

The Impact of Fiscal Policy on Unemployment in Indonesia

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Abstract-This research investigates fiscal policy's role in influencing Indonesia's unemployment rate. This study uses secondary data with the Vector Error Correction Model (VECM) analysis method from 1970-2021. The study results show that foreign debt, government expenditure, and government revenue do not significantly affect unemployment in Indonesia in the short term. However, in the long term, foreign debt and government expenditure have a significant positive effect on unemployment, while government revenue has a significant negative effect on unemployment. The IRF test results show that the unemployment variable responds negatively if there is a shock to government expenditure and positively if there is a shock to foreign debt and government revenue. The FEVD test shows that government expenditure is the most effective fiscal policy in reducing the unemployment rate in the short term.

Keywords-Unemployment, foreign debt, revenue, and government expenditure.

I. INTRODUCTION

Unemployment has been a persistent issue in many countries, including Indonesia. Limited access to job opportunities is one of the main causes of unemployment. This leads to an oversupply of labor in the labor market, resulting in a situation where demand for labor falls short of supply. Consequently, a significant portion of the workforce still needs to be recognized and utilized in the economy (Mulyadi, 2016).

Unemployment has a negative impact on the government's ability to generate revenue and tends to reduce economic activity. High levels of unemployment lead to fewer people paying taxes to the government, which in turn affects the government's revenue stream (Egbulonu dan Amadi, 2016). Continuous increase in unemployment directly threatens a country's economic and social stability, which can impede human and economic development (Abouelfarag, 2021).

Article 27, Paragraph 2 explicitly states that all citizens have the right to a decent job and life. However, if unemployment cannot be overcome, social unrest will arise, negatively impacting society's welfare and long-term economic development prospects. Therefore, the government endeavors to reduce unemployment rates and their impacts. One policy that the government can implement to address the issue of unemployment is fiscal policy.

This research examines how fiscal policy (government revenue, government expenditure, and foreign debt) can contribute to reducing unemployment in Indonesia.

II. METHODOLOGY

1. Type and source of data:

The data used in this research is secondary data in the form of time series data. Time series data refers to data with a sequential period. This study's entire set of variables ranges from 1970 to 2021, with 51 data points (n). This period includes the oil crisis in 1973, the Asian economic crisis, the global financial crisis, and the crisis caused by the Covid-19 pandemic.

The data sources for this research were obtained from Bank Indonesia, the World Bank, IMF, and the Indonesian Central Statistics Agency (BPS). In addition, data collection was also conducted by reading books, scientific journals, articles, documentation, and publications related to the research to obtain more comprehensive information to support this study. The research period covers 1970-2021, which includes the oil crisis, the Asian economic crisis, the global financial crisis, and the crisis caused by the COVID-19 pandemic.

Table 1. Research Variables

Variables	Unit	Data Source
REV= Government Revenue	Billion (IDR)	BPS
ED= External Debt	%	World Bank
GOV= Government Expenditure	Billion (IDR)	BPS
U = Unemployment	%	BPS

Source: Author, 2022.

2. Analytical Method:

The analysis utilized in this study is Vector Error Correction Model (VECM) analysis. The Vector Error Correction Model (VECM) is a derivative method of the VAR (Vector Autoregression) model VAR/VECM. Before estimation, several pre-estimation tests were conducted, including stationarity, optimal lag length, VAR stability, and cointegration tests.

3. Stages of VAR/VECM Testing

- 3.1 Stationarity Test:** Time series data is said to be stationary if the data stochastically exhibits a constant pattern over time. This stationarity test determines if the time series data contains a unit root. The methods used for this test are the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests. Data is considered stationary, assuming that its mean and variance are constant.
- 3.2 Optimal Lag Selection:** Estimating a VAR model begins by determining the appropriate lag length to use in the model. Determining the optimal lag length is an essential aspect of VAR modeling. If the chosen lag length is too short, there is a risk of not fully capturing the dynamics of the model. On the other hand, an overly long optimal lag length will result in inefficient estimates due to a decrease in degrees of freedom (particularly with small sample sizes). Therefore, it is necessary to determine the optimal lag length before estimating a VAR model (Sulistiana 2017).
- 3.3 VAR/VECM Stability Test:** The VAR stability test is performed by calculating the polynomial function's roots, also known as the roots of the characteristic polynomial. If all of the roots of the polynomial function are within the unit circle, or if their absolute value is greater than 1, then the VAR model is considered stable. As a result, the Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) generated from the model are considered valid (Firdaus, 2020).
- 3.4 Causality Test:** The causality test determines whether there is a one-way or two-way relationship between endogenous variables in the research model. The Granger causality test is used to analyze the causal relationships among the variables to determine whether the variables statistically influence each other (two-way relationship), have a one-way relationship, or have no relationship at all (no influence).
- 3.5 Cointegration Test:** Two variables that are not stationary before differencing but are stationary after first differencing are likely to be cointegrated, meaning they have a long-term relationship. If both of the analyzed data are not stationary but cointegrated, it means a long-term relationship or equilibrium between the two variables. In the short term, there may be an imbalance. Because of this imbalance, a correction is needed using an Error Correction Model (ECM) (Firdaus 2020).
- 3.6 VECM Model Estimation:** VECM is used in non-structural VAR models if the time series data is non-stationary at the level but stationary after differencing

and is cointegrated, indicating a theoretical relationship between variables. In VECM, there is a speed of adjustment from the short to the long term. VECM is a limited form of VAR because its data is non-stationary but cointegrated. VECM is often called the VAR design for non-stationary series with cointegration relationships. The general specification of the VECM model is as follows (Firdaus 2020):

$$\Delta y_t = \mu_{0x} + \mu_{1x}t + \Gamma_1 y_{t-1} + \mu_{kx} \Delta y_{t-1} + \varepsilon_t(1)$$

Note :

- y_t = vector containing the variables analyzed in the study
- μ_{0x} = vector intercept,
- μ_{1x} = vector regression coefficients,
- $\Gamma_1 = \alpha \times \beta'$, where β' contains the long-run cointegration equation,
- y_{t-1} = in-level variable,
- Γ_{ix} = matrix of regression coefficients,
- $k-1$ = b ordo VECM from VAR,
- ε_t = error term.

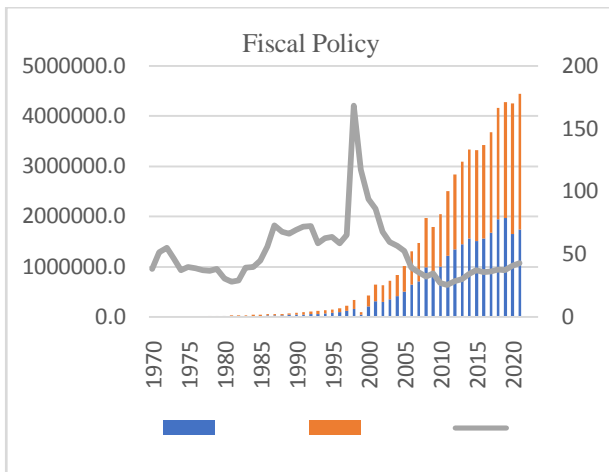
III. RESULTS AND DISCUSSION

1. Fiscal Policy:

Fiscal policy refers to the government's efforts to shape economic activities by utilizing the government budget. Traditionally, the budgetary approach emphasizes the balance of the government budget, whether in surplus or deficit. In addition, fiscal policy encompasses state revenues' magnitude and composition, government expenditure's level and design, and budget financing, including the amount and composition of public debt. (Greene 2021).

A portion of the government's revenue originates from foreign loans, which are required in the national budget as a component of government revenue and referred to as "developmental revenue." During the "New Order Regime" period, Indonesia's development relied heavily on foreign loans, reaching 72.68% (US\$) in 1988. However, due to the crisis of falling world oil prices and the economic crisis in 1998, foreign debt surged to 168.19% (US\$), and government expenditure rose sharply from IDR 82,221 billion in 1996 to IDR 172,670 billion in 1999. Nevertheless, it sharply declined to IDR 44,581 billion in 2000.

During the era of the New Order, foreign debt and foreign investment significantly contributed to rapid economic growth. Foreign debt increased dramatically during the 1998 currency crisis. Consequently, foreign debt was not only a supporting factor for development but had become the primary instrument for financing the state budget, especially during times of crisis.

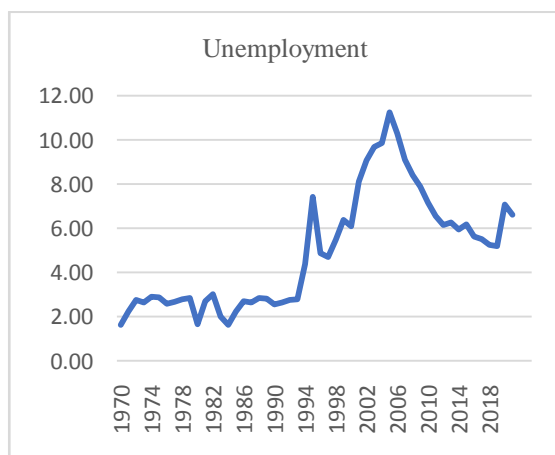


Source: Processed from BPS and World Bank 2022
Fig 1. Fiscal Policy in Indonesia from 1970-2021.

In 2019, the state revenue was Rp1,960.6 trillion; in 2020, it was Rp1,633.6 trillion. Therefore, the state revenue contracted by 16.7% or decreased by Rp327 trillion from the previous year. On the other hand, government expenditure increased drastically due to reallocating expenditures to support the handling of Covid-19. The realization of state expenditures in 2020 was Rp2,589.9 trillion or grew by 12.2% compared to 2019, which was only Rp2,309.3 trillion. (Afif 2021).

2. Unemployment:

Unemployment is caused by economic conditions, government policies that do not favor the people, development of non-real sectors, low education and lack of skills, limited job opportunities that are smaller than the number of job seekers, and job seekers' competition that is not in line with the labor market. The phenomenon of unemployment is also related to the termination of employment due to the economic crisis that closed business fields.



Source: Processed from the Indonesian Central Statistics Agency (BPS) 2022
Fig 2. Unemployment in Indonesia from 1970-2021.

Before the 1997 Indonesian economic crisis, the unemployment rate was generally below 5%. However, starting from 1999, the unemployment rate remained above 5% until 2021. The highest number of unemployed people was recorded in 2005, with 133,964 individuals and a 10.74% increase, attributed to the high inflation rate in that year, which directly impacted unemployment (Sirait, et al. 2018).

According to the Central Statistics Agency (BPS), the open unemployment rate in August 2020 was 7.07 percent, which increased by 1.84 percentage points compared to August 2019. This increase was due to the global crisis caused by the pandemic in 2020.

The economic sector was greatly affected by the decrease in demand for goods and services from the public. The closure of economic activities have led to an increase in unemployment and poverty. The number of unemployed people increased by 2.92 million (Hariyanto 2021).

3. Descriptive Analysis:

3.1 Data Stationarity Test:

The stationarity test of time series data is necessary at the initial stage to determine the presence of unit roots in all variables, to ensure the validity of the relationships in the equation and avoid producing spurious regression. Data that do not contain unit roots are stationary, which means the data has a variation that is not too large or close to the mean value. On the other hand, data with unit roots are non-stationary, resulting in inaccurate estimation results. The Augmented Dickey-Fuller (ADF) test can test data stationarity at the same degree (level or difference) until obtaining stationary data. On the other hand, data with unit roots are non-stationary, resulting in inaccurate estimation results. The Augmented Dickey-Fuller (ADF) test can test data stationarity at the same degree (level or difference) until obtaining stationary data.

Table 2. Stationarity Test with ADF Level.

Variable	t-Statistic	Critical Value 5%	Conclusion
Unemployment (U)	0.000289	1.95	Non-Stationary
Foreign Debt (ED)	-1.076734	1.95	Non-Stationary
Government Revenue (LNREV)	3.030052	1.95	Stationary
Government Expenditure (LNGOV)	3.201019	1.95	Stationary

Source: Processed Data Results, 2022.

Table 2 presents the results of the stationary test of fiscal policy and unemployment variables at the level using the Augmented Dickey-Fuller (ADF) method. The unit root test indicates that the variables used in this study are not all stationary in the class. The unemployment and foreign

debt variables at the level are smaller than the 5% significance level. This means that the two variables are not stationary in the class. Therefore, the test of variable stationarity is continued at the differentiation level.

Table 3. ADF Stationarity Test on 1st Difference

Variable	t-Statistic	Critical Value 5%	Conclusion
Unemployment (U)	-6.941769	1.95	Stationary
Foreign Debt (ED)	-8.268792	1.95	Stationary
Government Revenue (LNREV)	-7.350319	1.95	Stationary
Government Expenditure(LNGOV)	-7.441453	1.95	Stationary

Source: Processed Data Results, 2022

Table 3 presents the results of the stationarity test for the fiscal policy variable and the unemployment variable at the first difference level. The table shows that all variables are stationary at the first difference level, with all |t-statistic| values exceeding the critical t-value. Therefore, all variables in this model are fixed at the first difference level. This means the data used in this study is integrated at order one.

3.2 Optimum Lag Test:

Four criteria determined the optimal number of lags in this study: Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC), Hannan-Quin criterion (HQ), and Final Prediction Error (FPE), which have the most nominal or minimum value. Among the four criteria, it was found that the optimal lag for the VAR model to be estimated is 2.

Table 4. Optimum Lag Test.

lag	AIC	HQ	SC	FPE
1	-2.505529	-2.214286	-1.740720	0.081852
2	-3.988868	-3.464629	-2.612212	0.018818

Source: Processed Data Results, 2022

3.3 Model Stability Test:

Testing the stability of VAR is necessary before conducting model analysis because if the estimated results of VAR combined with the error correction model are unstable, then the impulse response function (IRF) and forecasting error variance decomposition (FEVD) will become invalid. Testing the stability of the VAR model in this study was done using the Root of Characteristic Polynomials.

Table 5. Model Stability Test

	Roots Value	Note
UtModel	0.077907-0.974094	stable

Source: Processed Data Results, 2022

A Root Modulus Polynomial value less than 1 (<1) indicates that the variable is stable. If the most considerable modulus value is less than one and is at the optimal point, then the model composition is optimal, and the VAR model is stable. Based on the stability results in table 5, it is known that the model is durable and passed the stability test because the root modulus polynomial value is less than one.

3.4 Results of causality testing:

The Granger causality test is conducted to determine whether there is a causal relationship among variables in the model. From table 6, it can be seen that the model does not have a causal relationship. This is indicated by the p-value, which is greater than 5%. This means that the model does not have a two-way relationship or does not mutually influence the endogenous variables in the model.

Table 6. Granger Causality.

F-Test	p-value	Note
1.187	0.3157	There is no causal relationship

Source: Processed Data Results, 2022

3.5 Cointegration Test:

The cointegration test was conducted using the Johansen approach by comparing the trace statistic with the critical value of 5%. The results of the cointegration test on the model based on the Johansen cointegration test can be seen below:

Table 7. Johansen Cointegration Test.

	Test	Critical Value 5%
r = 0	106.96	53.12
r = 1	35.94	34.91
r = 2	11.7	19.96
r = 3	3.14	9.24

Source: Processed Data Results, 2022

Based on the results of the Johansen cointegration test, it can be concluded that the role of fiscal policy on unemployment has a cointegrating relationship. This can be seen from table 7, which shows that there is more than one cointegrating equation, i.e., the trace statistic values at $r = 0$, $r = 1$ are more significant than the critical value of 5%, indicating the assumption of a long-run relationship between the fiscal policy and unemployment variables is proven. Therefore, the model of the role of fiscal policy on unemployment is estimated using Vector Error Correction Model (VECM) because there are cointegrated equations.

3.6 Results of Vector Error Correction Model (VECM) Estimation:

The results of the short-term VECM estimation of the role of fiscal policy on the unemployment variable are shown in table 8, while the long-term VECM estimation results are shown in Table 9.

Table 8. Short-Term VECM Estimation Results.

Dependent Variable		Independent Variable				
		ECT	U_{t-1}	ED_{t-1}	REV_{t-1}	GOV_{t-1}
U	Coef	0.002	0.028	0.004	2.735	-2.098
	P-value	0.714	0.85	0.639	0.259	0.376
ED	Coef	-0.101	-2.419	-0.19	11.762	-3.443
	P-value	0.348	0.418	0.232	0.806	0.942
REV	Coef	0.009	-0.039	-0.013	-0.692	0.4
	P-value	0.000***	0.098•	0.000***	0.073•	0.284
GOV	Coef	0.009	-0.044	-0.013	-0.619	0.346
	P-value	0.000***	0.087•	0.000***	0.13	0.385

Source: secondary Data, 2022 (processed)

Note: Significance at real level (•) 10%, (*) 5%, (**) 1%, (***) 0

The results of the short-run VECM in table 8 indicate that fiscal policy does not significantly affect the unemployment rate. The short-run analysis concludes that all budgetary policies do not substantially affect the unemployment variable. However, significant effects are found on other endogenous variables. The unemployment and foreign debt variables significantly negatively impact government revenue and expenditure.

Table 9. Long-Term VECM Estimation.

Dependent Variable		Independent Variable			
		U_{t-2}	ED_{t-2}	REV_{t-2}	GOV_{t-2}
U	Coef	1	0.380	-100.321	93.334
	P-value	.	0.000***	0.027*	0.035*

Source: Processed Data Results, 2022

Note: Significance at real level (•) 10%, (*) 5%, (**) 1%, (***) 0

The long-run VECM estimation results in table 9 show that government expenditure significantly positively affects the unemployment variable at 93.334. An increase in government expenditure by 1% would lead to a rise in unemployment by 93.334%. This indicates that government expenditure needs to reduce Indonesia's unemployment rate effectively.

This study's findings align with the research conducted by Marire (2022), who found that fiscal deficits lead to unemployment. A budgetary deficit means government expenditure exceeds government revenue in a certain period. However, the research conducted by Egbulonu and Amadi (2016) found that government expenditure has a significant negative effect at the 5% level.

Government expenditure on infrastructure projects can create job opportunities and boost the economy by increasing people's income and expenditure. This, in turn, can lead to a reduction in unemployment rates. Moreover, infrastructure development can also improve transportation and communication systems, attracting more businesses to invest and creating additional job

opportunities. Therefore, investing in infrastructure development can be an effective way for the government to stimulate economic growth and reduce unemployment rates.

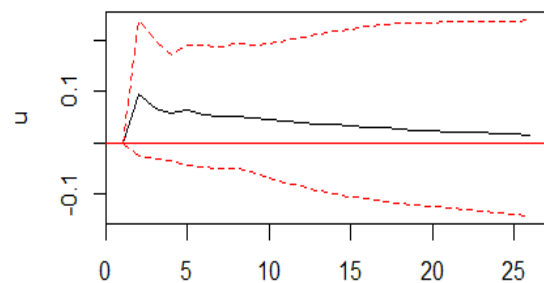
Based on the study results, it is correct that government revenue has a significant negative impact on unemployment, with a coefficient of -100.321. This means that a 1% increase in government revenue will decrease unemployment by -100.321%. Therefore, increasing government revenue can help reduce the unemployment rate.

Egbulonu and Amadi (2016), on the other hand, suggest that tax cuts (reduced revenue) used by the government to stimulate economic growth can reduce unemployment. Tax cuts give more money to consumers, which can lead to increased business income and expansion and hiring more workers. The foreign debt has a positive and significant impact on unemployment by 0.380. An increase in foreign debt by two periods before by 1% results in an increase in unemployment by 0.380% in the current period.

3.7 Impulse Response Function (IRF) Results:

3.7.1 Response of the Unemployment Variable to Government Revenue Shock: The response of the unemployment variable to a shock in government revenue of one standard deviation in the second year shows a positive response. The highest answer in period 2 is 0.094%. However, in the following periods, it continues to decrease, and even the response of the unemployment variable slowly approaches the equilibrium line. This means that shocks from government revenue can reduce unemployment rates in the long run.

Orthogonal Impulse Response from rev



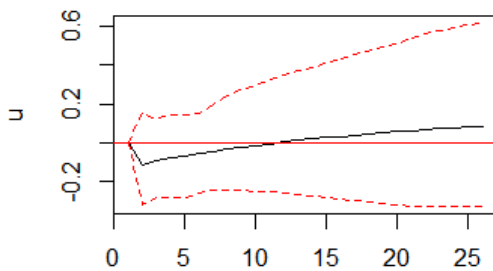
Source: Processed Data Results, 2022.

Fig 4. Response of the Unemployment Variable to Government Revenue Shock.

3.7.2 Response of Unemployment Variable to Government Expenditure Shock: The response of the unemployment variable to government expenditure shock in the second period exhibited a negative response until

the eleventh period and a positive response in the twelfth period of 0.004%, with further increasing response in subsequent periods. In other words, if a government expenditure shock of one standard deviation occurs, the unemployment rate can decrease until the eleventh period. However, starting from the twelfth period, a positive response occurs, indicating an increase in the unemployment rate.

Orthogonal Impulse Response from lngov

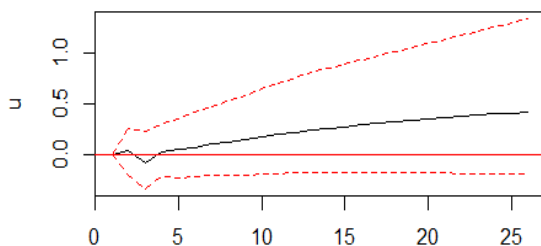


Source: Processed Data Results, 2022

Fig 5. Response of Unemployment Variable to Government Expenditure Shock.

3.7.3 Response of Unemployment Variable to Foreign Debt Shock:The unemployment variable response to foreign debt shock in the second period exhibited a positive response of 0.05%, a negative response in the third period of -0.07%, and a positive response in the fourth period and subsequent periods with a continuously increasing response value, reaching its highest value of 0.42% in the 25th period. In other words, if a foreign debt shock of one standard deviation occurs, the unemployment rate will continue to exhibit a positive response or an increase in unemployment rate, starting from the fourth period and persisting in the long run.

Orthogonal Impulse Response from ed



Source: Processed Data Results, 2022

Fig 6. Response of Unemployment Variable to Foreign Debt Shock.

3.7.4 Results of Forecasting Error Variance Decomposition (FEVD) regarding the role of Fiscal Policy in Unemployment:

The fiscal policy with the highest impact on unemployment is government expenditure at 0.848%. However, its contribution decreases continuously until period 10, reaching 0.493%. Similarly, government revenue contributes 0.0601% in the short run and reduces to 0.443% in the long run. The minor contribution in the second period is foreign debt at 0.184%, but it increases until period 10 to 1.367%.

Table 10. Results of Forecasting Error Variance Decomposition (FEVD)

No	Unemployment	External Debt	Government Revenue	Government Expenditure
1	1.0000000	0.000000000	0.000000000	0.000000000
2	0.9836515	0.001846948	0.006012937	0.008488587
3	0.9806753	0.003592116	0.006175819	0.009556728
4	0.9822884	0.002940853	0.005737756	0.009032945
5	0.9826297	0.003307553	0.005644594	0.008418202
6	0.9830139	0.003930744	0.005409110	0.007646202
7	0.9824096	0.005580101	0.005147107	0.006863223
8	0.9811285	0.007820038	0.004906804	0.006144643
9	0.9793293	0.010504542	0.004666503	0.005499644
10	0.9769540	0.013675445	0.004434354	0.004936213

Source: Processed Data Results, 2022

Based on the analysis, the variable that has the most significant impact on changes in the unemployment rate in Indonesia from 1970-2021 in the short term is government expenditure. However, for a long time, the policy that has had the most significant influence on unemployment is foreign debt. This implies that the approach that most affects changes in unemployment is government expenditure in the short term and foreign debt in the long term.

This is because government expenditure in the short term in the form of transfers to the public can maintain and increase people's purchasing power. Thus, the demand for production goods remains the same and may even increase. As a result, investors or entrepreneurs can expand or establish new businesses, thus increasing and maintaining their workforce.

III. CONCLUSION

Based on the long-term VECM test results, foreign debt and government expenditure significantly affect unemployment. In contrast, government revenue has a significant negative impact on unemployment. The IRF test results show that the unemployment variable responds negatively to a shock in government expenditure and positively to shocks in foreign debt and government

revenue. The FEVD test results also indicate that government expenditure is the most effective fiscal policy to reduce unemployment in the short term. However, in a long time, the most effective fiscal policy to reduce unemployment is government revenue.

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