



Analysis of The Relationship among Macroeconomics, Monetary and Income Inequality in Indonesia

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Abstract

Income inequality in Indonesia remains a controversial issue in the context of Indonesian macroeconomic condition that is evolving in output and government spending, and its increase in consumption accompanied by inflation and slowing of bank credit. The purpose of this study is to investigate the relationship among macroeconomics, monetary and income inequality through a broad theoretical model by adopting a panel Structural Vector Auto-regression (SVAR) model to get more sample size during the period 2005-2018 at 33 provinces in Indonesia. The main results indicate that the variables of output and inflation have positive relationships. The relationship between output and income inequality is also significantly correlated, and those results supported by Kuznets's theory reveal that the relationship between economic growth and income inequality is positive in the short term. The relationship between inflation and income inequality is positive as well in Indonesia. This result is by the fact that low-income families are considered more vulnerable to inflation. The impact of non-food consumption shocks increases income inequality, while Indonesian government spending and bank credit shocks reduce income inequality. Then the response of savings and bank credit to the shock of income inequality is positive.

INTRODUCTION

Recently, empirical studies have tried from various perspectives to investigate the reasons for the growing income inequality. However, recent researches have lacking attention paid to analyze the simultaneous relationship between macroeconomic, monetary and income inequality theoretically and empirically. Especially in Indonesia which has been reformed the economic in a crucial period, Indonesian macroeconomic conditions can be observed through output, consumption, government spending, domestic saving, and credit. Since 2005 up to 2018, the output growth in Indonesia has an average of 5.51%. Consumption and government spending continues to increase while domestic saving and credit have increased at a slower pace. Furthermore, those macroeconomic conditions have been followed by an increase in income inequality, In 2015-2018 the average of Gini coefficient reached 0.40 per year in that period, besides, was an increase in commodity prices over the past few years, which led to decline income in most of the Indonesian families.

The focus on the relationship between income inequality and macroeconomics began in 1950 during Kuznets concerning inverted U-shaped relationship between GDP and income inequality. Based on data on income inequality available at that time, Kuznets suggested while income increase in developing countries the income inequality increases as well, the Gini index reaches a maximum level then decrease as income levels increase. His findings were described as "inverted-U hypothesis". After this theory, many developing countries tolerate to increase income inequality on the foundation of the income will be more balanced in further developments as Kuznets observed. So far in Indonesia, income inequality has become more increased, where Indonesia's Gini coefficient has remained at 0.40 in 2018 while it was 0.34 in 2005. Even though Indonesia has a productive economy where the industrial sector contributes reached more than 45% of GDP, and Indonesia

reached the growth stage of output which has continued to increase in that period

Inflation levels are able to erode the value of money and reflect negatively on the standard of living and income inequality. The financial policies from consumers and investors sides have the power to reduce income inequality and help the poor to improve their living standards and purchasing power. According to Albanesi (2007), the correlation between inflation and income inequality is the result of a conflict distribution when decided on a policy, his study found a model for economy political offered where equilibrium inflation is positively related to income inequality because of low-income households relatively vulnerable to inflation. According to World Bank data, in 2008 Indonesia's inflation rate was 9.77% and it declined to 3.52 in 2016.

This study extends the literature to fill the gap on the relationship among macroeconomics, monetary and income inequality in Indonesia. We examined empirically the relationship of macroeconomics, monetary and income inequality through a comprehensive theoretical model that has multi-structural equations, which is an extension of Kuznets basic theory and other theoretical models which does not correlate the relationship between these variables simultaneously with the broader model. The problem studied in this paper extends the literature and fills the gap in the relationships, namely: 1) Is there a relationship among macroeconomic variables? 2) Is there a relationship among macroeconomic and monetary variables? 3) Is there a relationship among macroeconomic variables and income inequality? 4) Is there a relationship among monetary variables and income inequality?. We employ the panel data for 33 provinces in Indonesia with a structural vector autoregression (SVAR) approach. The sample period used in this study covers the data from 2005 to 2018. The suitable technical model is panel SVAR, which is the placement of boundaries in relationships that are not described in theory. This approach satisfies the purpose of integrating those simultaneous relationships into a structural

model to show the results of shocks between variables during the study period and answered its questions. In addition, we will get more observations by using the panel SVAR. This model is used to view structural impulse responses in the short run.

We outline the relationship among macroeconomics, monetary and income inequality, which is an extension of Kuznets' basic theory, and other theoretical models, which focuses on the correlation of income inequality with a macroeconomic or monetary variable unilateral and other variables are ignored. We correlate this relationship with simultaneously in a broader model, by describing this relationship in Figure 1. To explain this relationship in four blocks of illustration. The first block explained the relationship among macroeconomic variables. The second block, explains the relationship among macroeconomic and monetary variables. The third block describes the relationship among macroeconomic variables and income inequality. The fourth block defines the relationship among monetary variables and income inequality.

Correlating these four relationships into one model as in Figure 1, begins by correlating macro variables with each other, it is the output and its determinants of government spending consumption and savings. The output determines government spending by increasing revenues, and government spending increases household consumption and domestic savings, then saving is the opposite of consumption. These macro variables have a strong relationship with monetary variables (credit and inflation), starting with the fact that savings define credit, and the credit is directed to investment or consumption, which stimulates output and reduces inflation by increasing production. But inflation may rise as aggregate demand increases, any increased consumption. Inflation also affects output, stimulating production by increasing demand for goods and services. We assume that macro variables in this model, it has an effect on income inequality, and income inequality influenced by it excluding consumption and government

spending. As well as monetary variables, credit and inflation, affect and affected by income inequality. Below is the explanation of these relations and links it with literature.

The first block describes the relationship among macroeconomic variables, as illustrated by lines 1 in Figure 1. Macroeconomic variables in this research are output, consumption and savings and government expenditure. Output increases government spending. Atems (2019), uses the analysis of panel structural VAR to identify expenditure shocks assuming that government spending responds to output shocks with at least lag. Beyond that, government expenditures can increase output and affect national consumption and savings. As the study for Atems (2019) showed that government expenditure shocks have a Keynesian effect and positive innovations in government spending lead to increased output. A multiplier model for Murphy (2015) similar to a Keynesian multiplier, the effect of positive wealth which through its agents feel their permanent income increases when aggregate government spending increases, causes aggregate consumption to increase. But on the contrary, as alleged Barro (1990) output growth and saving rates drop with an increase in utility-type expenditures; the two rates rise primarily with government expenditures productivity but subsequently decline. The study of Olayungbo and Olayemi (2018) shows from error correction model and impulse responses, its results in the short-term and long-term negative effects of government spending on output. Also evidence from a sign-restricted VAR model for Chen and Liu (2018) found in the short term, the output response to a shock of government investment and government consumption is hump-shaped, the effect starts to be positive and becomes negative. Blanchard and Perotti (2002) have examined government spending by using a structural VAR approach and the results showed that government spending has a negative effect on investment spending. Due to the slowness of implementation, expansionary government investment can cause output contractions in the short term (Cogan et al., 2010).

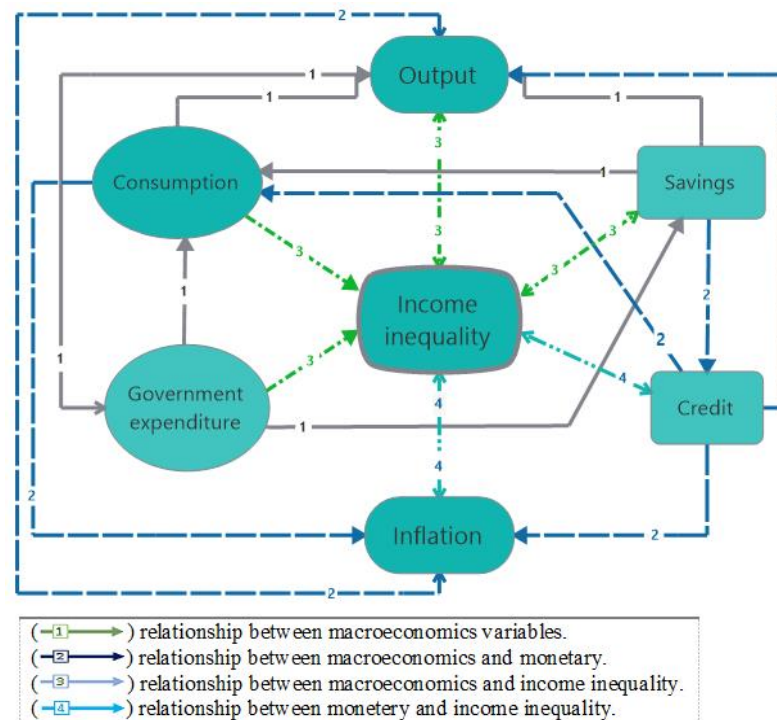


Figure 1. The relationship among macroeconomic, monetary and income inequality

Savings can promote output, accordance to empirical evidence from Patra et al. (2017) by using a structural break shows that savings encourage real activity and output growth. The study of Gu and Tam (2013) explains the problem of the Chinese savings complex using the SVAR model, findings that the output growth is positively affected by savings. Also, savings is inverse from consumption, hence consumption may influence output. The relationship between consumption and output more robust for low and middle-income countries, it is the logical conclusion because high-income countries allocate more capital for investment and highly specialize in research and development activities (Diacon and Maha, 2015).

Then the second block, explain the relationship among macroeconomic variables, and monetary variables namely inflation and credit, according to the illustration by lines 2 in Figure 1. Shows that output affects inflation. If the output from the supply side with increasing investment and supply of output will reduce inflation. But from the demand side, overall affects positive inflation because an increase in domestic and government demand for goods and

services will increase prices. Then gross domestic product and household consumption increase inflation. Nagayasu (2017) shows the importance of demand and supply elements in clarifying regional inflation, he found the different consumption forms across regions explain regional inflation in Japan. As well as Han and Mulligan (2008) provides evidence with a substantial relationship between inflation and public expenditure for the growth of a sample consisting of 80 countries.

While savings are a determinant of credit. And credit can affect consumption and inflation. The increase in loan interest increases production costs, then increases in prices of goods and services. Ignoring this effect when analyzing tight credit policies causes underestimation of inflation (Van Wijnbergen, 1983). Li, et al. (2016) explore the impact of credit constraints on consumption expenditure. The results show that reducing credit constraints helps increase rural household consumption expenditure in developing countries. From the other side inflation also stimulates production. Aydın, et al. (2016) observed that the inflation rate below 7.97% had a positive effect on output growth for

five Turkish republics. Then credit increases output because it increases investment. Tinoco-Zermeno et al. (2014), their results show that the private sector availability for bank credit in the economy has a positive impact on GDP. Peia and Roszbach (2015), show that there is an inverse causality between banking credit and output growth.

Block three describes the relationship between macroeconomic variables and income inequality as illustrated in Figure 1. Macro variables that affect the balance of income in this study are, Output, consumption, savings, and government expenditure. By integrating these macro variables and income inequality broadly, it began from Kuznet's hypothesis that the relationship between output growth and income inequality was positive in the initial stages of growth, and continued to increase until stable then declined at the stage of continued growth. According to Kuznets, the stages of growth to the advanced stage occurred when the living standards increase for lower-income classes. Campano and Salvatore (1988) show that the "Kuznets" hypothesis is acceptable and that the benefits of growth have not yet reached the poorer part of society, even though it increases the rate of economic growth. Paukert (1973) using the "Gini" coefficient to measure income inequality, shows that income inequality decreases with an increase in per capita income. An empirical study conducted by Qin, et al. (2009) regarding how income inequality influences growth in China, it indicates that income inequality is a consumption variable and that the way inequality develops has negative consequences on GDP. In contrast, the study of Rubin and Segal (2015) were concluded through used a panel regression causality that the link between economic growth and income inequality is positive.

Then the savings can promote income inequality. Gu and Tam (2013) found that income inequality is positively influenced by savings. Gu et al. (2018) showed strong evidence by a regression model, that the high and rising level of income inequality is a major mover of a savings glut. On the other hand, income

inequality affects savings. With increasing income inequality, savings will increase. Gu and Tam (2013) found that income inequality has a positive impact on savings, and that income inequality is a stronger factor than economic growth in explaining high savings. This happened because most of the income of the poor is for consumption while the rich people save. According to Chan et al. (2016), it has lately shown by panel VAR short-run that rising income inequality had contributed to rise in savings of the rich and reduce in consumption of the poor, pressuring politicians to authorize cheap loans for the poor from the rich. Chu and Wen (2017) conduct median regression analysis using community-level data and found that households with a high income had savings at a higher level, and also empirically states that income inequality is the dynamic power for increasing savings rates.

Consumption increases income inequality, especially non-food consumption. The increase in non-food consumption does not only come from higher-income but also from low income. Consumers imitate those at the top of their local economic ladder over large expenditures in highly visible categories of goods such as entertainment, vehicles, jewelry, and clothing (Charles and Lundy, 2013). These commodities monopolize their production by large capitalists so the excess in increasing consumption will increase income inequality.

Government expenditure can reduce income inequality. There are several studies, for example Anderson et al. (2017) and Anderson et al. (2018) they found evidence a negative relationship between government spending and income inequality, especially spending on social welfare and other social expenditures. However, income inequality does not affect government spending in the short term, because the government when determining the quantity of expenditure may income inequality not in consider compared to government revenue.

The fourth block illustrates the relationship among income inequality and monetary variables, as illustrated by lines 4 in Figure 1. The relationship between income

inequality and inflation, started by Al-Marhubi (1997) which used the positive political-economy approach to macroeconomic policy, found that countries with higher levels of inequality had higher average inflation. And Cysne, et al. (2005) has described the mechanism of the increase in the inflation rate, explicitly caused a decline in income inequality. The most realistic opinion expressed by Albanesi (2007), that inflation and income inequality are positively related, and low-income families are more vulnerable to inflation because households with low incomes are mostly consumption. However, if inflation is caused by input costs, for example in terms of high wage increases as a result of increased government spending on wages, this type of inflation leads to a continuous increase in wages because workers demand wage increases, while at the same time, monetary policy trying to reduce inflation by raising loan interest rates. As capital costs increase the business sector will respond to increased wages, thereby raising living standards and reducing income inequality.

Then credit affects income inequality as the Johansson and Wang (2014) show that monetary suppression tends to increase income inequality, so there is a positive relationship between credit pressure and income inequality, also found that credit control and performance barriers in the banking sector are the two most vital financial rules that affect income inequality. Furthermore according to Ghossoub and Reed (2017) have examined the role of money developing and the implications of financial development, that the economy with a relatively small stock market reaches the highest level of income inequality. In contrast, de Haan and Sturm (2017) which used a panel sample of 121 countries, showed that the credit increases income inequality. Further, income inequality affects credit bank, following Stockhammer (2015), income inequality leads to speculation in credit and to increase leverage among wealthier households, because inequality exhausts their consumption opportunities. Accordance with Malinen (2016) that higher-income inequality leads to higher bank credit, however, he claims that in short term income inequality may not

affect the bank credit, because borrowing matches the decreasing real income of workers as they do not increase their consumption, but just try to maintain their original level of consumption.

RESEARCH METHODS

This paper aims to analyze the relationship among variables of macroeconomic, monetary and income inequality in Indonesia using annual panel data during the period 2005-2018, covering 33 provinces in Indonesia. One of the advantages of the data panel structure using in this study which is has a greater number of observations and degrees of freedom. Source of data used is the Indonesian Central Bureau of Statistics, except data sources for credit and inflation from Indonesian banks. After transforming the data with absolute numbers to relative numbers, the standard deviation for all variables was 3.5% and the average annual improvement is 0.5%. (See Figure 2).

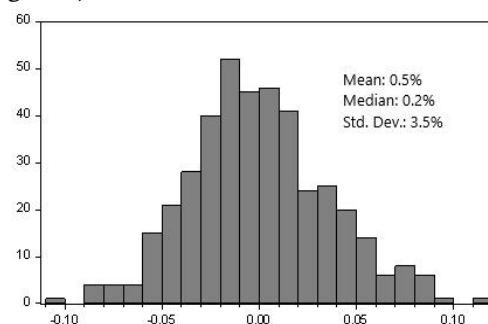


Figure 2. Distribution for the annual changes in the variables.

This paper uses a model for seven variables to estimate the effects of shocks among macroeconomic, monetary and income inequality. Macroeconomic variables are output, consumption, domestic savings, and government expenditure. Moreover output in the form of Indicators of Gross Domestic Product (GDP) of Regional. The consumption variable is the average monthly expenditure per capita in urban and rural areas by province and non-food items group. Savings is the position of the rupiah saving deposits in commercial and rural banks by province. Government expenditure is a

recapitulation of the realization of revenues and expenditures of the district/city government.

Monetary variables are two fundamental concepts which are inflation and credit, firstly inflation as measured by the consumer price index. Secondly, credit which is the number of loans given (in rupiah) by commercial and rural banks according to the provincial project location. The variable income inequality is the provincial Gini ratio.

In fact, to analyze the relationship among macroeconomics, monetary and income inequality, and integrating this simultaneous relationship into a structural model to show the results of shocks between variables during the study period, and to get more observations, it is necessary to use panel structural vector autoregression (SVAR), furthermore considering current and past random shock. This is reflected in the fact that the panel SVAR model which is an experimental tool is very suitable for understanding the nature of the impact of the shock. (Sims, 1980), proposes the use of a VAR approach includes the influence and accommodates all dynamic interactions that occur between variables. SVAR model is a simplified approach that will explain structural relationships if a number of identification assumptions are included, it also helps solve the problem of the complexity of the estimation and inference processes that occur when there are endogenous variables on both sides of the equation (dependent and independent). Use of the SVAR model because it has advantages, among others, is the description of data with a structural impulse response function that tracks the current and future response of each variable due to changes or a shock of a particular variable. For example, previous studies using the panel structural VAR are Lee, et al. (2012); Mishra, et al. (2014); Góes (2016); Attinasi and Metelli (2017); Messai and Gallali, (2019), and Liaqat (2019). To estimate this relationship, it will adopt the K variable panel structural VAR. Following the method explained by Lütkepohl, (2005), and Nasir, et al. (2019), the panel SVAR specification starts with the VAR Model for the panel data, as follows:

$$y_{it} = A_0 + A_1 y_{it-1} + \dots + A_p y_{it-p} + u_{it} \dots \dots \dots (1)$$

Where $y_{it} = (y_{1,it}, \dots, y_{k,it})$ is a vector of endogenous variables in each data unit $(y_{1t, \dots, it})$, (A_0) is $(k \times 1)$ vector of intercepts, $A_{(1, \dots, p)}$ is $(k \times k)$ coefficient matrices and u_{it} is $(k \times 1)$ vector of white noise error with zero mean and nonsingular covariance matrix $\sum u_i$. For identifying the innovations of structures that induce the effects of structural shocks in the structure variables y_{it} , we conclude the following structural specification for Eq. (1):

$$A y_{it} = A'_0 + A'_1 y_{it-1} + \dots + A'_p y_{it-p} + \varepsilon_{it} \dots \dots \dots (2)$$

Where ε_{it} is a $(k \times 1)$ structural disturbances vector with zero mean and covariance matrix $\sum \varepsilon_i$. Premultiplying structure (2) by A^{-1} provides the reduced form of Eq. (1) where $A_j = A^{-1} A'_{(1, \dots, p)}$ and:

$$u_{it} = A^{-1} \varepsilon_{it} = B \varepsilon_{it} \dots \dots \dots (3)$$

Determine the relationship among variables that can be observed directly to interpret unexpected part from change or shock. It is not uncommon to identify structural innovations directly from estimates of errors or reduce form residues u_{it} . One way to do this is to think about estimates of errors as a linear function of structural innovation (Lütkepohl, 2005). Variance-covariance matrix of the reduced system residuals can be retrieved by Eq. (3) as $\sum u_i = B \sum \varepsilon_i B'$, and:

$$\sum u_i B B' \dots \dots \dots (4)$$

Therefore the based standard assumption is that the structural shocks are not correlated and have unit variances. The minimum number of limitations essential for the unique specification of k^2 elements of B is equal to $k(k-1)/2$ (Emami and Adibpour, 2012).

We shall use the panel structural VAR model because the structural VAR specification is consistent with our theoretical model derivation. To obtain a series of identification, it can be used the theoretical model of the

relationship among macroeconomics, monetary, and income inequality. Which imposes a set of limits on excessive identification of the coefficients of matrix B in Equation (5). There are seven equations and seven variables in matrix B. Equation one there are six variables that directly influence income inequality reflected in the index Gini (gini). These variables consist of output (gdp), Inflation (π) as measured by the consumer price index, and consumption (c), credit (cred), savings (s), and government expenditure (gexp). In addition to these six variables and income inequality are determined also the total output in equation two. Moreover, income inequality and output, consumption, and credit affect inflation as equation three. In the fourth equation, consumption can be affected by credit, savings, and government expenditure. The fifth equation of credit is affected by savings and income inequality. The sixth equation, savings is affected by income inequality and government expenditure. Government expenditure is influenced by output as the seventh equation. Following the SVAR panel equations written by forming the matrix below:

$$\begin{bmatrix} u_i^{gini} \\ u_i^{gdp} \\ u_i^{\pi} \\ u_i^c \\ u_i^{cred} \\ u_i^s \\ u_i^{gexp} \end{bmatrix} = \begin{bmatrix} 1 & b_{12} & b_{13} & b_{14} & b_{15} & b_{16} & b_{17} \\ b_{21} & 1 & b_{23} & b_{24} & b_{25} & b_{26} & b_{27} \\ b_{31} & b_{32} & 1 & b_{34} & b_{35} & 0 & 0 \\ 0 & 0 & 0 & 1 & b_{45} & b_{46} & b_{47} \\ b_{51} & 0 & 0 & 0 & 1 & b_{56} & 0 \\ b_{61} & 0 & 0 & 0 & 0 & 1 & b_{67} \\ 0 & b_{72} & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_i^{gini} \\ \varepsilon_i^{gdp} \\ \varepsilon_i^{\pi} \\ \varepsilon_i^c \\ \varepsilon_i^{cred} \\ \varepsilon_i^s \\ \varepsilon_i^{gexp} \end{bmatrix} \dots\dots(5)$$

Where u_i^K is a structural disturbance for output shocks. The restrictions of the matrix of structural parameters from matrix B which is done substantially, changing the reaction function of the relationship between variables macro, monetary, and income inequality, based on the theoretical model of this research. In the model above the explanation of the restriction marked by zero (0) is an external variable that is not affected by simultaneous changes of the domestic variable. To analyze the relationship between these variables with the panel structural

VAR model will be tested over-identifying restriction by Log Likelihood statics. Moreover, by anticipation the matrix B, the structural shocks coefficients will be recovered and their effects on the system being investigated with impulse responses.

RESULTS AND DISCUSSION

The panel SVAR model described above is over-identified of restrictions were imposed and structural shocks coefficients were estimated. It is used to produce a short run structural impulse response function that captures the dynamic relationship. By following the steps of this method, the first step of the empirical analysis has been tested of panel unit root for all of the variables and to escape from spurious regression problematic, it was employed Augmented Dickey-Fuller (ADF) and Philips and Perron (PP) tests. The Basis on the obtained results, the first difference of all the variables are combined of order zero/I(0); hence, all the variables measured here are stationary.

In the following step, were employed to select optimal lag order of a panel VAR model, with assuming a maximum lag order of 2, the optimal lag proposed was 1 for which were conducted in the diagnostic tests. Then, the SVAR panel stability testing was carried out to looking the unit circle Inverse Roots of Autoregressive Characteristic Polynomial. Based on Figure 3, it can be a claim that the panel SVAR model formed is in a stable condition, because all roots are inside the unit circle.

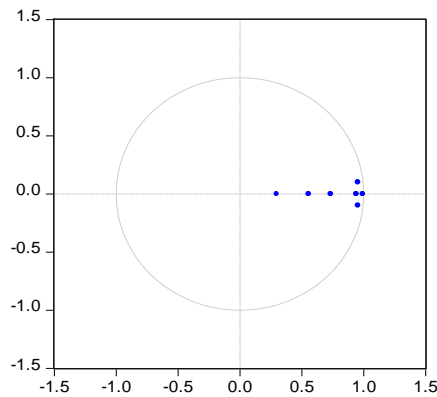


Figure 3. Inverse Roots of AR Characteristic Polynomial

The methodology of Panel SVAR is used to produce a short run structural impulse response function that captures the dynamic relationship among macroeconomic, monetary and income inequality in all provinces of Indonesia. In this section we use this estimated impulse response to answer four questions: 1) Is there a relationship among macroeconomic variables? 2) Is there a relationship among macroeconomic and monetary variables? 3) Is there a relationship among macroeconomic variables and income inequality? 4) Is there a relationship among monetary variables and income inequality?.

The Panel SVAR described above used to produce a short run structural impulse response function. The impact of short-run shocks for macroeconomic variables such as output (GDP), consumption (C), government expenditure (GEXP), and saving (S). As well as Indonesian monetary variables such as credit (CRED), inflation (INF). And income inequality (GINI). The IRFs analysis was carried out on the presence of innovations in the form of increasing the value of one variable equal to one standard deviation at the beginning of the period which results in an annual change over a period of 13 years to other variables. The selection of a period of 13 years after excluded 1 lag during the study period is estimated to be appropriate to observe changes in external variables to innovation shock from internal variables.

The results of the impulse response show the short-run impulse response among macroeconomic variables in Indonesia for 13 years in Figure 4. Appendices. The response of government expenditure to gross domestic product shocks is positive. That means output increases government spending, this result supports the study result of Athens (2019). But the gross domestic product response to government expenditure shocks began at the beginning of the period until the fifth period was responded positively, then became a negative response until the end of the simulation. These findings are in accordance with the findings of Chen and Liu (2018) who found the response of output to the shocks of government expenditure

was in the shaped of bumps, the effect began to be positive and become negative. Therefore maybe in Indonesia due to the slowness of implementation, expansionary government investment can cause output contractions in the short term as the claim of Cogan et al. (2010). Then the shock of government spending on savings is negative. This means that in Indonesia the savings decrease with increasing government spending. And the shocks of government expenditure on consumption is not significant.

The findings also show that consumption positively affects gross domestic product. This fact can be seen from the impact of consumption starting at the beginning of the period until the end of the simulation is responded positively to gross domestic product. This means that consumption drives gross domestic product. This finding is consistent with Barro, (1990). From the empirical findings, the shocks of savings to gross domestic product is positive. The results show that savings drive output, also from the empirical findings, the shocks of savings on consumption is negative. Meaning that Indonesian savings encourage real activity and output growth. These fact accordance with Patra et al. (2017) and Gu and Tam (2013), who concluded that the output growth is positively affected by savings.

The empirical findings, in Figure 5. Appendices. Show that the response of inflation to gross domestic product shocks and consumption is positive. This means that output and household consumption increase inflation; because the increase in household and government demand for goods and services will increase prices. These results accordance with the results of Nagayasu (2017) and Han and Mulligan (2008). From empirical findings and analysis of impulses response also found the shock of savings to credit is positive. The results show that savings encourage bank credit. And credit was responded by gross domestic product as seen from the impact of credit starting negative at the beginning of the period and then becoming positive until the end of the simulation. This result supports Tinoco-Zermeno et al. (2014), which shows that the availability of bank credit has a positive impact on output.

The impact of the response received by inflation and consumption due to bank credit shocks is negative. This means that the increase in bank credit has a negative impact on the real prices of commodities and declines in consumption in Indonesia. This condition is due to the innovation of bank credit which has driven the growth of real sector output. Increased real sector production has resulted in a decline in the prices of traded commodities. And the increase in credit constraints pushing reduce household consumption in Indonesia.

At the same time, the gross domestic product response to inflation shocks is positively effective starting at the beginning of the period up to the end of the simulation. This means that in Indonesia the increase in inflation tends to be responded by an increase in output growth. Indonesia's inflation rate was 9.77% in 2008 and it declined to 3.52 in 2016 and 3.13 in 2018. Therefor these finding constant with the results of Aydın, et al. (2016) who observed that the inflation rate below 7.97% had a positive effect on output growth.

The consequences of the impulse response show the impact of income inequality on the macroeconomic variable in Figure 6. Appendices. The impact of the response received by gross domestic product due to the shock of income inequality is positive, starts highly at the beginning of the period then shrinks at the end of the simulation. These results support Kuznets's theory and other studies which say that the relationship between economic growth and income inequality is positive in the short run or in the initial stages of growth. Simultaneously, the response of income inequality to gross domestic product shocks is also positive and starts highly at the beginning of the period then shrinks at the end of the simulation. This result also supports the claim of Campano and Salvatore (1988) wich that says the "Kuznets" hypothesis is acceptable and that the benefits of growth have not yet reached the poorer part of society in the short term, even though it increases the rate of economic growth.

The shocks of savings against income inequality is positive. And the impact of the

response received by savings due to the shock of income inequality is positive response. This refers that income inequality has a positive impact on savings, and rising in income inequality has contributed to an increase in rich people's savings and a decrease in consumption of poor people. Therefor it is constant with Chu and Wen (2017) who empirically states that income inequality is the dynamic power for increasing savings rates and that households with a high income had savings at a higher level. Also, these results support the results of Gu and Tam (2013) who found that income inequality has a positive impact on savings and Chan et al. (2016) who found in the short-run that rising income inequality has contributed to the rise in savings of the rich and reduce in poor consumption.

The findings also show that consumption positively affects income inequality. This fact can be seen from the impact of consumption starting at the beginning of the period until the end of the simulation was responded positively by income inequality. This means that consumption of non-food has increases income inequality in Indonesia. The reason for this fact is that non-food commodities have a monopoly on their production by large capitalists so the excess in increasing consumption increased income inequality. The findings also show that government spending negatively affects income inequality. Based on the coefficient matrix of the structural estimation results it is considered that significant. This means that government spending shocks reduce income inequality in Indonesia. This fact is consistent with Anderson et al. (2017) and Anderson et al. (2018) which found evidence a negative relationship between government spending and income inequality, especially spending on social welfare and other social expenditures.

The impulse response results, show the impact of income inequality on the monetary variable in Indonesia for 13 years in Figure 7. Appendices. The results point to inflation and income inequality are positively related. It seen from the impact of the response received by inflation due to the shock of income inequality is positive. This can conclude from the impact of

the Gini index at the beginning of the simulation period responded positively by inflation. This fact supports the study of Al-Marhubi (1997) and Albanesi (2007). At the same time, the response of income inequality to inflation shocks is positive, effective starting at the beginning of the period up to the end of the simulation. This means that the increase in inflation tends to an increase in income inequality. The results are in accordance with Albanesi (2007), which is assumed that low-income families are more vulnerable to inflation.

Furthermore, monetary variable shocks which are proxied by credit. The credit is responded negatively by the Gini index. Effective at the beginning of the 7th year. This means that the increase in bank credit tends to be responded by a decrease in income inequality in Indonesia. This result in contrast with de Haan and Sturm (2017) which found that the credit increases income inequality. However this result supports the study of Johansson and Wang (2014) which found that the credit control and performance barriers in the banking sector are the two most vital financial rules that affect income inequality.

Also, the impact of the response received by credit bank due to the shock of income inequality is positive, this refers that income inequality has a positive impact on savings and credit in the short term, and rising in income inequality has contributed to an increased credit by wealthier households as in accordance with Stockhammer (2015) who claims the income inequality leads to speculation in credit and to increase leverage among wealthier households because inequality exhausts their consumption opportunities. These results in contrast to Malinen (2016) which claim that in the short-run income inequality may not affect the bank credit because in the short-run borrowing matches the decreasing real income of workers as they do not increase their consumption, but just try to maintain their original level of consumption.

CONCLUSION

These study has been shown by results there is a relationship among macroeconomic variables in Indonesia, it is seen from the positive

impact of output shocks on government expenditure. At the same time, the output has responded to government expenditure shocks positively at the beginning of the period, then has become a negative response at the end of the period. Furthermore, the shocks of government spending on savings are negative. Also, the shocks of savings and consumption on output growth are positive. Moreover, the shock of savings on consumption is negative.

In fact, the relationship among macroeconomics and monetary can be seen from the impact of shocks and response between output and inflation positively. Also, the inflation response to consumption shocks is positive. From the empirical findings, it is also seen that the shocks of savings to credit is positive. While the credit was responded by output, it was seen from the impact of credit starting at the beginning of the period negatively and then becoming positive until the end of the period. Also, the impact of the response received by inflation and consumption due to bank credit shock is negative.

The results found there is a relationship among macroeconomic and income inequality which can be seen from the positive impact of the shock and the response between income inequality and output. The positive impact starts highly at the beginning of the period then shrinks at the end of the period. These results support Kuznets's theory and other studies which says that the relationship between economic growth and income inequality is positive in the short term. The findings show that the consumption shock towards income inequality is positive. While the findings show the shock of government spending to decrease income inequality. Hence, the impact of the response received by savings due to the shock of income inequality is positive.

Besides, it was a relationship among monetary and income inequality, which can be seen from the positive impact of the shocks and the responses between income inequality and inflation. This result is following the opinion that low-income families are considered more vulnerable to inflation. While credit was responded negatively by the Gini index, and the

Gini index has a positive impact on credit. This means that the increase in bank credit tends to decrease income inequality, and the rising in income inequality has contributed to an increased credit.

In term of further implications, we highly recommend to decrease income inequality in Indonesia and distribute the benefits of economic growth to all society members. The most focus on government investment expenditure that has a short-term return in promoting the output growth. Also should be increasing in domestic savings, with facilitating loans to low-income earners and directed it towards investment that reduces the higher of non-food consumption and reduces inflation. In addition to creating a competitive atmosphere must for production among the levels of income in society and achieving economic justice.

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APPENDIX

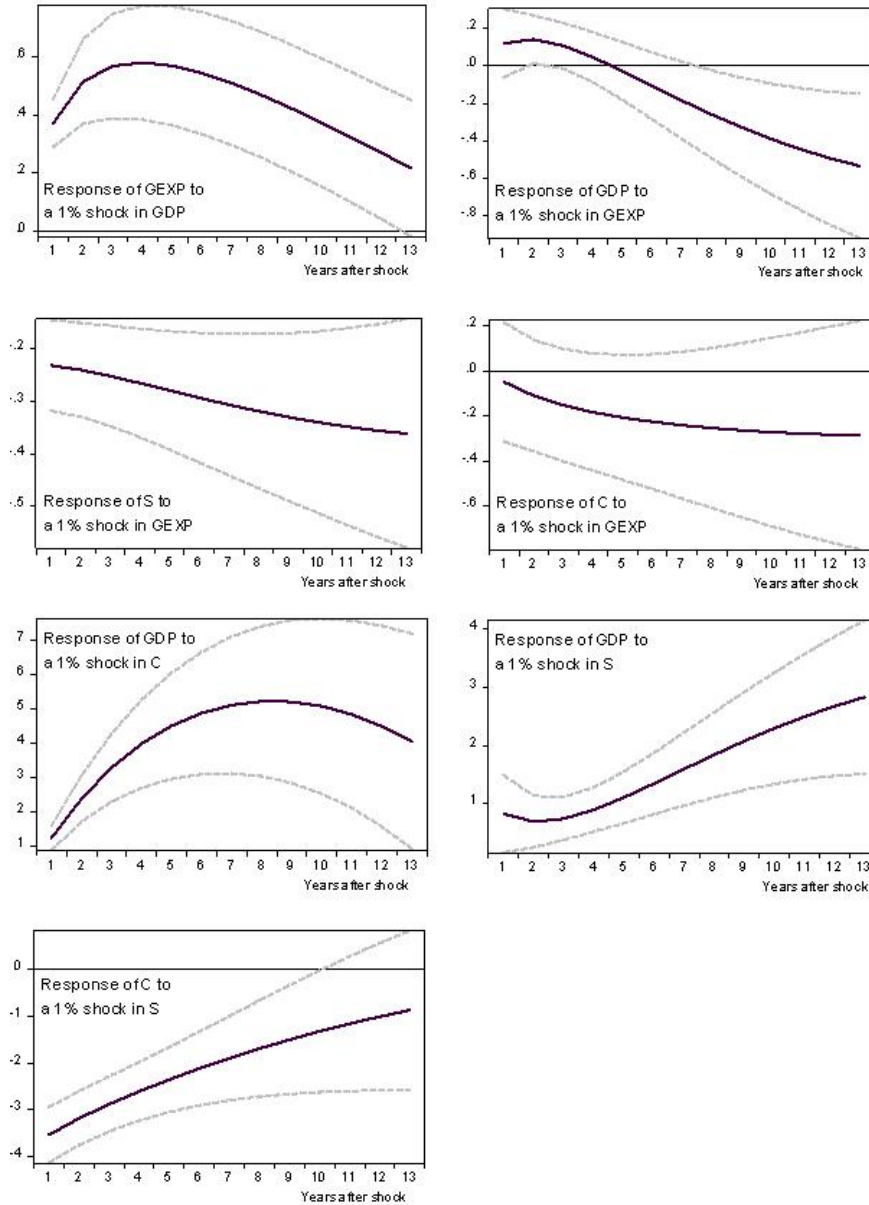


Figure 4. Impulse response functions structural among macroeconomic variables. Regard to 100 replication of the Hall-bootstrap.

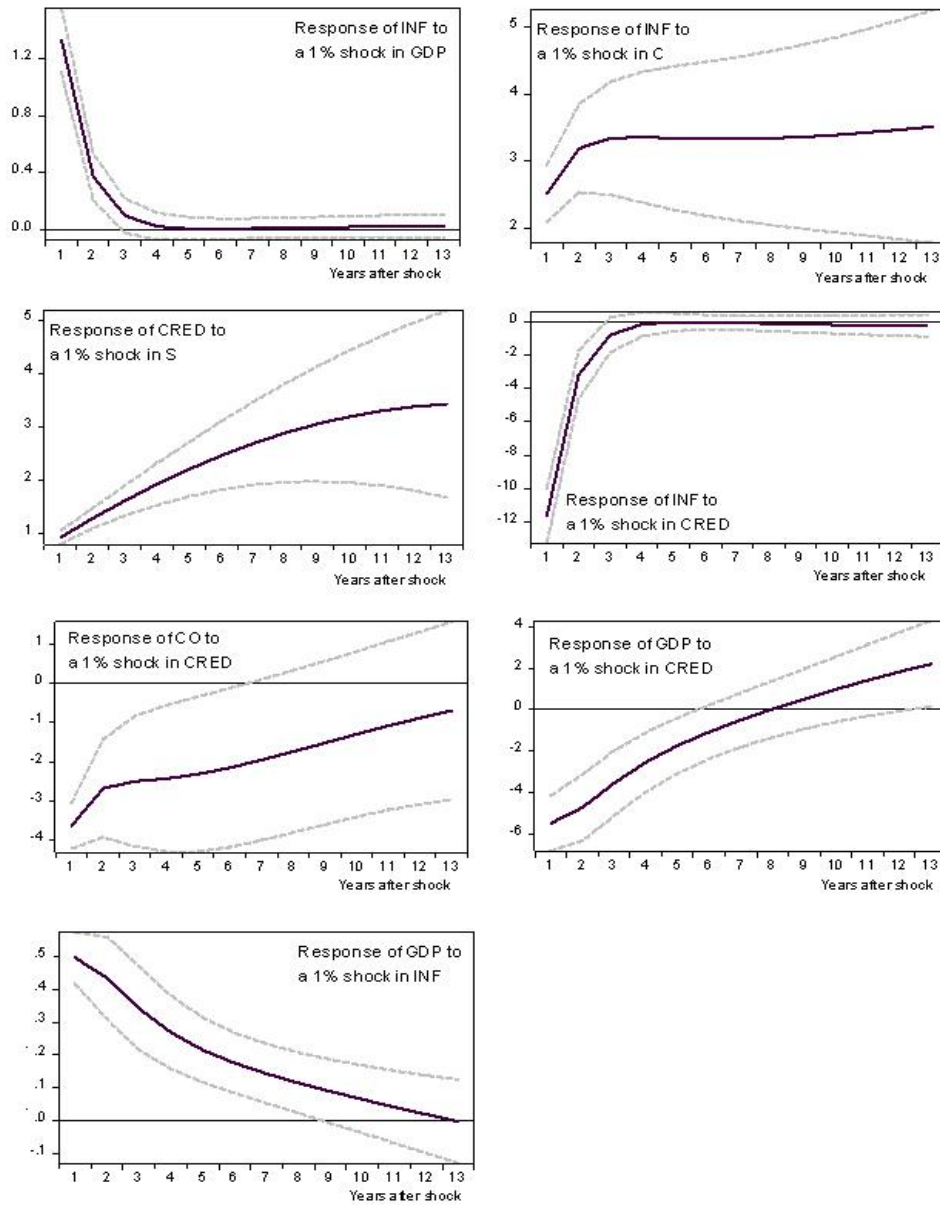


Figure 5. Impulse response functions structural among macroeconomic and monetary. Regard to 100 replication of the Hall-bootstrap.

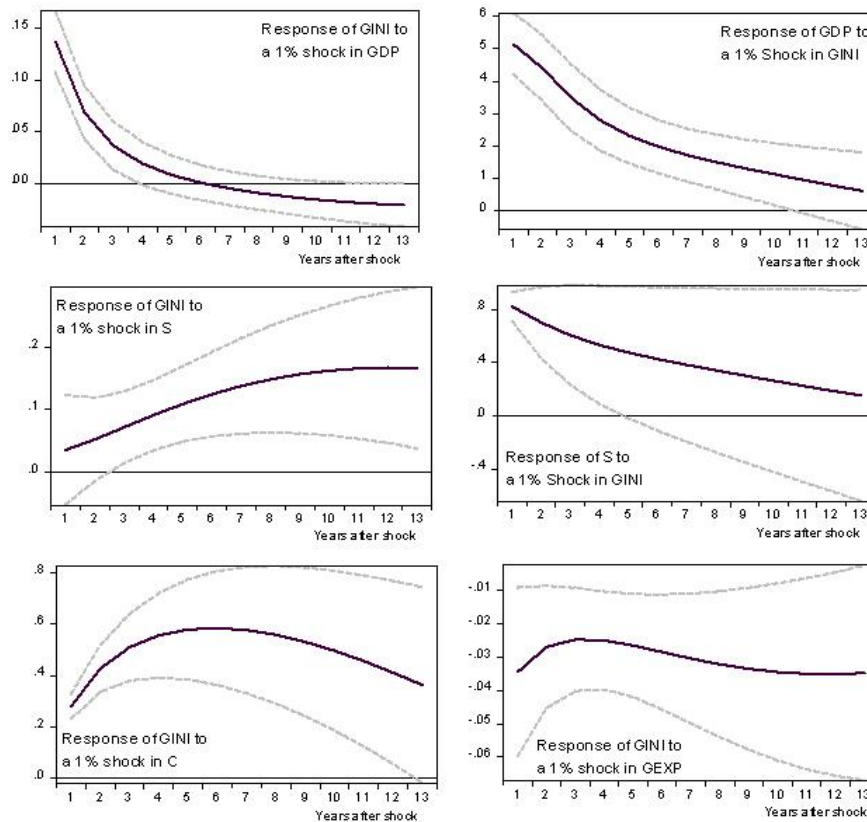


Figure 6. Impulse response functions structural among macroeconomics and income inequality. Regard to 100 replication of the Hall-bootstrap.

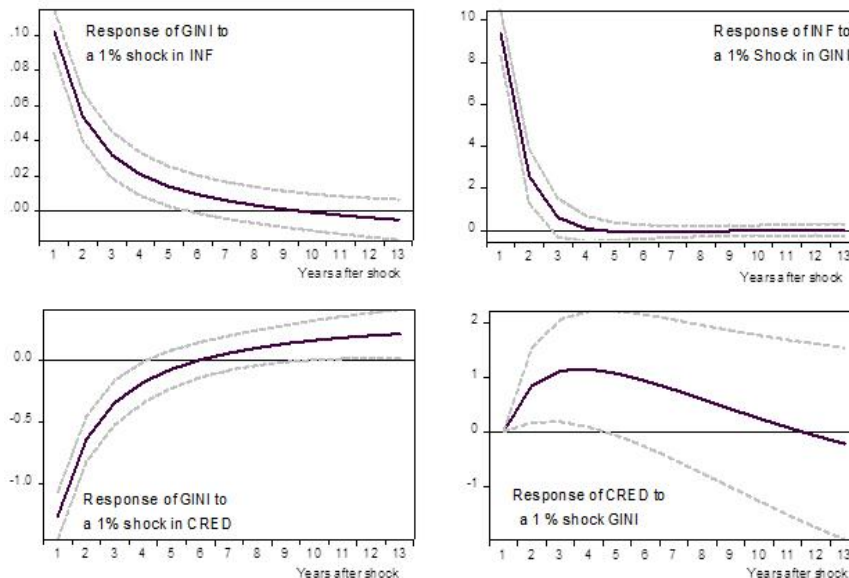


Figure 7. Impulse response functions structural among monetary and income inequality. Regard to 100 replication of the Hall-bootstrap.