




Public Spending and Income Inequality: Evidence from Indonesia

Nazah Lailatus Syarifah ^{a,1,*} Yozi Aulia Rahman ^{b,2}

^{a,b} Faculty of Economics and Business, Semarang State University, Indonesia

¹ nazahlailaa@students.unnes.ac.id*; ² yoziaulia@mail.unnes.ac.id

* corresponding author

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ABSTRACT

Income inequality represents a persistent structural challenge that poses a serious threat to inclusive economic development in Indonesia. This study investigates the impact of public expenditure on education, health, and social protection, GRDP per capita, and poverty on income inequality across 34 provinces in Indonesia during the 2015–2023 period. The analysis applies the System Generalized Method of Moments (Sys-GMM) to address dynamic panel characteristics and intertemporal persistence, allowing for consistent and reliable parameter estimation. The empirical findings indicate that lag income inequality, education expenditure, per capita GRDP, and poverty significantly contribute to higher income inequality. In contrast, public spending on health and social protection does not exhibit a statistically significant effect. Overall, the results suggest that fiscal policy, particularly public expenditure allocation, has not yet operated optimally as an instrument for reducing inequality, highlighting the importance of more targeted and equity-oriented fiscal interventions.

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1. Introduction

Income inequality continues to be a central issue in the process of economic development, with particular relevance to developing countries such as Indonesia. Income inequality is essentially a phenomenon that cannot be completely eliminated in the development process of a region. The phenomenon of inequality arises due to differences in resources and economic growth rates between regions, where economic activity tends to be concentrated in large cities. This condition has an impact on differences in employment opportunities and income levels between developed and underdeveloped regions. These differences trigger a perception that groups with very high incomes will continue to gain wealth, while those with low incomes will become increasingly impoverished, resulting in income distribution inequality (Rifaldo & Rejekiningsih, 2024). If income inequality is not immediately addressed through appropriate policies, this condition has the potential to hamper economic development and exacerbate a variety of social issues, including limited access to health services, education, and social mobility (Polacko, 2021).

According to Todaro and Smith 2006, in (Rini et al., 2022) The Gini Ratio, an indicator that measures overall inequality, is derived from the Lorenz Curve Theory and has a value range of zero to one. A value that is closer to zero suggests that the income distribution is approaching ideal equality. Conversely, a value closer to one means that the level of income inequality is approaching perfect inequality.

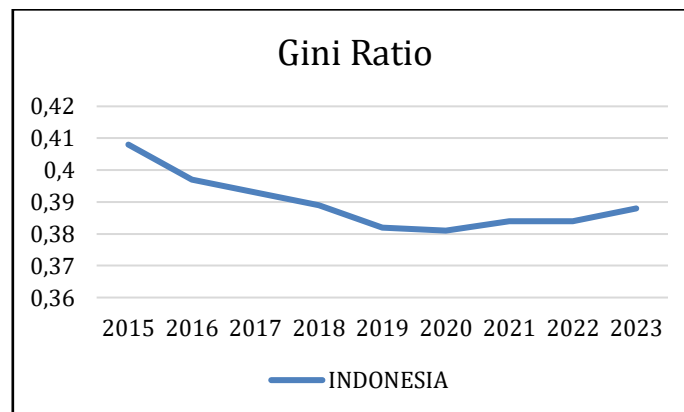


Figure 1. Indonesia's Gini Ratio Trend in 2015-2023
Source: Central Bureau of Statistics (BPS) Indonesia

Based on Figure 1, Indonesia's Gini ratio trend from 2015 to 2023 shows a pattern of fluctuation. Inequality has decreased from 0.408 in 2015 to 0.381 in 2020. However, a significant increase occurred again in 2021-2023. This increase was due to the socioeconomic impacts of the COVID-19 pandemic, as evidenced by the inequality figures before and after the COVID-19 pandemic, which showed a significant increase. In addition, in the 2020-2024 National Medium-Term Development Plan (RPJMN) document, the government targets a Gini ratio as an indicator of income inequality to decrease to 0.360-0.374. However, the level of the national Gini ratio in 2023 was 0.388, which implies that the objectives outlined in the RPJMN document have not been met. The failure to achieve the Gini ratio target shows that the issue of income inequality in Indonesia still requires more sustainable intervention from the government or the private sector in order to achieve equity (Muyassar, 2024).

One of the efforts that can be made to achieve the Gini ratio target in Indonesia is by implementing fiscal policies through the State Budget (APBN) and Regional Budget (APBD). The

APBN/APBD refers to policies made by the government to regulate the country's economy through taxes and government spending, which will ultimately affect the national income level, which in turn affects employment opportunities, national investment, and national income distribution (Firmansyah, 2021). According to Law Number 1 of 2022 concerning Central and Regional Financial Relations (HKPD), the government has the main objective of overcoming both vertical and horizontal inequalities by improving the quality of spending through fiscal decentralization. Public spending directed at enhancing human resources (HR) is expected to play a strategic role in promoting community welfare through spending designed to serve social interests, such as public spending on education, health, and social protection.

Public spending is a fiscal instrument of the government that functions as a strategic means to improve income distribution through equal access to economic opportunities (Eke et al., 2023). When public spending is relatively low, redistribution will be the main determinant of reducing inequality (Baç̃ao et al., 2025). Research by Sidek (2021) Involving 122 developing countries and 91 developed countries shows that public expenditure generally acts to mitigate income inequality. The impact is more pronounced in developed countries because the proportion of public spending to GDP is higher than in developing countries. Government spending in developed countries may initially widen the gap, but once it passes a certain threshold, it can become positive in reducing inequality. These findings confirm that the size of government spending does not automatically lead to equality. Education spending is a primary driver of decreasing income inequality, but its effectiveness is strongly influenced by the structure and quality of spending.

In Indonesia, the effectiveness of public spending in mitigating income inequality is still limited, and the results are inconsistent, especially in social aspects (education, health, and social protection). Several studies show varying results, Alamanda (2020) found that public spending on social programs using indicators (social assistance, subsidies, and grant spending) did not exhibit a statistically significant effect in lowering inequality in Indonesia. Government social spending is not the primary determinant of inequality reduction, especially in urban regions. More public spending can drive higher inequality in rural areas. Meanwhile, panel data research using the Fixed Effect Model (FEM) in West Java Province by Prannisa et al. (2023) indicates that the impact of public spending on social protection, education, and health can significantly reduce income inequality. Social spending programs have economic and social functions for the community, where funds allocated to low-income groups come from tax revenues paid by high-income groups. This creates a mechanism for income redistribution in the economy. Rindiani et al. (2025) also found that increasing public expenditure on health, education, and social protection can significantly lower income inequality in Indonesia in both the short and long run.

Meanwhile, panel data research on 38 districts/cities in East Java Province by Fatihudin & Mauliddah (2019) shows that education and health spending positively and significantly influence income inequality, implying that higher allocations to these sectors will increase income inequality. Research by Khairunnisa et al., (2021) shows the same thing, that education sector spending can actually increase income inequality, because it does not have an immediate impact or requires stages to achieve the desired results, while health spending does not have a significant effect on income inequality in Indonesia. Research by Rahma (2024) states that education and social protection expenditure showed no statistically significant effect on income inequality in Indonesia during the 2000-2022 period.

Previous findings on the effectiveness of public expenditure on education, health, and social protection in Indonesia are inconsistent and limited to only a few provinces in Indonesia.

This inconsistency can cause confusion for policymakers in determining effective interventions. Furthermore, the inconsistency of the findings does not provide a clear picture of the contribution of each sector to income inequality in Indonesia. Through this gap, this study will complement previous studies by combining fiscal aspects, namely public expenditure on education, health, and social protection, with economic aspects, namely GRDP per capita and poverty as independent variables and income inequality as a dependent variable. This study applies the Generalized Method of Moments (GMM) dynamic panel data regression, in which the lag of the dependent variable is used as an explanatory variable to capture the intertemporal persistence effect. This model will produce consistent, unbiased, and efficient estimators. Thus, this study aims to examine the determinants of income inequality in Indonesia for the period 2015-2023.

2. Literature Review

Income Inequality

Income inequality is a central concern in development economics, the extent to which the advantages of economic expansion are distributed fairly among all segments of society. The gaps in earnings between wealthy and low-income groups act as a primary measure of income inequality levels (Baldwin 1986, in Juniati et al., 2022). Income inequality represents a significant concern in development economics, indicating how evenly the outcomes of economic growth are spread throughout society. An empirical study by Isiaka et al., (2025) Conducted research in 51 middle-income countries during the 2005-2015 period and found that fiscal aspects of education spending and social protection can mitigate income inequality depending on the country's income level, while health spending does not significantly effect on reducing income inequality. Study by Sidek (2021) Involving 122 developing countries and 91 developed countries shows that public spending in general contributes to reducing income inequality. As a developing country, research in Indonesia related to income inequality is an important part of assessing the effectiveness of development policies that have been implemented by the government.

Public Spending on Education

Education spending is part of the government budget in the State Budget, which is allocated to support education services, including educators' salaries, except for the official education budget. Education spending is considered a productive investment by the government because it contributes to the economy. Human resource theory explains that education contributes to economic growth and reduces income inequality, because increased education will increase workforce productivity (Saluy et al., 2024). According to this theory, individual productivity determines the economic growth of a population. Panel data studies conducted by Prannisa et al., (2023) in West Java Province for the period 2015-2020 and Wahyudi (2023) In Indonesia for the period 2015-2019 stated that human resources have different qualities, so that the government's contribution to education spending can improve individual skills, which will contribute to reducing income inequality. Meanwhile, other studies by Fatihudin & Mauliddah (2019); Khairunnisa et al., (2021); Voto et al., (2024) found that higher education spending could actually widen income inequality, depending on the quality of education in each region.

Public Spending on Health

Health spending covers all government expenditures allocated to public health services. Law No. 36 of 2009 stipulates that the central government's health budget must be allocated at

least 5% of the state budget (APBN), excluding salaries for central government employees, while the health budgets of provincial and district/municipal governments must be allocated at least 10% of the regional budget (APBD). Public health spending tends to be progressive and can decrease income inequality if targeted effectively. Research by Rindiani et al., (2025) found that health expenditure can significantly reduce inequality in Indonesia, in both the short and long run. Meanwhile, study by Khairunnisa et al., (2021) showed that health spending failed to demonstrate a significant determine on income inequality in Indonesia for the period 2014-2018. Health spending has not had a direct impact because each program requires different stages and mechanisms to reduce income inequality.

Public Spending on Social Protection

Public spending on social protection functions is allocated to support various social programs and activities aimed at improving the welfare of the community. One important aspect of strengthening the state budget is ensuring that funds are allocated to protect vulnerable populations that are exposed to economic, social, or environmental changes. Social protection programs such as social assistance, subsidies, and health insurance play a crucial role in decreasing inequality. The government can use fiscal policy to reduce inequality by redistributing income through higher taxes on high-income groups (Apergis, 2020). Social spending programs are used effectively to reduce income inequality because they have economic and social functions for the community, where funds allocated to low-income groups come from tax revenues paid by high-income groups, which is called a redistributive mechanism (Prannisa et al., 2023; Rindiani et al., 2025). Conversely, empirical study results by Alamanda (2020) show that government social spending is not the main driver of reducing inequality, especially in urban areas (high-income groups). More public spending can actually drive higher inequality in rural areas (low-income groups).

Gross Regional Domestic Product Per Capita

The Gross Regional Domestic Product (GRDP per capita) is a measure of the average annual income of a nation's citizens, obtained by dividing the total GDP of the region by its population. This finding is consistent with Kuznets' theory, which posits a positive short-term link between GRDP per capita and income inequality, which is illustrated by an inverted U shape. However, over time, GRDP per capita can contribute significantly to reducing income inequality in a region after passing a certain stage known as the turning point. An increase in per capita GRDP will also increase income inequality in the early stages of development. Over time, an increase in per capita GRDP will contribute positively to income equality (Hartini, 2017; Fatihudin & Mauliddah, 2019; Prannisa et al., 2023). Research using a static approach, namely the Ordinary Least Squares (OLS) method, by Andina et al. (2021); Janah (2022) shows that increases in per capita GRDP tend to reduce income inequality.

Poverty

The inability to provide minimum needs, including food and non-food items, is known as poverty. In Indonesia, high poverty rates have a direct impact on income inequality due to relatively different living standards among various social groups. In addition, there are regional disparities such as differences in resources and production factor. Regional differences also exist, such as variations in production variables and resources (Pertiwi & Juwita, 2021). Due to unequal resource distribution, prosperous regions with better connectivity tend to experience significant economic progress compared to less prosperous and underdeveloped regions (Muryani et al., 2021). A panel data study of 34 provinces in Indonesia for the period 2015-2022 by Panggabean (2025) shows that as poverty rates rise, income inequality will also rise.

If the poor find it difficult to escape the cycle of poverty, while the rich continue to experience an increase in income, this will cause the economic gap to widen. Dai et al., (2023) show that an increase in poverty levels will be followed by an increase in income inequality. If the poor find it difficult to escape the cycle of poverty, while the rich continue to experience an increase in income, this will cause the economic gap to widen.

3. Research Method

This study employs the regression analysis method of dynamic panel data analysis using quantitative methods. The Central Bureau of Statistics (BPS) and the Directorate General of Fiscal Balance (DJPK) provided secondary data, covering 34 Indonesian provinces (cross-section) in the 2015-2023 time series, resulting in 306 samples. Income inequality, as measured by the Gini Index, serves as the dependent variable in this study. The independent variables consist of public expenditure on education, health, and social protection, as well as Gross Regional Domestic Product (GRDP) per capita and poverty levels.

Table 1. Description of Variables and Data Sources

Variable	Label	Description	Data Source
Dependent Variable			
Income Inequality	Gini	Income distribution inequality using Gini index data by province and region (urban + rural)	BPS
Independent Variables			
Public Spending on Education	Eduexp	Government spending allocated for programs and policies in the field of education	DJPK
Public Spending on Health	Healthexp	Government spending allocated for programs and policies in the field of health	DJPK
Public Spending on Social Protection	Socialexp	Government spending allocated for social protection programs and policies	DJPK
GRDP Per capita	Grdppc	Gross Regional Domestic Product per capita at constant prices (2010)	BPS
Poverty	Pov	Percentage of poor population (P0) by province and region	BPS

Source: Data Processed, 2025

The method used is dynamic panel data regression Generalized Method of Moments (GMM) using Stata 17 analysis tools, where in this model, the dependent variable's lag serves as an explanatory variable so that the Gini lag is treated as an endogenous variable. The selection of this model is based on the need to capture the intertemporal persistence effect of the dependent variable. In addition, this model is able to overcome potential endogeneity caused by the two-way relationship between the independent and dependent variables and the correlation between the lag of the dependent variable and the error term (Arellano & Bond 1991; Arellano & Bover 1995; Blundell & Bond 1998) in (Malla & Pathranarakul, 2022). To overcome inconsistency, the instrumental variable estimation method can be used, namely with variables that correlate with the error term. GMM is an extension of the method of moments that equates the conditional moments of the population with the conditional moments of the sample (Susilo et al., 2020).

System Generalized Method of Moments (SYS-GMM)

The estimation model used in this study is Sys-GMM to estimate the system of equations by combining first differences and levels. This approach has the advantage of strengthening instrument variables to produce efficient and consistent estimates (Astuti et al., 2025). Specifically, this model uses Sys-GMM Two-Step to solve the problems of endogeneity of explanatory variables, unobserved heterogeneity (fixed effects), and autocorrelation, which produces the following equation:

$$\hat{\delta} = \left[(N^{-1} \sum_{i=1}^N \phi_{i,t-1} Z_{sys}) \hat{\psi}^{-1} (N^{-1} \sum_{i=1}^N \dot{Z}_{sys} \phi_{i,-1}) \right]^{-1} \left[(N^{-1} \sum_{i=1}^N \phi_{i,t-1} Z_{sys}) \hat{\psi}^{-1} (N^{-1} \sum_{i=1}^N \dot{Z}_{sys} q_i) \right] \dots \dots \dots (1)$$

Model Specification Test

In the GMM model, several important specification tests are required to ensure that the model meets the criteria of consistency, validity, and unbiasedness. First, the Arellano-Bond test, which serves to ensure that there is no correlation between the second-order series (AR(2)) and the error term, so that the estimates obtained are consistent. Second, the Sargan test, which serves to test the overall validity of the instrument variables, namely, to ensure that the overall validity of the instrument variables is not overidentifying and is not correlated with the error term. If both tests produce a p-value > α 5% (0.05), then the model is declared consistent and valid (Blundell & Bond, 1998; Roodman, 2009) in (Malla & Pathranarakul, 2022). Third, the data unbiasedness test compares the lag coefficients of the dependent variable in the Sys-GMM model with the lag coefficients of the Fixed Effect Model (FEM) and Pooled Least Squares (PLS) models. The Sys-GMM model is declared unbiased when the lag coefficients are between the FEM and PLS models. Based on these considerations, the researcher applied the two-step Sys-GMM method in the estimation process to obtain consistent, valid, and unbiased estimates. Specifically, the simplified model in this study is as follows:

$$Gini_{i,t} = \beta_0 + \beta_1 \delta Gini_{i,t-1} + \beta_2 Log(eduexp)_{it} + \beta_3 Log(healthexp)_{it} + \beta_4 Log(socialexp)_{it} + \beta_5 Log(grdppc)_{it} + \beta_6 pov_{it} + \epsilon_{it} \dots \dots \dots (2)$$

Where: Comparison of GMM Estimator with FEM and PLS

- Gini : Gini Ratio (Income Inequality)
- Eduexp : Public Spending on Education
- Healthexp : Public Spending on Health
- Socialexp : Public Spending on Social Protection
- Grdppc : Gross Regional Domestic Product Per Capita
- Pov : Poverty
- i* : Province
- t* : Period/Year
- $\delta Gini_{i,t-1}$: Lag of the Gini Ratio variable (previous period)
- β_0 : Intercept
- ϵ_{it} : Error term

Logarithmic transformation was applied to the variables of education spending, health spending, social protection spending, and per capita GRDP to stabilize the variance and facilitate flexible interpretation, given that the data used were large-scale and asymmetrically distributed.

4. Results and Discussion

Results

The findings of the empirical study on the impact of education expenditure, health expenditure, social protection expenditure, per capita GRDP, and poverty on income inequality as determined by the Gini Index in Indonesia are presented in this section. The estimation process uses a dynamic panel data model to obtain consistent and reliable results. Before estimating the model using the SYS-GMM method, the researchers examined descriptive statistics to give a summary of the study. The descriptive statistical distribution is presented in Table 2.

Table 2. Statistics Descriptive

Variable	Observation	Mean	Std. Deviation	Min	Max
Gini	306	0.3538889	0.0403701	0.24	0.45
Eduexp	306	2.76e+12	3.44e+12	1.44e+11	2.18e+13
Healthexp	306	9.90e+11	1.63e+12	6.85e+10	1.09e+13
Socialexp	306	1.27e+11	3.03e+11	8.29e+09	3.90e+12
Grdppc	306	4.25e+07	3.21e+07	2336290	1.92e+08
Pov	306	10.82928	5.650557	3.47	28.54

Source: Data processed, Stata 17 (2025)

In this study, the amount of data used was 306 samples, consisting of 34 provinces in Indonesia during the period 2015-2023. The average Gini ratio was 0.353, with the highest value being 0.45 and the lowest value being 0.24, indicating that the level of inequality in Indonesia is still quite high. Standard deviation measures the extent to which data is spread, describing which variables are the most unstable. It can be seen that the variable of public spending on education has the largest standard deviation among the other variables, namely 53.44e+12, compared to the average calculation of 2.76e+12.

Table 3. Two-step Sys-GMM Estimation Results

Variable	Coefficient	Std. Error	Z-Statistic	P-value
$\delta\text{Gini}_{i,t-1}$	0.8197626	0.0200022	40.98	0.000
$\text{Log}(\text{Eduexp})_{i,t}$	0.0052373	0.0008566	6.11	0.000
$\text{Log}(\text{Healthexp})_{i,t}$	-0.0014633	0.0018625	-0.79	0.432
$\text{Log}(\text{Socialexp})_{i,t}$	-0.001221	0.0010027	-1.22	0.223
$\text{Log}(\text{Grdppc})_{i,t}$	0.0079914	0.0024082	3.32	0.001
$\text{Pov}_{i,t}$	0.0014046	0.0003809	3.69	0.000
_Cons	-0.170932	0.0456072	-3.75	0.000
Wald Test	5468.06			
p-value	0.0000			

Source: Data processed, Stata 17 (2025)

Table 3 shows that the Lag Gini variable (Gini ratio in the previous year), education spending, per capita GRDP, and poverty have a favorable and substantial impact on income disparity, with a p-value < 0.05. Conversely, public spending on health and social protection does not have a significant effect on income inequality in Indonesia because it has a p-value > 0.05.

The lagged Gini index has a significant positive impact on current income inequality, indicating that a one-unit increase in income inequality in the previous year leads to an increase of 0.8197 units in the current year, holding other factors constant. In addition, government spending on education also significantly and positively affects the Gini index, implying that a 1% rise in education expenditure increases income inequality by 0.0052 units, assuming ceteris paribus. Per capita GRDP similarly has a significant positive effect, with a 1% increase in per

capita GRDP associated with a 0.0079 unit rise in the Gini index, assuming *ceteris paribus*. Finally, the poverty rate is positively and significantly related to income inequality, meaning that a 1% increase in poverty results in a 0.0014-unit increase in the Gini index, assuming *ceteris paribus*.

Unlike the other three variables, health spending and social protection spending do not have a significant effect on income inequality, with probabilities of 0.432 and 0.233, respectively, which are greater than 1%, 5%, or 10%. This means that health spending and social protection spending do not have a significant effect on reducing income inequality in Indonesia in the 2015-2023 period. Table 4 shows the results of the model specification test, namely the Arellano-Bond and Sargan tests.

Table 4. Model Specification Test

Models	Z-Statistic	P-Value
(AR)1	-4.2063	0.0000
(AR)2	.80643	0.4200
Sargan Test	27.52638	0.7761

Source: Data processed, Stata 17 (2025)

Table 4 shows the results of the model consistency test measured using the Arellano-Bond (AR) test. The Arellano-Bond test aims to detect autocorrelation with residual components. The results are said to be consistent if the second-order p-value (AR(2)) $> \alpha$ 5%. The residuals and endogenous variables do not exhibit autocorrelation. The findings demonstrate that the AR(1) p-value is significant at α 5% with a value of 0.0000, indicating first-order autocorrelation, a typical feature because of the differentiation model. In the meantime, H_0 is rejected since the second-order p-value (AR(2)) of 0.4200 indicates unimpressive results at α 5%. We can conclude that the model satisfies Arellano Bond's fundamental presumptions, the estimates generated are deemed consistent, and there is no autocorrelation.

Additionally, the Sargan test seeks to ascertain the reliability of the tools employed. According to the results, H_0 is rejected because the Sargan test's p-value is 0.7761 $> \alpha$ 5%. It can be concluded that the instruments used in the model are valid because they have no correlation with the error term.

Table 5. Comparison of Sys-GMM Estimator with FEM and PLS

Variable	Sys-GMM2	FEM	PLS
$\delta Gini_{i,t-1}$	0.8197626***	0.41631873***	0.96747396***

Note: *, **, and *** are significant at the 1%, 5%, and 10% levels, respectively.

Source: Processed data, Stata 17 (2025)

Table 5 shows the results of the model bias test, intended to examine whether the model used is biased or unbiased. The results show a comparison of the Lag Gini coefficient values in the Sys-GMM, FEM, and PLS models. The coefficient in the Sys-GMM model is 0.8197, which is between the coefficients of the FEM (0.4163) and PLS (0.9674) models. Therefore, it can be concluded that this model is not biased downward or upward, or in other words, this model is unbiased.

Table 6. Short-Term and Long-Term Elasticity Coefficients

Variable	Coefficient	Std. Error	Z	P-value	Short-term	Long-term
$\delta\text{Gini}_{i,t-1}$	0.8197626	0.0200022	40.98	0.000	-	-
$\text{Log}(\text{Eduexp})_{i,t}$	0.0052373	0.0008566	6.11	0.000	0.0052373	0.0290578
$\text{Log}(\text{Healthexp})_{i,t}$	-0.0014633	0.0018625	-0.79	0.432	-0.0014633	-0.0081188
$\text{Log}(\text{Socialexp})_{i,t}$	-0.001221	0.0010027	-1.22	0.223	-0.001221	-0.0067745
$\text{Log}(\text{Grdppc})_{i,t}$	0.0079914	0.0024082	3.32	0.001	0.0079914	0.0443383
$\text{Pov}_{i,t}$	0.0014046	0.0003809	3.69	0.000	0.0014046	0.0077931

Source: Processed data, Stata 17 (2025)

Table 6 shows the results of the long-term and short-term coefficients of variables thought to affect income inequality. The present period's income inequality is positively and significantly influenced by Lag Gini. With almost 82% of the inequality from the prior period affecting the present period, this suggests that income inequality is durable.

Education spending possesses a good and significant effect on income inequality in both the short and long run, as evidenced by a probability of $0.000 < \alpha$ (5%). In the short term, Inequality will rise by 0.0052 index units for every 1% increase in education spending. In the meantime, the impact will rise to 0.0290 over time. However, there is no discernible long-term or short-term impact from health spending. This is demonstrated by the probability value of health expenditure of $0.432 > \alpha$ (5%) with a coefficient of -0.0014, which indicates that although health spending contributes negatively to income inequality in Indonesia, its impact is not statistically significant. Similarly, social protection spending has no significant effect on income inequality in either the short or long term, with a probability value of $0.223 > \alpha$ (5%) and a coefficient of - 0.001221, meaning that social protection spending has a negative correlation with income inequality, although this correlation is not statistically significant.

A probability value shows that per capita GRDP significantly and favorably affects income disparity both in the short and long run, as evidenced by a probability value of $0.001 < \alpha$ (5%). In the short term, a 1% rise in per capita GRDP will increase inequality by 0.0079 index units. In the long term, the effect will be even greater, at 0.0443 index units. Poverty also has a positive and significant effect on income inequality in both the short and long run. This is evidenced by a probability value of $0.000 < \alpha$ (5%). In the short term, a 1% increase in poverty will enhance inequality by 0.0014 index units. In the long term, the effect will be even greater, at 0.0077 index units.

Discussion

The Effect of Public Spending on Education on Income Inequality

Based on the explanation in the results section, income inequality can be positively and significantly influenced by education spending in both the short and long term. Education spending tends to widen income inequality because its benefits are indirect and require a gradual process. Although the government has set a policy of allocating a minimum of 20% of the state budget and regional budget to education, its implementation has not yet shown a significant impact on people's welfare. There are still areas with poor access to education, a shortage of qualified teachers, and a lack of infrastructure, especially in disadvantaged areas. Education spending tends to provide a faster return for high-income groups who already have better access to education. Meanwhile, low-income groups who still have limited access only receive the effects after infrastructure, education quality, and education services are evenly distributed (Artige & Cavenaile, 2023). In general, high-income groups already have good initial access to education, which will produce quality human capital. On the other hand, the demand

for highly educated workers is increasing in line with the growth of the service sector, so low-income households are greatly influenced by education levels.

These findings align with the previous studies by Fatihudin & Mauliddah (2019); Khairunnisa et al. (2021); Voto et al., (2024) which shows that the cause of increased education spending can increase educational inequality, namely the quality of education, which is suspected to be suboptimal and therefore unable to decrease income inequality. This differs from the findings of Prannisa et al., (2023) in West Java Province and Wahyudi (2023) in 34 provinces in Indonesia, which state that human resources have varying qualities, so that the government's contribution to education spending can improve individual skills, which will contribute to decreasing income inequality.

The Effect of Public Spending on Health on Income Inequality

Public spending on health exhibits a negative relationship with income inequality. However, its impact is not statistically significant in either the short or long term. This suggests that while increasing health spending may help to reduce income inequality, the effect is not strong enough to be deemed significant, but it does not contribute significantly. Through the state budget and regional budgets, the government is committed to supporting the transformation of a national health system that is adaptive, resilient, and equitable. However, in practice, there are still structural challenges such as suboptimal basic services, a lack of promotional and preventive activities, and inequality in the distribution of health workers. As a result, many disadvantaged regions with low-income communities still face limitations in accessing quality health services.

This study is in line with research conducted by Khairunnisa et al. (2021) which found that health spending did not have a significant effect on income inequality in Indonesia for the period 2014-2018. Health spending has not had a direct impact because each program requires different stages and mechanisms to reduce income inequality. Findings in Austria by Neuhuber & Schneider (2024) and research in 51 middle-income countries by (Isiaka et al., 2025) also show that health spending does not reduce income inequality or benefit low-income groups in upper-middle-income countries. Conversely, research conducted by Rindiani et al. (2025), public spending on health significantly reduces inequality in Indonesia, both in the long and short run. Health spending acts as a long-term investment that supports national development and promotes inclusive economic growth, thereby potentially reducing income inequality.

The Effect of Public Spending on Social Protection on Income Inequality

Public spending on social protection is negatively associated with income inequality, though the effect is insignificant in both short and long-run perspectives. This means that there are indications that an increase in social protection spending can reduce income inequality, but it does not contribute significantly. In the Ministry of Finance's study, the state budget as an instrument in the allocation of social protection spending is an important pillar in efforts to reduce inequality, poverty, and maintain the purchasing power of people who are vulnerable to economic shocks. However, the limited integration between social protection programs and the inappropriate targeting of beneficiaries make these social protection programs less effective in improving the welfare of vulnerable communities. Social protection programs that are not targeted appropriately have the potential to weaken the redistributive effect, so that government social assistance (PKH, PIP, BLT, BPNT, and others) reduces its effectiveness in helping low-income communities, making it difficult to significantly reduce inequality.

This finding is aligned with study by Alamanda (2020) which found that public spending on social programs using indicators (social assistance, subsidies, and grant spending) was not

statistically significant on reducing inequality in Indonesia. Government social spending is not the primary factor of inequality reduction, especially in urban areas (high-income groups). More public spending can drive higher inequality in rural areas (low-income groups). Meanwhile, in the research Verberi & Yaşar (2021); Prannisa et al. (2023); Rindiani et al., (2025) found that social spending programs are used effectively to reduce income inequality because they have economic and social functions for the community, where funds allocated to low-income groups come from tax revenues paid by high-income groups, known as the redistributive mechanism.

The Effect of GRDP Per Capita on Income Inequality

The results show that Indonesia's income inequality is strongly and positively influenced by per capita GRDP in the short and long term. This implies that a rise in per capita GRDP leads to significant increase income inequality in Indonesia. High GRDP per capita indicates that the economic growth of the Indonesian people is becoming more prosperous, but increased economic growth is not always followed by equitable income distribution. High economic growth is tend to be localized within particular regions or sectors, so that groups with better economic access reap greater benefits than groups in vulnerable areas.

This findings is align with research conducted by Hartini (2017); Fatihudin & Mauliddah (2019); Prannisa et al. (2023) which states that increases in per capita GRDP are often felt only by certain communities, which can trigger an increase in income inequality in society. This certainly exacerbates income inequality because economic development is only focused on certain areas. This contrasts with research by Andina, (2021) on the island of Java for the period 2014-2020, which shows that an increase in per capita GRDP can mitigate income inequality. In line with research by Janah (2022) in Indonesia during the 2019-2021 period, high per capita GRDP reflects the economic success of a region in optimizing available resources, thereby decreasing income inequality in Indonesia.

The Effect of Poverty on Income Inequality

The findings indicate that higher levels of poverty are strongly associated with increased income inequality in Indonesia from 2015 to 2023, both in the short and long run. Where every increase in poverty can increase income inequality, conversely, if poverty decreases, it will go hand in hand with a decrease in income inequality. Poverty is one of the important factors that influences the size of the gap between groups or individuals in society. A significant increase in poverty contributes to an increase in income inequality between community groups. High-income community groups certainly have a lot of potential to further increase their income. Meanwhile, people with low incomes will find it increasingly difficult to increase their income if they do not receive stimulus from the government.

This study is consistent with the findings of Panggabean (2025) In Indonesia during the period 2015-2022, showing that an increase in poverty will increase income inequality, and vice versa. Poverty arises when human capital quality among the population remains low, which leads to a decline in labor productivity. Low labor productivity results in low income for each individual, ultimately preventing the community from meeting decent living standards, thereby creating a gap with communities that have high labor productivity. However, the results diverge from the research conducted by Dai et al., (2023) which found that poverty did not significantly affect income inequality in Western and Eastern Indonesia in 2010-2020. When the average expenditure of the community is below the poverty line, this will not affect income inequality because income distribution is considered uneven.

5. Conclusion

Based on the estimation results using the Sys-GMM model for 34 provinces in Indonesia during the 2015-2023 period, the researchers provided several important and consistent findings. Income inequality in Indonesia is both dynamic and persistent, with almost 82% of past-period inequality affecting inequality in the current period. Income inequality is positively and significantly influenced by the variables of education expenditure, per capita GRDP, and poverty in both the short and long run. Increases in education spending actually widen income inequality because the benefits are felt more quickly by high-income groups with better access, while low-income groups are still constrained by infrastructure and the quality of education services. Similarly, per capita GRDP and poverty also contribute to widening income inequality. On the other hand, health and social protection spending did not show a statistically significant effect on reducing income inequality. This is because fiscal policy interventions are likely hampered by the problem of inaccuracy in targeting beneficiaries, resulting in uneven distribution of services and an inability to have a real impact on reducing income inequality.

The findings of this study can provide knowledge and serve as a basis for policy-making by the government in its efforts to equalize income distribution. To optimize the function of public spending in reducing income inequality in Indonesia, the government should enhance coordination between the central and regional authorities to ensure that fiscal policy implementation runs smoothly, especially in the allocation of social spending budgets to be more inclusive and equitable. This study has limitations in explaining the potential non-linear relationship between variables, which may cause the impact of fiscal policy to appear insignificant in certain allocations. Therefore, we recommend that further research explore non-linear effects or threshold effects to identify the point at which public spending begins to effectively mitigate income inequality.

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