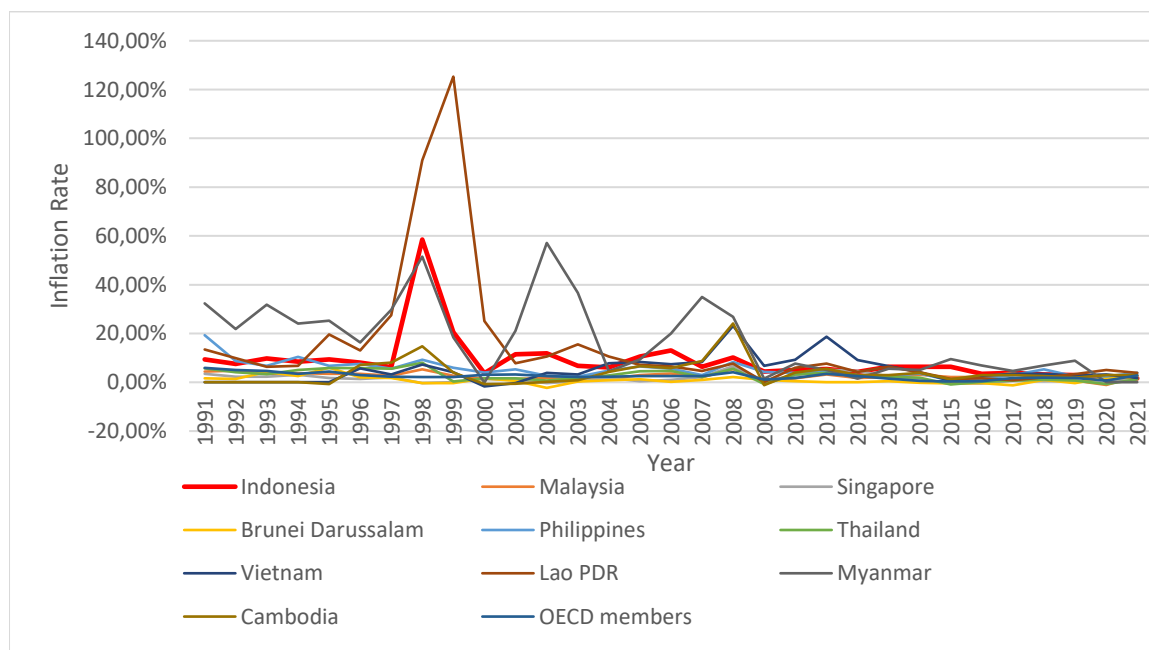

Figure 7 Inflation Rate in ASEAN and OECD Countries In 1991 - 2021
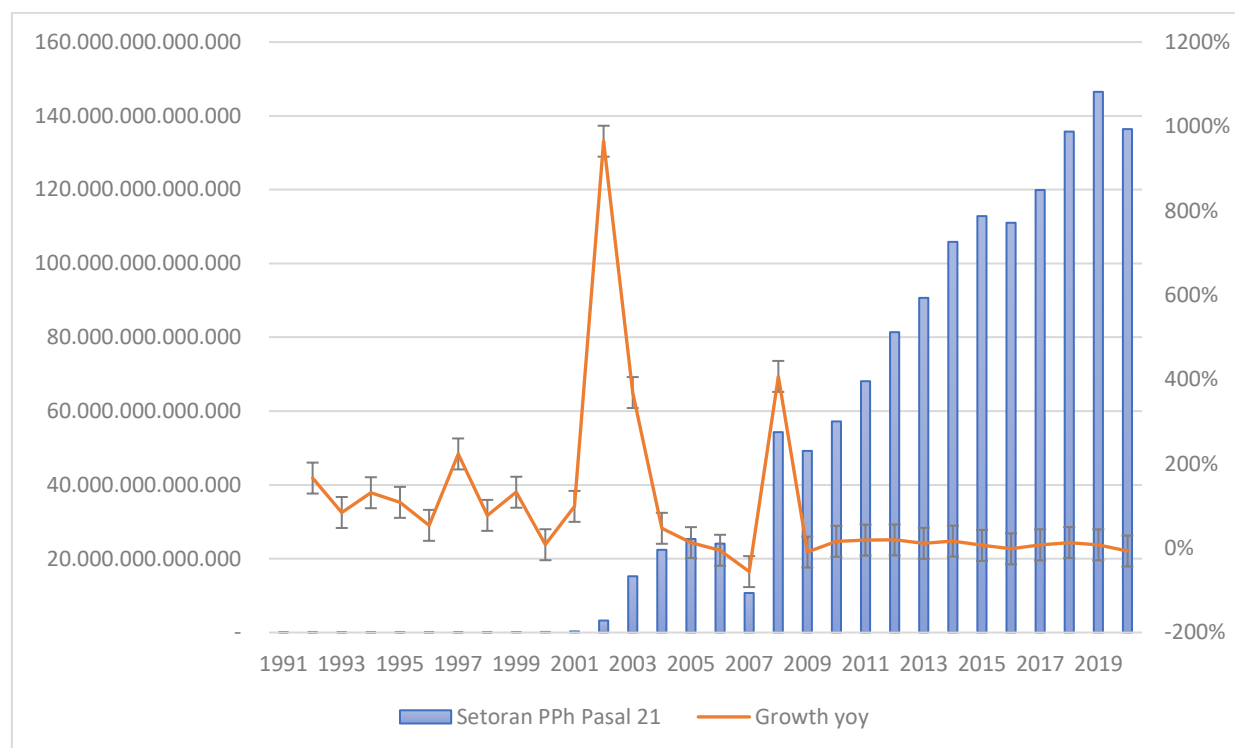Source: World Bank, 2022.

Figure 8 Value and Growth of Income Tax Payments Article 21 in the Period 1991 - 2021
Source: processed by author.

4.4 Overview of Income Tax Deposit Article 21 in Indonesia

DGT data shows that the payment of Income Tax Article 21 in Indonesia generally shows a good trend (DGT, 2022). The amount of Income Tax Article 21 payments continues to increase. In 2019 the amount of Income Tax Article 21 paid by taxpayers reached 146 trillion Rupiah. This number decreased slightly to 136 trillion Rupiah in 2020 due to the Covid-19 pandemic.

However, the amount of PPh Article 21 deposit in 2020 is still better than the amount of Income Tax Article 21 deposit in 2018 of 135 trillion Rupiah. To get an idea of the trend of Income Tax Article 21 payments in Indonesia, we can see the Figure 8.

The figure shows that the payment of Income Tax Article 21 has increased since 1991. However, by year-on-year growth, the growth of Income Tax Article 21 payments had experienced a drastic spike in 1997, 2002, and 2008. Those conditions could be due to the payment of

employee lay-off severance pay due to the political and economic crisis and subprime mortgage crisis in those years. To complete this analysis, the next section of this research will analyze the relationship between the payment of Income Tax Article 21 with economic growth and inflation.

4.5 The Relationship between Economic Growth and Unemployment in Indonesia (Okun's Law)

Okun's law theory states a negative relationship between unemployment and economic growth. Therefore, to examine the Okun's law in Indonesia, this research uses the null hypothesis (Ho) as follows: the changes in economic growth have no effect on the growth of the unemployment rate in Indonesia.

To test this hypothesis, this research employs the time series data on changes in the unemployment rate and economic growth from 1992 to 2020 in Indonesia.

Table 1 Results of Testing the Unemployment Rate with Economic Growth
Source: author

ChangeinGDPGrowth	Coef.	Std. Err	T	P> | t |
ChangeinunemplymentRate	-2,079808	1,650623	-1,26	0,218
_cons	0,0124031	0,2370941	0,05	0,959
Number of obs				29
R-Squared				0,0555
Adj R-Squared				0,0206

The examination found that changes in the unemployment rate are negatively correlated to changes in GDP, with a coefficient of –2,07. Any 1% increase in the unemployment rate change will reduce economic growth by 2.07%. However, table 1 also shows that the regression has a t-statistic of – 1,26 or lower than its critical value of 1,96. This condition can be interpreted that, statistically, changes in the unemployment rate have no significant effect on economic growth.

In addition, the examination results also showed that R-square value of 0,0555 which means that the variable change in the unemployment rate can only explain by 5,55% of the changes that occur in the economic growth rate. Mathematically, the relationship between the unemployment rate and economic growth can be explained in formula as follows:

$$Y_t - Y_{t-1} = \alpha + \beta(U_t - U_{t-1}) + \varepsilon t(i.i.d)$$
$$Y_t - Y_{t-1} = 0,01 - 2,07(U_t - U_{t-1}) + \varepsilon t \qquad (4)$$

$Y_t - Y_{t-1}$ is the change in the economic growth rate, $U_t - U_{t-1}$ is the change in the unemployment rate and εt is the error term.

The findings that the unemployment rate does not have a significant effect on the economic growth rate (Figure 9) is in line with the findings of Astuti (2016), which states that there is a negative relationship between changes in economic growth rates and changes in the unemployment rate in Indonesia but the negative relationship is not statistically significant. It shows that economic growth in Indonesia is not strong enough to improve the welfare of its population.
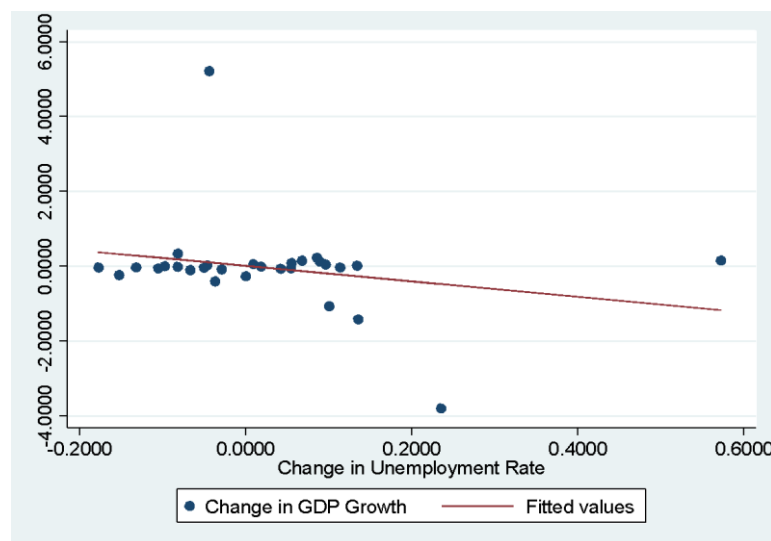

Figure 9 Scatter Plot of Economic Growth by Unemployment Rate
Source: processed by author

4.6 The Relationship between Inflation and Unemployment in Indonesia (Phillips Curve)

The Phillips curve theory explains that there is a negative relationship between the unemployment rate and inflation. A year with a low unemployment rate generally has a high inflation rate. Conversely, years with high unemployment rates tend to have low inflation rates.

However, based on research on the unemployment rate and inflation in Indonesia using the regression method, it is known that in Indonesia, the unemployment rate and inflation rate have little correlation. The lower t-statistic value proves this than the critical value of 1,96 (confidence level 95%). In addition, the p-value in the regression test also shows as much as 0,064 or greater than the critical value of 0,05.

Table 2 Testing Results of Unemployment Rate by Inflation Rate
Source: author

Inflationr~e	Coef.	Std. Err	t	P> | t |
Unemployment	1,2347	0,6391001	1,93	0,064
_cons	0,0260409	0,0250861	1,04	0,308
Number of obs				30
R-Squared				0,0353
Prob >F				0,0635

In theory, this led to the initial hypothesis that there was no correlation between the unemployment rate and the inflation rate to be plausible or statistically acceptable. Furthermore, the results of this test indirectly can be interpreted that the condition of the Phillips curve does not occur in Indonesia as shown by Figure 10.

The relationship between the inflation rate and the unemployment rate was previously observed by Sukirno. Sukirno (2019) argues that the inflation rate that occurs will result in an increase in the interest rate of loans. An increase in the interest rate will reduce investment to develop productive sectors. This condition lead affect to the high number of unemployed due to low employment opportunities as a result of low investment. Findings in Sukirno's research is in line with the findings of the test results which state that in
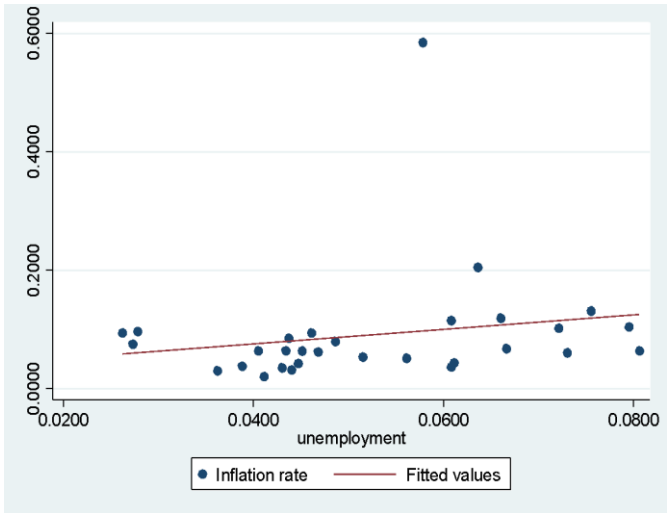

Figure 10 Scatter Plot of Inflation Rate with Unemployment Rate
Source: processed by author

Indonesia, there is a positive correlation between inflation and the unemployment rate.

Furthermore, the test results also stated that the value of R-squared was 0,0353. We can interpret this fact as the assumption that the variable unemployment rate can only explain 3,53 for the inflation that occurs in Indonesia. The rest are still many factors that affect the inflation rate in Indonesia. Mathematically, the relationship between the inflation rate and the unemployment rate is as follows:

$$Yi = \beta0 + \beta1X1i + ui \, (i.i.d.)$$
$$Yi = 0,2 + 1,2X + ui \qquad (5)$$

4.7 The Relationship between Unemployment, Economic Growth and Inflation Against Income Tax Deposits Article 21

The relationship between Article 21 income tax payments, economic growth, and inflation rates is the main issue in the third research question. Therefore, to answer the third research question, this research used data growth and inflation data provided by the World Bank and data on the growth of Income Tax Article 21 payments (year on year) since 1991.

Table 3 Results of Testing the Growth of Income Tax Payments Article 21 with the Rate of Inflation and Economic Growth
Source: author

PPh21	Coef.	Std. Err	t	P> | t |
GDPGrowth	15,88354	8,463495	1,88	0,072
Inflation	7,201252	3,62889	1,98	0,058
_cons	-,3643113	,5166775	-0,71	0,487
Number of obs				29
R-Squared				0,0477
Prob >F				0,1484

Based on the test results, it found that the variable GDP growth has a t-statistic value of 1,88 or lower than its critical value of 1,96. It means that the initial hypothesis that economic growth does not affect the growth of Article 21 income tax payments is accepted even though economic growth has a coefficient of 15,8.

On the other hand, the test results also found that the inflation variable had a t-statistic of 1,98 or greater than the critical value of 1,96. This t-statistical value shows that the initial hypothesis that the inflation rate did not affect the growth of Article 21 income tax payments was rejected while explaining that the inflation rate affected the growth of Article 21 income tax payments.

Furthermore, the R-squared value in this analysis is 0,0477. It means that the economic growth and inflation variables can only account for

4,7% of the changes in the income tax article 21 payment. Apart from the inflation rate and economic growth, various other factors still affect the payment of Income Tax Article 21.

Mathematically, the relationship between the growth of Income Tax payments in Article 21 and economic growth and the inflation rate can be described in the following equation:

$$Yi = \beta0 + \beta1 X 1i + \beta2X2i + ui$$
$$Yi = -0,3 + 15,8X1i + 7,2X2i + ui \qquad (6)$$

Where Yi is the rate of economic growth, X1i is the rate of economic growth, X2i is the rate of inflation and ui is the error terms.

Based on the data, facts and test results above, we can presumably know that economic growth does not directly affect the growth of

income tax Article 21 payments. On the other hand, the inflation rate affects the growth of Article 21 income tax payments.

It shows that the labor market in Indonesia is elastic to rising prices. Any increase in the price of goods will be responded to by an increase in wages and salaries of employees. This could be due to the strength of trade unions asking for an increase in the regional minimum wage.

5. CONCLUSION

Based on the examination of changes in economic growth with changes in the unemployment rate, it is known that there is no significant relationship between the unemployment rate and economic growth in Indonesia. It shows that statistically, the Okun's law does not happen in Indonesia.

Based on the examination of the inflation rate with the unemployment rate describes that there is no significant relationship between the inflation rate and the unemployment rate. This finding also answers the second research question that the Phillips curve does not apply in Indonesia.

Based on the examination between the growth of Article 21 income tax payments and the inflation rate and economic growth, it is known that economic growth does not directly affect the growth of Article 21 income tax payments. However, based on the test results, it is known that the inflation rate has a positive correlation with the growth of Article 21 income tax payments in Indonesia.

This research also found that economic growth does not directly affect the growth of Income Tax Article 21 payments. Therefore, this research suggests that the DGT Regional Office should refrain from using the growth of Regional Gross Domestic Product (GRDP) in determining the target of monitoring the period payment (PPM) of Income Tax Article 21.

This research also suggests that the regional inflation database provided by the Statistics Indonesia and Indonesia Central Bank can be used by the DGT Regional Office as an indicator

of growth in Income Tax Article 21 payments. This suggestion is led by the finding that the inflation rate positively affects the growth of Article 21 income tax deposits.

Moreover, this study also suggests a more in-depth study on what factors statistically affect the payment of Income Tax Article 21 so that Period Payment Supervision (PPM) can be evaluated periodically.

6. IMPLICATIONS AND LIMITATIONS

The author realizes there are still methods and results presented in this study. Therefore, the author encourages further research on the relationship between economic growth, inflation rate, and the unemployment rate to receipts tax by using more complete data, persistent variables, and comprehensive methods.

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