THE ANALYSIS OF INCOME INEQUALITY IN INDONESIA DURING COVID-19: A REVIEW OF POLICY RESPONSES
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Abstract

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The Covid-19 pandemic has affected the economy from both the supply and demand sides. Policies are designed coherently and quickly, especially monetary and fiscal stimulus. However, the network effect of Covid-19 and global uncertainty can be a challenge in implementing a policy. The motivation behind this study is to determine the response of fiscal and monetary policies to income inequality in Indonesia pra-pandemic and during the period of Covid-19 pandemic. The dataset used in this study is panel data which consists of 25 provinces in Indonesia and period from 2017 – 2021. The estimation method used to identify the response of monetary and fiscal policy to income inequality in Indonesia is Dynamic GMM. This study found that only fiscal policies were effective in reducing inequality in Indonesia before the Covid-19 pandemic. Then during the Covid-19 pandemic period, this study found that monetary and fiscal policies were effective in reducing inequality in Indonesia. This condition shows that the stimulus issued by the government is effective in the sense that it can be a cushion to prevent widening inequality during the Covid-19 period. Overall, this study implies that policy synchronization between fiscal and monetary is needed to minimize the economic impact during the Covid-19 pandemic.

Keywords: *Inequality; Fiscal Policy; Monetary Policy; Panel Data*

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INTRODUCTION

Covid-19 pandemic impacts economic contraction worldwide (Brata et al., 2021). Covid-19 or SARS-CoV-2 is identified as a medical shock to the economy as it harms almost all sectors of the economy simultaneously (Baldwin & Mauro, 2020). This is a reason to always be aware of all aspects, ranging from social, political, cultural, to medical issues that can later disrupt the economy.

The Covid-19 pandemic has impacted all countries, both developed and developing countries (Benmelech & Tzur-Ilan, 2020). Based on data from the World Health Organization (WHO) as of April 26, 2023, it is known that the Covid-19 virus has spread throughout all regions in the world with a percentage of Europe by 36%, Western Pacific by 27%, America by 25%, Southeast Asia by 8%, Eastern Mediterranean by 3%, and Africa by 1% (WHO, 2023). One of countries affected by the Covid-19 pandemic is Indonesia.

The social distancing policy is one of the policies aimed at suppressing the spread of the virus that triggered the economic downturn in Indonesia. The policy causes disruptions in the supply chain and reduces production and consumption activities, increases unemployment, and reduces economic growth (Adam & Hermawan, 2011; Bartik et al., 2020; Crossley et al., 2021; Dalton et al., 2021; Shibata,

2020). The Central Bureau of Statistics reported that poverty and income inequality increased at the beginning of the pandemic (Indonesia Central Bureau of Statistics, 2022). Several previous studies also explain that the Covid-19 Pandemic and economic shocks have an effect on increasing income inequality (Blundell et al., 2020; Caggiano et al., 2020; Furceri et al., 2018; Galletta & Giommoni, 2020; Olivia et al., 2020). This is also evidenced by the value of the level of income inequality in Indonesia through the gini ratio value in 2020 of 0.383 which increased by 0.003 point compared to 2019 of 0.380 (Indonesia Central Bureau of Statistics, 2022). There is an increase in income inequality during the Covid-19 pandemic because many companies and self-employed people have lost significant income (Weidmann, 2021). Economic shocks have an impact on the level of income inequality or welfare of each household. In this case, the government and Central Bank responded to the Covid-19 pandemic by using various instruments such as fiscal and monetary policies.

Fiscal and monetary policies have been issued as an economic recovery stimulus package to minimize the increase in income inequality during the Covid-19 pandemic, focusing on the household and corporate side. Based on government regulation in lieu of law number 1 of 2020 on State Financial Sector Policy and Stability, the implementation of

fiscal policy in Indonesia includes: setting the state budget deficit limit above 3% of GDP, adjusting tax rates, ease of tax implementation, and customs and excise exemptions for imported goods related to domestic industrial development. The easing of fiscal policy can hold back a deeper economic weakening due to Covid-19 (Bennedsen et al., 2020; Chetty et al., 2020). The large role of fiscal policy in the economy is increasingly visible when fiscal policy is able to play a role in reducing income inequality (Enami, 2017; Enami et al., 2019; Ibarra et al., 2019). However, the selection of fiscal policy instruments is also of particular concern as there are instruments that can widen income inequality such as indirect taxes (Nguyen & Rubil, 2021).

The implementation of monetary policy can be done by reducing interest rates accompanied by easing the minimum reserve requirement and taking unconventional policies (quantitative easing) through the purchase of government and private securities. The central bank also released policies that ensure financial markets continue to run and ensure the availability of liquidity in the banking system for smooth lending. Accommodative monetary policy is expected to increase public consumption and increase productive investment so as to reduce income inequality (Saiki & Frost, 2014; Schnabel et al., 2020; Wardhono et al., 2021). However, other studies also suggest that expansionary monetary policy can increase income inequality (Mumtaz & Theophilopoulou, 2020). The channels used are net property wealth and net financial wealth in creating the increase in income inequality.

In spite of the implementation of various policy packages, the response of both monetary and fiscal policies to income inequality remains a particular concern, especially during shocks such as Covid-19. Thus, the purpose of this study is to determine the response of monetary and fiscal policies to income inequality in Indonesia during the Covid-19 pandemic. This study has several novelties compared to previous studies. First, it combines monetary and fiscal policies to determine their effect on income inequality. Previous research conducted studies that only focused on one of the policies (Enami, 2017; Furceri et al., 2018; Ibarra et al., 2019; Mejia-Mantilla et al., 2019; Samarina & Nguyen, 2019). Second, the dependent variable is income inequality. Previous studies have discussed monetary and fiscal policies on poverty and economic development (Chugunov et al., 2021; Tanjung et al., 2019). Third, this research used the Covid-19 pandemic as a form of shock to determine the effect of fiscal and monetary policy on income inequality, compared to Mumtaz & Theophilopoulou (2020) in their study that used the recession in the UK as a

form of shock to determine the effect of monetary policy on income inequality.

THEORETICAL BASIS

Several previous studies have conducted research related to the role of monetary and fiscal policy in reducing income inequality. Fiscal policy is able to reduce income inequality by 40% where the largest impact occurs in high-income and upper-middle-income countries because these countries have flexible tax policies (Granger et al., 2022). Studies related to fiscal policy and income inequality were also conducted by Rodriguez & Wai-poi (2021), Nguyen & Rubil (2021), and Carrasco et al. (2022). The results show that fiscal policy is able to reduce income inequality. This is evidenced by a decrease in the Gini index by several points. Fiscal instruments in the form of direct taxes, cash transfers, and transfers of goods and services through education spending have the greatest impact on reducing income inequality (Granger et al., 2022). While the overall picture shows that fiscal policy can reduce income inequality, on the other hand, it is known that there are fiscal instruments that can widen income inequality, namely indirect taxes, such as the study conducted by Nguyen & Rubil (2021) in Croatia. The Gambian government has minimized the effects of indirect taxes by implementing a cash transfer program (Carrasco et al., 2022). This is done to make the fiscal system also favor the poor.

There are several findings related to the impact of monetary policy on income inequality. Feldkircher & Kakamu (2022) conducted study in Japan found that monetary policy had different responses to income inequality based on the type of household. When the monetary policy is tight, income inequality is reduced for households that are broadly defined or included to the unemployed and retired population. Meanwhile, there is a different result for the households whose head family is still employed. Tighter monetary policy will lead to higher income inequality for these households. According to counterfactual analysis, it is concluded that long-term interest rate and unemployment rate are the main drivers for income inequality. This is especially true for working households where the long-term rate, which is the overall financing condition, is important for monetary policy transmission.

According to the studies conducted by Samarina & Nguyen (2019) in Europe and Park (2021) in Korea, there is a positive relationship between monetary policy and income inequality. An expansionary monetary policy can lead to income inequality reduction, particularly for periphery countries. Monetary policy impacts income inequality through general equilibrium effect.

The relationship between monetary policy and income inequality can be explained through several channels. First, the interest rate channel. Monetary policy on income inequality can be seen through the assets and liabilities owned by households (Amaral, 2017). Expansionary monetary policy will be more favorable when net savers have short-term assets and net borrowers have liabilities of relatively long duration. While in the opposite condition where net savers dominate long-term assets and net borrowers dominate short-term liabilities will be sacrificed a lot.

Second, the inflation expectation channel. Based on the study of Erosa & Ventura (2002), it is known that inflation expectations act as a regressive consumption tax and can eventually increase income inequality. Households will avoid the flat tax (inflation) by buying goods on credit to reduce transaction costs. However, this alternative has an impact on increasing income inequality because households with high consumption have low transaction costs, and low-income households with low consumption will have higher transaction costs or welfare costs. This condition makes income inequality more pronounced when there is a change in inflation expectations.

Third, saving channel. Expansionary monetary policy will tend to reduce inequality. This can be explained by research conducted by Doepke & Schneider (2006) which shows that middle-class households experience increased wealth than rich households. This is because middle-class households tend to have long-term debt with fixed interest and rich households have assets in deposits (short-term). This condition results in rich households being more disadvantaged.

Fourth, income channel. When interest rates increase, it can reduce the labor force ratio. This is because there is an increase in unemployment of less skilled workers and minorities (Carpenter & Rodgers, 2004). The unemployed may represent the group at the bottom of the income distribution. In other words, this channel explains that contractionary monetary policy will increase inequality, and vice versa.

RESEARCH METHODS

Type and Sources Data

This study uses panel data which is the mixture of time series and cross-section data. The time series starts from period 2017 which indicates the condition before Covid-19 pandemic to period 2021 which indicates the period during Covid-19 pandemic. Pandemic acts as a shock for the economy that has disrupted many aspects of the economy. Thus, it is important to be investigated to see the response between monetary and fiscal policies on income inequality in Indonesia. The cross-

section data selected in this study are 25 provinces in Indonesia, including Aceh, Bengkulu, Riau Islands, Riau, South Sumatra, Banten, Jakarta, DI Yogyakarta, Bali, West Java, Central Java, East Java, South Kalimantan, East Kalimantan, Central Kalimantan, NTB, NTT, Gorontalo, West Sulawesi, South Sulawesi, Central Sulawesi, Southeast Sulawesi, North Sulawesi, Papua, and West Papua. The 25 provinces are those that have high income inequality in Indonesia.

Table 1. Data Description

Data	Unit	Sources of Data
Income inequality	Indeks	Central Bureau of Statistics
Interest rate	Percentage (%)	Bank Indonesia
Government expenditure	Logarithms	Central Bureau of Statistics
Economic growth	Percentage (%)	Central Bureau of Statistics
Inflation	Percentage (%)	Central Bureau of Statistics

Source: Various sources, 2022

Some of the variables used in this study and their data sources can be seen in Table 1. The dependent variable is income inequality as measured by the gini ratio. The value of the gini ratio is between 0 and 1, which will describe high income inequality when the ratio value is close to 1. Then the independent variables in this study consist of interest rates and government spending. Interest rates represent monetary policy, while government spending represents fiscal policy. Economic growth and inflation variables act as control variables.

Model Specifications

This research refers to the research model used by Tanjung et al. (2019) regarding the effect of monetary and fiscal policies on poverty in Indonesia. The model of Tanjung et al. (2019) can be written as in equation (1) which can later be transformed into an econometric model such as equation (2), written as:

$$Pov = f(IR, exp, ER, GDP, INF, \ Crisis \quad (1)$$

$$Pov_t = \beta_0 + \beta_1 IR_t + \beta_2 exp_t + \beta_3 ER_t + \beta_4 GDP_t + \beta_5 INF_t + \beta_6 Crisis_t + \varepsilon_t \quad (2)$$

where *pov* describes the poverty rate, *IR* explains interest rates as a form of representation of monetary policy, *exp* explains government spending to represent fiscal policy, *GDP* explains real Gross Domestic Product, *INF* explains the annual inflation rate, and *Crisis* is a dummy variable for the occurrence of crises in Indonesia to determine the condition of the Indonesian economy.

The model from Tanjung et al. (2019) was modified in accordance with the objectives of this study, namely changing the dependent variable from poverty to income inequality. Then the crisis used in this study is the Covid-19 pandemic. Therefore, this research model can be written as equation (3) which is then transformed into an econometric model as can be seen in equation (4).

$$GINI = f(ir, lexp, ircov, lexpcov, \ gdp, inf)$$
$$(3)$$

$$GINI_{it} = \beta_0 + \beta_1 ir_{it} + \beta_2 lexp_{it} +$$
$$\beta_3 ircov_{it} + \beta_4 lexpcov_{it} +$$
$$\beta_5 growth_{it} + \beta_6 inf_{it} + \varepsilon_{it} \quad (4)$$

where *GINI* explains income inequality in Indonesia, *ir* explains interest rates before Covid-19, lexp explains government spending before Covid-19. Then this study uses interaction variables between covid-19 dummy variables and monetary and fiscal policies. This is done to determine changes in the relationship between the two variables. The interaction variable of monetary policy and Covid-19 is denoted by *ircov*, while the interaction variable of fiscal policy and Covid-19 is denoted by *lexpcov*. Then growth explains economic growth, and inf explains the inflation rate.

Data Analysis Method

The response of monetary and fiscal policies to income inequality in Indonesia can be answered using Generalized Method of Moment (GMM) estimation. This is because in estimating panel data there are problems that may occur, namely autocorrelation between variables (Wardhono, 2004). The presence of lagged dependent variable as independent variable can solve autocorrelation problems in the regression. In panel data analysis, this approach can also be implemented when dealing with autocorrelation problems.

However, this could lead to biased estimation due to the correlation between lagged dependent variable and error term. To address this issue, Arellano & Bond (1991) used GMM estimation method for estimating the dynamic panel models, which can resolve the autocorrelation problem and eliminate the correlation between error terms and independent variables. Furthermore, estimation using GMM can also capture the changes in the behavior of variables in a certain time span or called moments (Wardhono et al., 2014, 2015, 2017).

Based on the advantages possessed by GMM, this study uses the GMM system in answering research objectives related to the effect of monetary and fiscal policies on income inequality in Indonesia during Covid-19. The dynamic panel model used in this study can be written as in equation (5).

$$GINI_{it} = \beta_0 + \beta_1 GINI_{it-1} + \beta_1 ir_{it} +$$
$$\beta_2 lexp_{it} + \beta_3 ircov_{it} + \beta_4 lexpcov_{it} +$$
$$\beta_5 growth_{it} + \beta_6 inf_{it} + \varepsilon_{it}$$
$$(5)$$

Equation (5) is a development model of equation (4), namely the addition of a lagged dependent variable. This is in accordance with the assumptions used in GMM estimation.

RESEARCH RESULT AND DISCUSSION

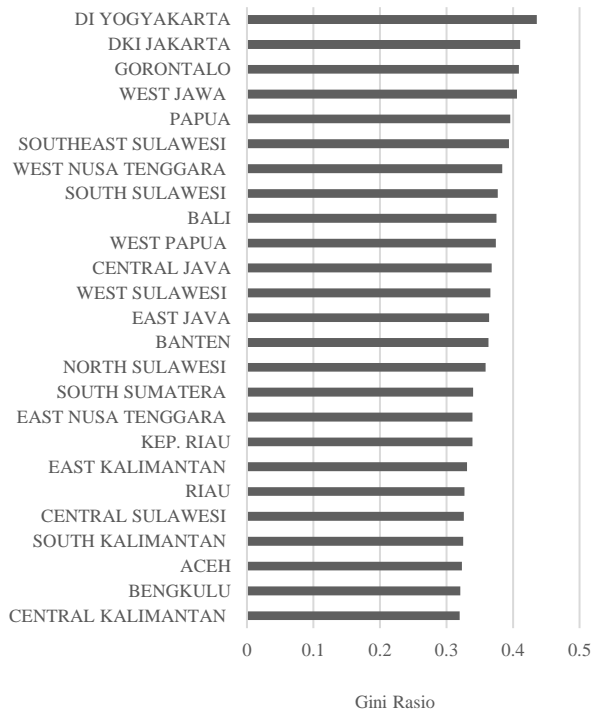**Dynamic of Income Inequality in Indonesia**

Income inequality is a regional problem that needs to be a major concern. Income inequality can have an impact on economic instability which will lead to an economic crisis. Income inequality in Indonesia before the Covid-19 pandemic (2017-2019) tended to decrease. However, during the Covid-19 pandemic (2020-2021) income inequality in Indonesia showed an increase (Figure 1). This shows that the problem of income inequality in Indonesia is still vulnerable to shocks. The Covid-19 pandemic has brought major changes in almost all sectors, one of which is the increase in income inequality. The implementation of various policies in order to cope with the spread of Covid-19, such as mobility restrictions, may cause economic activities to experience losses or even closure. Therefore, in aggregate, the Covid-19 shock increases income inequality due to increased unemployment.
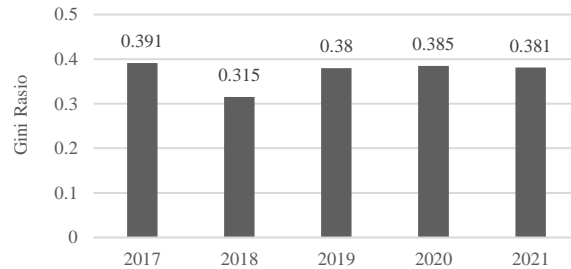
Source: Central Bureau of Statistics (2022)

Figure 1. Dynamic of Income Inequality in Indonesia

In 2021, the overall gini ratio in Indonesia is 0.381. Based on province, it is known that DI Yogyakarta is the province with the highest level of income inequality in Indonesia in 2021 at 0.436. This condition can occur due to the large impact of the Covid-19 pandemic in Yogyakarta where many workers are unemployed. However, the government has also tried to overcome it by optimizing government spending through labor-intensive projects because the Yogyakarta government can no longer rely on private spending. The government has also made tax reductions to entrepreneurs so that later they can absorb workers affected by the Covid-19 pandemic. After Yogyakarta, the regions with high income inequality are DKI Jakarta, Gorontalo, West Java, Papua, and Southeast Sulawesi. Meanwhile, Central Kalimantan is the province with the lowest level of income inequality in Indonesia in 2021 with a gini ratio of 0.320, followed by Bengkulu and Aceh (Figure 2).

Source: Central Bureau of Statistics (2022)

Figure 2. Income Inequality in Indonesia by Province in 2021

Result of Dynamic GMM Panel Estimating Analysis

This section reports the results of the dynamic GMM panel estimation to determine the response of monetary and fiscal policies to income inequality of several provinces in Indonesia according to equation (5). Prior to estimation, there are several tests such as Sargan Test and Arellano-Bond Test. These tests are used to test for over-identification restrictions in a models. This model was originally proposed by Sargan (1958) and then refined in later years. Sargan Test is built on the assumption that the coefficients of model

parameters are identified through priori restrictions and the tests are validated through over-identification restrictions. Whereas the Arellano-Bond Test assumes that first differentiation error has zero autocorrelation. The probability of Sargan Test and Arrelano-Bond Test must be more than α, which is 0,05 to ensure that the GMM instruments are valid.

As in this section, the analysis is carried out based on the full sample data approach. The test results in Table 2 for the Sargan Test show that the probability value is above 0.05. These results illustrate the validity of the instrument used. Then, the Arellano Bond Test results show no second-order serial correlation in the first difference residual. So overall it can be concluded that the instruments used in this study are valid.

Table 2. Model goodness of fit test

Test	Chi²	Z Score	Prob
Sargan Tets	12,13542		0,0590
Abond Test		0,47278	0,6364

Source: Secondary data, processed, 2022

Then, to consider the dynamic effects of the dependent variable and the exogenous characteristics of the dependent variable, this study constructs an Arellano-Bond dynamic panel model for the examination of dynamic panel data. The results of testing the response of monetary and fiscal policies on income inequality before and during the pandemic using Dynamic GMM are shown in Table 3. The

estimation results using Dynamic GMM show that before the Covid-19 pandemic, monetary policy, represented by interest rates, has a significant negative effect on income inequality with a coefficient of -0.019. This means that when there is an increase in the interest rate (*ir*), it will reduce income inequality by 0.019 percent. These results indicate that contractionary monetary policy will reduce income inequality in Indonesia in the period before the Covid-19 pandemic. This condition occurs through the income composition channel. Each household has unique characteristics in terms of resource and income level. However, it is found that households with higher income level tend to rely more on business income than wage income. Thus, a contractionary monetary policy shock can reduce income inequality as it reduces business income level more than wage income level. This finding leads to the conclusion that income inequality can be reduced by monetary policy through income composition channel. This result is supported by Battisti et al. (2014) who found that an increase in interest rates can reduce income inequality. Mumtaz & Theophilopoulou (2020) also found that contractionary monetary policy leads to a reduction in wealth inequality through the channels of net property wealth and net financial wealth. To overcome this problem, we

can utilize other wealth, namely physical wealth, to reduce wealth inequality.

Table 3. Dynamic GMM Estimation Results

Variable	Coefficient	Z Stat	Prob
$Gini_{t-1}$	-0,400	-14,84	0,000***
ir	-0,019	-14,84	0,037**
lexp	-.0,333	-2,66	0,008***
Covid-19 Variable			
ircov	0,018	2,06	0,040**
lexpcov	-0,004	-1,67	0,095*
Control Variable			
growth	-0,001	-0,51	0,613
inf	-0,011	-2,86	0,004***
cons	1,128	5,67	0.000
Wald chi^2		1482,20	
Prob > chi^2		0,000	

Notes: *, **, *** significant at *alpha* 1%, 5%, and 10%.
Source: Secondary data, processed, 2022

In a different direction, during the Covid-19 pandemic crisis, the results of this study found that monetary policy through interest rates can significantly affect income inequality positively with a coefficient value of 0.018. This indicates that when the central bank increase interest rates by 1 percent, it increases income inequality by 0.018 percent. During the Covid-19 pandemic crisis, monetary policy can affect income inequality through income heterogeneity. Income and wealth heterogeneity is widely regarded as the main channel of policy transmission. (Auclert, 2017). Hence, when the monetary policy is set to an expansionary stance, it can increase the level income of low-income workers to reduce

income inequality. This is also in line with Gertler & Gilchrist (1994) study which found that monetary policy shock had bigger effects on the sales of smaller firms than larger firms. Expansionary monetary policy will reduce income inequality by increasing the sales of small firms. This is also the case during the pandemic, where monetary policy plays an important role in mitigating the cyclical increase in income inequality. This can be good for low-income households as monetary policy can be used as a cushion in times of crisis. Households with lower incomes tend to have a higher risk of job loss during recessions than workers in higher-income households, so the positive effect of expansionary monetary policy through its effect on GDP growth can benefit the lowest-income groups. The implication is that a stable-oriented central bank, by carrying out its core mandate, tends to protect the most vulnerable and disadvantaged members of society first.

Fiscal policy as seen from government expenditure has a significant negative relationship with income inequality with a coefficient value of -0.003 before the Covid-19 pandemic. This indicates that the existence of government spending, especially those that lead to the empowerment of the lower middle class, will reduce the poverty rate in Indonesia. This also happened during the pandemic, where fiscal policy in the form of government

spending was able to reduce income inequality in Indonesia. This result is in line with previous studies that fiscal policy can reduce income inequality (Bennedsen et al., 2020; Chetty et al., 2020). This is because easing fiscal policy can cushion further economic weakness due to Covid-19 (De Gregorio & Lee, 2002; Lustig, 2014). In addition, incentivizing and providing full insurance payments to workers affected by Covid 19. Fiscal policy can slow down the increase in income inequality due to the large number of layoffs (Guerrieri et al., 2020). During the Covid-19 crisis, the government provided assistance to the labor and household sectors in the form of unemployment insurance, direct cash payments, and tax easing. In addition, the Government also provides assistance to other affected sectors, such as health with financial support to provide health facilities for its citizens.

CONCLUSIONS AND SUGGESTIONS

The Covid-19 pandemic has caused economies around the world to contract deeply, one of which is the Indonesian economy. Not only the economy, specifically the Covid-19 pandemic has caused a widening of income inequality in Indonesia. Various policy packages, both fiscal and monetary, were issued as a buffer for the economy with one of the objectives of suppressing the widening of income inequality in Indonesia. Therefore, this

study tries to determine the response of monetary and fiscal policies to income inequality before and during the Covid-19 pandemic.

The results show that before the Covid-19 crisis, monetary policy that was effective in reducing income inequality in Indonesia was contractive monetary policy. The transmission can be realized through the income composition channel. Meanwhile, fiscal policy that can reduce income inequality is expansionary fiscal policy. An increase in government expenditure in the form of subsidies directed at households can reduce income inequality.

There is an adjustment in the policy response to income inequality during the Covid-19 crisis period. Expansionary monetary policy is more effective than contractionary monetary in reducing income inequality in Indonesia. The decline in interest rates can be utilized to increase the amount of credit for allocation to the productive sector. This can be done by households with low income who are more vulnerable when shocks occur in the economy. Fiscal policy in reducing income inequality during the pandemic has the same nature as before the pandemic, namely expansionary. Expansion of government spending directed at social assistance can protect vulnerable people and thus reduce income inequality.

Based on the study results in this study, several policy implications can be given, namely, first, during a pandemic, fiscal policy in the form of government spending needs to be directed as subsidies and social assistance for the lower middle class. This is used to protect and can also improve the economy so that income inequality in Indonesia can be reduced. In addition, the government can optimize the role of fiscal policy in the form of spending on productive things to encourage the reduction of income inequality. Then, for monetary policy during a pandemic, it is carried out with supporting properties in becoming national stability through exchange rate and price stability.

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