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The Effect of Government Expenditure and GRDP Per Capita on Income Inequality

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Abstract

The high condition of income inequality in Yogyakarta (DIY) among other provinces in Indonesia indicates that based on the Kuznets hypothesis, the increase in per capita income has not been able to overcome inequality. We found a previous study that government expenditure could reduce income inequality. At the same time, Keynesian states that forming national income is government expenditure. Exciting phenomena have directed this study to determine the effect of government expenditure on GRDP per capita and the impact of these variables on income inequality, using district/city level data in the DIY province for 2012-2021 with panel data analysis. The study also analyzes the indirect effect of government expenditure on income inequality through per capita GRDP using the Sobel test. The finding shows that government expenditure and GRDP per capita affect inequality. At the same time, Indirect effect analysis finds that government expenditure affects inequality through per capita income.

Keywords: Income Inequality, GRDP Per Capita, Government Expenditure, Path Analysis

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INTRODUCTION

The diversity of natural and geographical resources in each region in Indonesia makes each part have different characteristics in terms of economic and social conditions from other regions. Even though an area has regional conditions with differences in specific traits, all regions will make full efforts to increase the level of the economy to create prosperity. Economic improvement should reach economic equality between parts to achieve economic development goals. But, in an increased economy, some

condition does not necessarily follow the achievement of equity.

The relationship between the economy and inequality follows the Kuznets hypothesis of an inverted U-curve (Kuznets, 1955). The inverted U-curve Kuznets hypothesis states that a rise will follow an increase in per capita income at the beginning of growth in income inequality, and income inequality will begin to fall when the increase in per capita income is at its maximum level (Barro, 2000).

Kuznets's theory shows that inequality will occur according to the level of national income, so an increase in per capita income can reduce income inequality and improve the standard of living (Tumba Henry & Asaph Panotani, 2019). The distribution condition of regional income in Indonesia is quite diverse.

Judging from the Gini ratio value, the publication of the Central Statistics Agency in 2021 semester 2 shows that the Yogyakarta (DIY) province is the region with the highest Gini ratio value among areas in Indonesia. The high Gini ratio value means that the income distribution level in the DIY is low compared to other provinces.

The income side in the DIY region, seen from the amount of GRDP per capita in the last ten years between 2012-2021, shows an increase yearly. The rise in GRDP per capita was followed by fluctuations in the Gini ratio, which tended to show an increasing trendline from 2012-2021. Comparing these data indicates that based on the Kuznets hypothesis, the increase in per capita income in DIY province has not been able to overcome the problem of income inequality.

The above phenomenon can be an exciting topic to discuss, and it needs statistical proof of whether per capita income can indeed affect income inequality in the area. Based on several previous studies, per capita income has a positive effect on income inequality in several regions in Asia, Latin America, and Nigeria (Song, 2013; Munir & Sultan, 2017; Yang & Greaney, 2017; Gnangoin et al., 2019; Tumba Henry & Asaph Panotani, 2019).

Meanwhile, in other studies, per capita income harms income distribution in several regions of Europe, America, and Asia (Halmos, 2011; Yang & Greaney, 2017; Ha et al., 2019). At the same time, multiple indicators of macroeconomic context can form output or national income.

Based on the Keynesian understanding of government expenditure (G) is one of the constituents of Gross Domestic Product with other forming factors, namely household consumption (C), investment (I), and export-import (X-M), (The formula: Y=C+I+G+(X-M)) (Dumairy, 2006). This equation means that an increase in government expenditure can affect an increase in income.

In contrast, the downward trendline in the proportion of government final consumption expenditure showed an increase in GRDP per capita income in the DIY province during 2012-2021. The comparison data can assume that a decrease follows an increase in per capita income in the proportion of government expenditure. Based on previous research on the influence and relationship of government expenditure on per capita income, this variable has proven related (Yang & Greaney, 2017; Gnangoin et al., 2019; Salam & Mohammed, 2019; Ismail & Houssein, 2020).

Government expenditure can be an instrument to increase economic income. Naturally, government expenditure can also solve the income distribution problem. Not only can per capita income influence the level of

inequality, but based on various previous studies, government expenditure can affect income inequality in multiple regions. Previous studies have evidence that government expenditure influences income inequality (Doerrenberg & Peichl, 2014; Munir & Sultan, 2017). Various previous existing studies can as a basis for researching whether the condition of government expenditure on income inequality can have a statistical effect in the DIY province.

The description of the above phenomenon based on facts, theory, and previous research regarding the effect of government expenditure on per capita income and its impact on income inequality in several regions show that research on this topic is interesting to focus study. The addition of macroeconomic variables such as exports and investment based on the Keynesian output theory and various previous studies regarding their effect on output and inequality to avoid biased research.

The influence framework between variables can add an indirect influence analysis between variables, using per capita GRDP as an intervening variable. Therefore, adding an indirect effect analysis test can provide completeness to the study by testing the direct and indirect effects between variables. The analysis results can assist local governments in the policy design process to improve the income distribution between regions. In this study, we will examine the data from the districts and cities of the DIY province.

RESEARCH METHODS

Research analyzing the relationship between government expenditure on GRDP and its impact on inequality uses a quantitative approach. This study uses data acquisition through the Central Statistics Agency in the form of GRDP per capita, the proportion of government expenditure, and income inequality level.

Data on the proportion of investment and exports are also added as independent variables to complete the research. Secondary data was used in this study in 2012-2021 using five regions in the province of DIY, including Kulonprogo district, Bantul district, Gunungkidul district, Sleman district, and the city of Jogja. The analysis method uses panel data regression to analyze the direct influence of the Eviews program. The regression equation model used in this study:

$$LogY_{it} = \alpha + \beta_1 G_{it} + \beta_2 I_{it} + \beta_3 X_{it} + \varepsilon_{it}$$
$$Gini_{it} = \alpha + \beta_4 G_{it} + \beta_5 I_{it} + \beta_6 X_{it} + \beta_7 LogY_{it} + \varepsilon_{it}$$

Where Gini is Income inequality, LogY is GRDP per capita, G is Government expenditure, I is Investment, X is Export, i is Region and t is time (year). Sobel provides a test of the effect of the independent variable on the dependent variable through the intervening variable to test the significance of the impact between variables (Baron & Kenny, 1986).

To test the indirect effect in this study using the Sobel test with the Sobel test calculator developed by Preacher by entering the values of a, b, Sa, and Sb (J. Preacher & J. Leonardelli, 2022). The coefficients are: A is an independent variable regression coefficient on the intervening variable.

B is the regression coefficient of the intervening variable on the dependent variable. Sa is Standard error of the influence of the independent variable on the intervening variable. Sb is Standard error of the influence of the intervening variable on the dependent variable.

Table 1. Variable Operational Definition

Variables	Definition	Data
Income inequality	Differences in income distribution between regions	Gini ratio
GRDP	The average income of the population as an indicator of regional economic conditions	GRDP per capita constant price (IDR)
Government Expenditure	Government expenditure on goods or services consumed	Government final consumption expenditure (% of GRDP)
Investment	Capital investing activity in creating future profits	Gross Fixed Capital Formation (% of GRDP)
Export	Foreign trade is the transportation of goods from one country to another	Exports (% of GRDP)

Source : Data Processed, 2023

RESULTS AND DISCUSSION

The first step is model testing to obtain the best model between the common, fixed, and random effect models. In the first equation model, the fixed effect model became the best model. While the second equation model, the common effect became the best model. After obtaining the best model, the next step is the classical assumption test to prove the accuracy of the regression equation.

Classical assumption tests on panel data must include normality, multicollinearity, and heteroscedasticity tests. In the first equation model, the overall classical assumption test shows the test results that the regression equation is free from the classical assumption test problem. The second equation model shows that the test results are free from the issues of normality and multicollinearity but have heteroscedasticity issues.

The heteroscedasticity problem can be solved using generalized least squares (GLS) (Gujarati, 2009). So the second model uses the GLS weight method with cross-section SUR to avoid heteroscedasticity problems. The results of the regression equations of the two models caan be seen in table 2.

Table 2. Result Equation Model I

Variable	Coefficient	Probability
G	-0.122730	0.0000
I	-0.009755	0.0000
X	-0.009034	0.0255
C	19.53766	0.0000
R-Square	0.993978	
Prob(F-statistics)	0.000000	

Source : Data Processed, 2023

The calculation of the first model panel data regression based on table 2 shows that all independent variables provide significant results with an R-Square value of 0.993978, which means that the independent variable used in the model can explain 99.39% of the GRDP per capita variable.

The significance of the statistical findings gives a strong independent variable effect on the dependent variable with a high R-Square value. The statistical results state that it is proven that

the amount of government expenditure, investment, and exports affect per capita income. The result above variable shows a negative coefficient value, while the Keynesian theory states that government expenditure, investment, and exports are income generators.

With these exciting findings in this study, it can conclude that although the dependent variable is proven to affect per capita income, the value of the influence of the independent variable is harmful. According to the provincial data in DIY, the proportion of government expenditure tends to experience a downward trendline, followed by an increase in income per capita from 2012-2021.

The condition of the existing data shows similarities with the results of research in each region in the DIY province, which negatively influences the decrease in the proportion of government expenditure followed by an increase in per capita income. The results of these statistical calculations are similar to previous research, which also states that the various independent variables above negatively influence the dependent variable.

Previous research shows that government expenditure negatively affects GDP per capita in multiple regions (Gnangoin et al., 2019; Salam & Mohammed, 2019; Ismail & Houssein, 2020). Compared to other studies, the final government consumption expenditure positively affects GDP per capita in various regions (Yang & Greaney, 2017).

The difference in these findings can occur because each area has different conditions at the level of government expenditure and per capita income. Although the phenomenon in the results of this study does not follow the theory that government expenditure can support regional income, this condition can occur because regional income can be driven by other economic forming sectors. Based on the report on the publication of a regional fiscal study in 2021 by the Ministry of Finance for the province of DIY, it was explained that the proportion of government consumption expenditure tends to decrease from the previous year.

It is known from the last few years that the proportion of government expenditure tends to show fluctuating changes. With these conditions, the government's role in driving the DIY economy can be said to be quite stable, both in terms of policy planning and development implementation through the proportion of available government expenditure.

In addition, the report on the publication of a regional fiscal study also states that the dominance of household consumption expenditure can drive an increase in economic income despite weak government spending. In this case, local governments can implement a strategy on government expenditure by allocating these expenditures to activities that can support the economy, such as infrastructure development in various regions with economic centers. In this case, the help of other sectors is also needed to maintain the increase in regional economic income in the DIY province.

Some studies that cannot support the relationship and influence of investment on per capita income state that there is a positive relationship and impact between investment on per capita income (Akalpler & Hove, 2019; Francis Akintola et al., 2020; Gnangoin et al., 2019; Yang & Greaney, 2017) in contrast, other studies state that capital formation or investment does not significantly affect per capita income (Onyinye et al., 2017). The previous research has the same findings that investment or capital formation involves per

capita income with a negative value (Aslan & Altinoz, 2021). A comparison of the conclusions impact of investment on per capita income in various previous studies shows that each region has different conditions according to the characteristics of each area.

According to the existing theory, the amount of investment should be able to support an increase in economic income. In contrast, the development of investment in DIY fluctuates along with the movement of GRDP per capita which tends to increase according to data for the last 10 years.

The Ministry of Finance explained that in the publication of the regional fiscal study for the DIY province before the period when there was Covid-19 the investment trendline had increased, but after the period when there was Covid-19 investment had dropped dramatically. This condition was due to investment performance which was previously supported by the business sector, processing industry, accommodation and food, and beverage providers, and the massive infrastructure development in DIY after the Covid-19 pandemic caused several government strategic projects to be delayed, such as the construction of toll road infrastructure.

This is an example of a phenomenon where several global conditions can be a factor causing the proportion of investment to decrease. On the other hand, the government's role in the DIY economy can be said to be quite stable in maintaining the economy to continue to increase with the condition that the amount of investment has decreased.

On the effect of the export variable, the equation of the statistical findings of this study with previous research found that the study of the export variable had an impact on per capita income with a negative value (Ikpesu et al., 2019; Yang & Greaney, 2017) Other studies that do not support the statistical findings in this study state that the proportion of exports has a positive effect (Akalpler & Hove, 2019).

A comparison of the conclusions impact of exports on per capita income in various previous studies shows that each region has different conditions according to the characteristics of each area. According to the existing theory, exports should be able to support an increase in economic income.

At the same time, this study found that an increase followed the declining proportion of exports in per capita income. Conditions in which the economy remains stable even though the proportion of exports fluctuates or tends to decrease can be said to be reasonable according to a regional fiscal study by the Ministry of Finance of the DIY province.

This is due to the government's role in driving the DIY economy in terms of policy planning and development implementation which is quite stable. So even though exports have decreased, the economy can still be driven by other economic sectors. Foreign export activities in DIY are related to the agricultural business sector, processing industry, and trade.

According to a fiscal study by the DIY Ministry of Finance, the fluctuation in the amount of export activity was due to a decline in global financial market performance, which put pressure on many currencies and triggered capital outflows. The condition of decline in global market performance was due to the recent Covid-19 conditions which caused export demand to decline and become unstable.

In response to the findings above, local governments should maximize regional financial revenue by increasing regional investment and

exports in various regions in DIY. Local governments can form new investment centers in areas with excellent economic prospects and can provide benefits for improving the regional economy in the future.

On the other hand, local industries can be given away or facilities with the help of local governments to be able to export local industrial products. Assistance from other sectors is also needed to maintain the increase in regional economic income in the DIY province.

Table 3. Result Equation Model II

Variable	Coefficient	Probability
G	-0.005877	0.0262
I	0.000312	0.7484
X	0.003826	0.0003
C	0.078520	0.0000
R-Square	0.780311	
Prob(F-statistics)	0.000000	

Source : Data Processed, 2023

The results of the second model with panel data regression calculation based on table 3, almost all dependent variables show significant results except investment with an R-Square value of 0.780311. It means that the dependent variable used in the model can explain 78.03% of the income inequality variable.

At the same time, the rest is the contribution of the influence of other variables that are not used in this study. The statistical findings above show that income or GRDP per capita positively affects income inequality, meaning that an increase follows an increase in income per capita in income inequality.

On the contrary, the research found that income per capita harms income inequality (Halmos, 2011; Ha et al., 2019). At the same time, other studies have found that income per capita does not affect income inequality (Doerrenberg & Peichl, 2014). It is natural that differences can occur, given that there are differences in data or conditions of economic income and income inequality in various regions.

Several previous studies can support the statistical findings above by showing the same results that income per capita is proven to have an influence and relationship on income inequality in various regions with a positive influence value (Gnangoin et al., 2019; Munir & Sultan, 2017; Song, 2013; Tumba Henry & Asaph Panotani, 2019; Yang & Greaney, 2017).

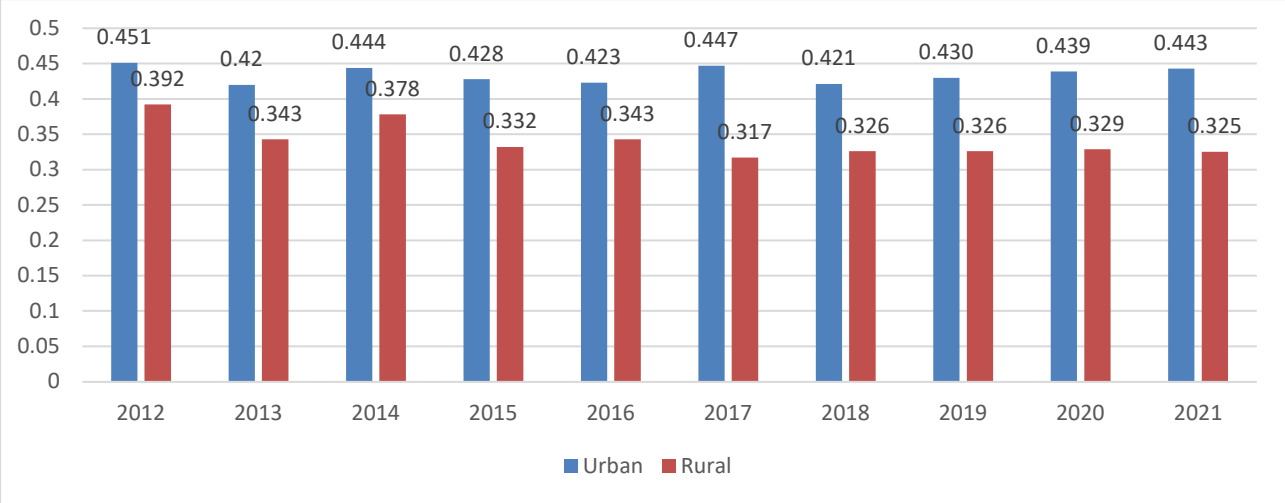
It can say from the results of the statistical calculations above that per capita income and regional income inequality in the DIY province is still in the early stages of development following the Kuznets hypothesis of an U inverted.

Based on the observation data in figure 1, income inequality in DIY can increase in a fairly high category because the urban Gini ratio is very high compared to the rural Gini ratio. A regional study by the Ministry of Finance for the DIY province stated that this condition occurred because the gap in the distribution of population expenditure which is known to influence the level of income inequality is difficult to overcome.

Although the DIY province shows an increasing trendline in economic gain, it indicates that the strategies and policies implemented by each region in DIY in controlling income inequality have not been optimal. In this case, local governments can plan strategies to support the creation of economic development in areas with low average incomes, one of which is by creating jobs for local communities. By absorbing local people's

workforce, regional economic productivity will increase and support the regional or population's economic income level. So, that strategy can improve income distribution in low-economic areas.

Figure 1. Comparison of Rural and Urban Gini Ratio of DIY Province



Sources: BPS Indonesia Processed, 2022

The government expenditure variable is proven through statistical calculations to affect income inequality by showing a negative influence value. Support from previous research shows the same results by finding a negative effect of government expenditure on income inequality and also a negative relationship between variables in various regions (Anderson et al., 2017; Doerrenberg & Peichl, 2014; Guzi & Kahanec, 2015; Munir & Sultan, 2017).

Some research contradicts that government expenditure does not affect income inequality (Mihaylova, 2015). Policies or strategies that local governments should design to overcome the problem of income inequality in the DIY province can be through increasing the proportion of government expenditure. Improving the proportion of government expenditure can help allocate regional economic development funds, especially for regions with underdeveloped economies.

The role of government expenditure as an instrument of economic development in economically disadvantaged areas. The implementation of appropriate policies and development by utilizing the proportion of government expenditure as much as possible will affect the increase in equity in the province of DIY. This effort is an ideal instrument from a fiscal standpoint by the government to be able to overcome the problem of high-income inequality in DIY.

The investment and export variables show the same effect on income inequality with a positive influence value, but the investment effect is insignificant. Previous studies show that investment or capital formation positively impacts income inequality (Ucal et al., 2016; Purba et al., 2019). Other studies can support this study's findings by finding investment or capital formation doesn't affect income inequality (Munir & Sultan, 2017).

Although investment is not proven to affect income inequality, investment should be able to become an instrument to increase economic activity in several regions. The formation of capital or investment in economically disadvantaged areas can increase regional economic productivity and reduce income inequality between parts.

Previous research shows that the size of exports affects income inequality negatively (for developing countries and regions of Eastern Europe) and positively (for industrial countries and Estonia) (Meschi & Vivarelli, 2009; Halmos, 2011). Meanwhile, other studies have found that the size of exports does not affect income inequality (Ha et al., 2019).

According to statistics result, the proportion of exports has a positive effect on income inequality. Even if export performance increases, this can also be followed by income inequality which continues to widen. Based on the existing facts, the conditions in the DIY province show that efforts to increase export performance have not been able to overcome the problem of inequality.

Following the previous explanation that the high-income inequality in DIY is contributed by urban areas. This is because income distribution or the level of the economy in urban areas has widened the gap as evidenced by an increase in expenditure by the low group followed by an increase in expenditure by the high group so it is difficult for inequality to decrease. Local governments should empower and assist people with local industries, especially those in low-income areas, to market their industrial products outside the region or abroad for export. The above strategies can support and increase the DIY province's economic development and income distribution.

Table 4. Result Sobel Test Calculate

Variable	Test Statistic	Probability
G	-6.84153697	0.00
I	-4.05198014	0.00005079
X	-2.2279139	0.02588626

Source : Data Processed, 2023

A variable is said to be an intervening variable with the condition that the independent variable can significantly affect the intervening variable, and the intervening variable also influences the dependent variable (Baron & Kenny, 1986). This study shows that all independent variables significantly affect the intervening variable, and the intervening variable substantially impacts the dependent variable.

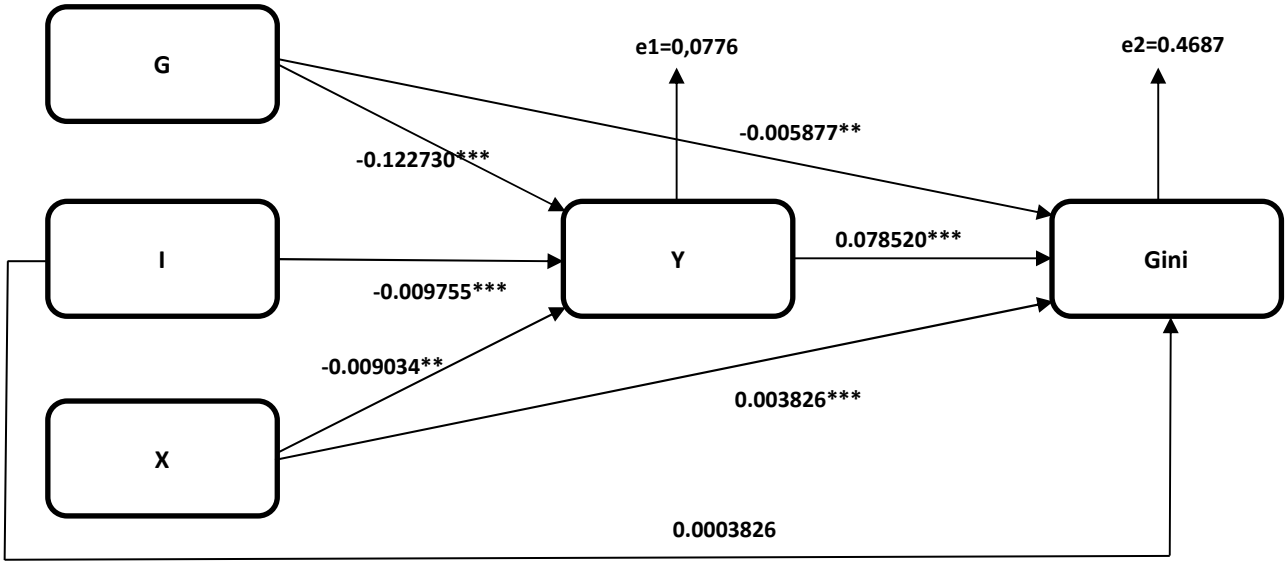
In addition, the Sobel test must also meet the requirements with normally distributed data. The indirect effect test in this study show meets the requirements. The indirect effect significance test results with the Sobel calculator showed that all variables had a significant effect. Obtained test statistics on government expenditure variables Sobel test statistic value -6.84153697 > 1.96 and p-value 0.00 < 0.05, then the final government consumption expenditure significantly affects income inequality through GRDP per capita.

The investment variable has a statistical Sobel test value of -4.05198014 > 1.96 and a p-value of 0.00005079 < 0.05, so investment significantly affects income inequality through per capita GRDP. In the export variable, the Sobel test statistic value is -2.2279139 > 1.96, and the p-value is 0.02588626 < 0.05, then exports significantly affect income inequality through per capita GRDP.

Figure 2 shows the framework influence among variables in this study. Almost all

variables show a significant effect, except for the direct impact of investment on income inequality. To find out the value of the indirect effect, we can use the multiplication of the coefficient impact of the independent on the intervening with the intervening coefficient on the dependent.

Figure 2. Path Coefficient Framework



Notes: formula e = (1-R2) 1/2
Information: *** significant α=1%, ** significant α=5%, * significant α=10
Source : Data Processed, 2023

All the independent variables significantly affect the intervening variable with a negative value. At the same time, the influence of the intervening variable on the dependent variable is positive, so it can be said that the indirect effect of government expenditure, investment, and exports harms income inequality through per capita income.

An interesting finding in this study is that although investment does not directly affect income inequality, investment is known to affect income inequality through per capita GRDP. In this case, the regions in the DIY province can reduce the level of income inequality by increasing the proportion of government expenditure through per capita GRDP as the mediator variable. Similar to government expenditure, increasing the proportion of investment and exports can also be an instrument to reduce income inequality through per capita GRDP. Addressing the problem of the distribution of economic income through increasing government expenditure can be an appropriate policy instrument.

But field practice is certainly not as easy as the existing theory. We need a careful design in shaping the increase in government expenditure to affect economic development and income distribution. Government expenditure is related to fiscal policy. One aspect of fiscal policy besides expenditure is from the income side through taxes. A previous study stated that fiscal policy in taxes and other macroeconomic variables, such as government expenditure

budgets, are closely related to increasing development in Indonesia (Bendesa & Setyari, 2020). The government can increase the proportion expenditure budget if the government increases tax revenue. In this case, government expenditure and taxes will be interrelated.

CONCLUSION

We found several conclusions based on the results of econometric calculations using panel data analysis and Sobel calculators with research objects in the DIY province during 2012-2021. The main finding in this study is that government expenditure affects per capita income, and these two variables also show a significant effect on income inequality.

The proportion of government expenditure, investment, and exports impact GRDP per capita with a negative effect value. The research findings show that although government expenditure has a downward trendline, it does not depress per capita income. GRDP per capita and the proportion of exports influence income inequality with a positive effect, while the proportion of government expenditure harms income inequality.

The findings have not proven that investment directly affects income inequality. An interesting result in the indirect effect analysis is that the proportion of government expenditure, investment, and exports affects income inequality through per capita GRDP.

Income inequality in DIY can increase in a high category because the urban Gini ratio is very high compared to the rural Gini ratio. It is difficult to reduce the income inequality ratio due to the high disparity in the distribution of expenditures among people. This study has shown that the proportion of final government consumption expenditure and per capita income affects the condition of high-income inequality in the DIY province.

The problem of income inequality is still a problem for several regions in the DIY area, although income per capita tends to show an increase every year. Therefore, it is necessary for the government role in conducting an in-depth evaluation of these problems. through the distribution of government spending, capital formation, and available exports, the government and various parties can maintain efficiency in increasing regional per capita income through the assistance of other leading sectors such as the household consumption activity sector.

Efforts to address income inequality are through increasing government consumption spending allocated to economic development activities, especially in urban areas that have the highest levels of inequality, with a focus on employing non-skilled workers who have low incomes.

Mapping underdeveloped economic areas in the DIY province direct further research to design policies in terms of government expenditure that can be allocated to build infrastructure that is important in generating the regional economy according to the characteristics of each economic sector.

This research's limitations can trigger further research related to mapping in areas with low financial income, then can be evaluated on how to increase income distribution through the government expenditure side. Subsequent analysis can add other proxy variables apart from government expenditure policies in increasing economic income and distribution of regional financial income. For example, adding variables in government revenues and other

macro aspects can be related to increasing government expenditure to create economic development goals.

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