

The Impact of Mandatory Spending on Poverty in Indonesia

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Abstract

Poverty in Indonesia remains a critical issue, with a current rate of 9.57% that has not met the RPJPN target of 6.5% to 7.5%. This study analyzes the impact of mandatory government spending in education, health, and infrastructure on poverty from 2011 to 2022, using Generalized Method of Moments (GMM) with data from 33 provinces. Findings indicate that spending in education and health significantly reduces poverty, while infrastructure spending does not show a notable effect. To effectively combat poverty, the research recommends that the central government optimize its allocation of mandatory spending and enhance funding in other areas to achieve better outcomes.

Keywords: Education spending, health spending, infrastructure spending, poverty, Generalized Methods of Moments (GMM)

JEL Classification: E62, H51, H52, H54, I32

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I. Introduction

1.1 Background

Poverty is a global issue that poses a serious challenge, particularly in developing countries. In general, poverty is described as the condition of low welfare among citizens within an economy system. Various global efforts have been directed towards sustainable development and poverty alleviation, including policies, programs, and declarations from the international community. In September 2015, 189 world leaders agreed that ending poverty is one of the main objectives of the Sustainable Development Goals (SDGs). Indonesia has also committed to addressing poverty in all its forms. However, real solutions to tackle poverty remain unclear and require consistent and measurable efforts.

The definition of poverty varies, ranging from a broad definition that includes aspects such as hunger, malnutrition, limited access to education and basic services, discrimination, to low participation in decision-making (United Nations, 2023). On the other hand, a narrower definition of poverty refers to the inability of communities to meet basic living standards (Haughton, 2009). Todaro (2006) defines poverty as the inability to meet decent living standards in terms of food, shelter, and clothing. Meanwhile, the World Bank (1990) views poverty as powerlessness and a lack of freedom to achieve adequate living standards. In Indonesia, Bappenas (2010) defines poverty as a condition in which individuals or groups are unable to manage their lives to a humane level.

The Indonesian government, both at the central and regional levels, has made poverty alleviation a top priority. This is reflected in the national goals outlined in the preamble of the 1945 Constitution, which aim to promote the general welfare and social justice. National development, planned systematically, comprehensively, progressively, and sustainably, encompasses all aspects of community life, including ideology, politics, economy, social affairs, culture, defense, and state security. One of the main goals of the National Medium-Term Development Plan (RPJP) 2005–2025 is to achieve a balance between development and justice. Various methods have been implemented to reduce poverty, such as the establishment of the National Team for the Acceleration of Poverty Reduction (TNP2K) at the central level and Regional Team for the Acceleration of Poverty Reduction (TKPK) at the regional level.

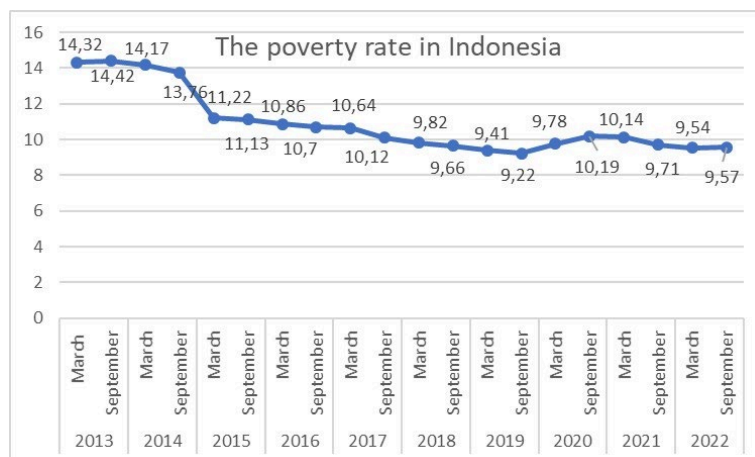


Figure 1. The poverty rate in Indonesia 2013–2022

Source: BPS, 2023

Figure 1 shows the poverty rate in Indonesia has in general significantly decreased over the past 10 years, reaching 9.57% in September 2022 according to data from Statistics Indonesia (BPS). This shows that during the period from March 2013 to September 2022, the percentage or total population living in poverty in Indonesia tended to decrease, except in September 2013, March 2020, September 2020, and September 2022. The increase in prices of various commodities and the rise in subsidized fuel prices caused an increase in the number and percentage of the poor from March to September 2013. Meanwhile, during the period from March to September 2020, this increase was due to the COVID-19 pandemic in Indonesia. Lastly, in the period from March to September 2022, the poverty rate also rose due to adjustments in fuel prices, increases in retail prices of essential commodities, and the high number of people affected by the pandemic and layoffs. Nevertheless, the decreasing poverty rate is still far from the target set in the National Medium-Term Development Plan (RPJPN), which is between 6.5% and 7.5%.

Although poverty is a complex problem, poverty alleviation can be achieved through economic growth (Taruno, 2019). If a country's GDP growth rate is higher than its population growth rate, its economic growth can be considered successful. Better economic performance is indicated by economic growth. However, this growth is not only reflected in increased growth rates; more importantly, it is about the quality of that growth. This means that economic growth must be accompanied by a decrease in the total number of people living in poverty. Higher economic growth can lead to an economic bubble if it is not accompanied by favorable policies (Sasana and Kusuma, 2018).

To support impoverished communities, the government's fiscal policy on the allocation of functions, such as government expenditure, should be implemented. The Indonesian government has modified various programs and policies to address or reduce the number of people living in poverty, such as the Special Market Operation (OPK), rice for the poor program (Raskin), social safety net systems, direct cash assistance (BLT), PNPB Mandiri, and others. However, government policies to reduce the number of people in poverty cannot be consistently applied in every region due to differing in social, demographic, and geographic characteristics (Sasana and Kusuma, 2018).

A report from the World Bank (2006) stated that the government can help address poverty by setting targeted expenditures for the poor. First, government spending can be maximized to support the community's income side through social protection systems, helping them to better cope with economic uncertainty. Second, government spending can be utilized to assist impoverished communities from a non-income perspective by improving human development indicators.

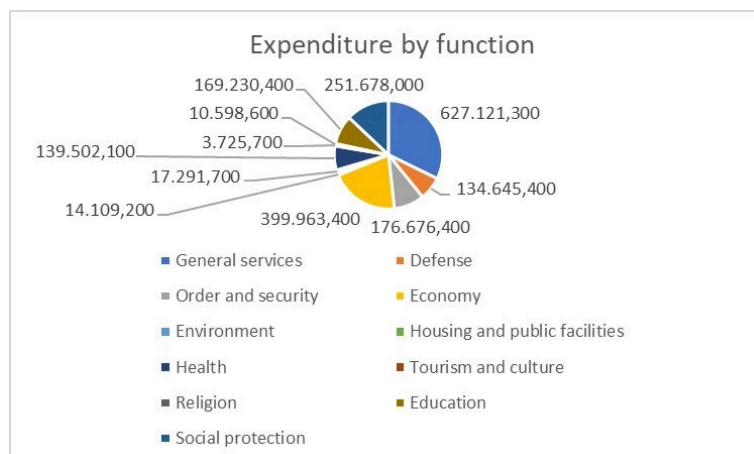


Figure 2. Expenditure by function

Source: Ministry of Finance, 2023

Figure 2 shows the budget for the education function in 2022 was IDR 169.230,400 billion, the health budget was IDR 139.502,100 billion, and the infrastructure budget (housing and public facilities) was IDR 17.291,700 billion out of the total overall budget. This demonstrates the government's efforts to increase budget allocations in the sectors of education, health, and infrastructure. This commitment is outlined in mandatory spending as mandated by the 1945 Constitution Amendment IV, Article 31, Paragraph 4, which states, "The state prioritizes the education budget at least twenty percent of the state and regional revenue and expenditure budgets to meet the needs of national education management," and is further detailed in Law No. 20 of 2003, Article 49, Paragraph 1.

Furthermore, regarding the health budget, Law No. 36 of 2009 establishes a minimum health budget that must be provided by the government, which is 5% of the state budget (APBN) and 10% of the regional budget (APBD). In addition, in the context of state spending, budgeting for productive expenditures, such as infrastructure development and interregional connectivity, becomes a top priority. Efforts to provide decent housing with access to drinking water and sanitation will be supported by the construction of basic service infrastructure (Summary of the State Budget, 2023).

Previous studies have demonstrated the impact of government expenditure on poverty alleviation. Akbar et al. (2019) explained that government spending in the education sector has a significant effect on reducing poverty in 20 Asian countries. The research by Arham and Naue (2015) showed that healthcare spending has a negative and significant impact on poverty in Gorontalo Province. However, Niuwa et al. (2020) identified that education spending has a negative and significant impact on poverty in the regencies and cities of Gorontalo Province. Nabeela Asghar (2012) found that education spending contributes to poverty alleviation, but healthcare spending does not have a negative and significant impact. Liu et al. (2020) stated that spending on education, healthcare, and infrastructure positively affects poverty alleviation in China.

Patricia et al. (2019) and Miar and Yunani (2020) concluded that government expenditure has a short-term impact on poverty reduction in Nigeria. Hidalgo-Hidalgo and Iturbe-Ormaetxe (2018) found that education has a long-term impact on poverty reduction. The study by Asrol and Ahmad (2018) showed that government spending on infrastructure is highly responsive to poverty in Indonesia. Alamanda (2020) proved that infrastructure spending affects poverty and is more significant in rural areas compared to urban areas. Omari and Muturi (2016) stated that infrastructure spending has an impact on poverty alleviation in Kenya, whereas Arham and Naue (2015) identified that infrastructure spending does not have a negative and significant impact on poverty in Gorontalo. These studies generally use the Fixed Effect method in static panels.

This research employs a dynamic panel approach with the Generalized Method of Moments (GMM) to identify endogeneity in the model, particularly the issue of reverse causality. Based on this, government spending in education, healthcare, and infrastructure as mandatory spending is expected to alleviate poverty in Indonesia. Therefore, the aim of this study is to analyze the impact of mandatory spending on poverty in Indonesia.

1.2 Research Purpose

This study aims to determine the effect of government expenditure in education, health, and infrastructure on poverty in Indonesia.

II. Data and Methodology

2.1 Data

The study population includes 33 provinces in Indonesia during the period 2011–2022.

2.2 Methodology

The research method used is a panel data research method. Inferential analysis methods were applied to

answer the research questions. Furthermore, data processing was conducted using Microsoft Excel 2019 and STATA version 14.

The analysis was conducted in several stages. First, descriptive statistical analysis was performed to describe the data in this study and presents the numerical distribution of the data by providing observations, mean, median, mode, standard deviation, minimum, and maximum values. This study utilizes cross-sectional data (N) of 33 provinces with a time series (T) spanning 12 years. Because the number of cross-sectional data is greater than the time series data, the Generalized Method of Moments (GMM) technique is more appropriate to be applied (Siddiqui & Ahmed, 2013). The GMM analysis technique has advantages over other panel data analysis techniques when facing various issues such as biased estimation results, heteroskedasticity, measurement error, simultaneous reverse causality, and unobserved individual heterogeneity (Apergis & Ozturk, 2015).

Next, post-estimation tests are needed to check the validity and autocorrelation in the error term. Sargan Test is used to examine validity, while autocorrelation is examined using the Arellano-Bond test. The final step is testing the bias of the model by comparing the regression results between the Common Effect Model (CEM), Fixed Effect Model (FEM), and GMM.

2.3 Operational Definition of Variables

2.3.1 Poverty (Dependent Variable)

The poverty rate is the percentage of the population living below the poverty line. The data source is from BPS and is expressed in thousand people, based on previous research (Elshahawany & Elazhary, 2023).

2.3.2 Mandatory Spending (Independent Variable)

a. Mandatory spending by function: education

Mandatory spending by function of education is the amount of funds allocated in the APBD to finance the implementation of government affairs in education. Law number 20 of 2003 concerning the national education system stipulates that the minimum education costs should be 20%. The data used, namely expenditure by function of education contained in the APBD in the form of annual data expressed in nominal rupiah. Based on previous researches (Arham & Naue, 2015; Hidalgo-Hidalgo & Iturbe-Ormaetxe, 2018; Taruno, 2019; Akbaret al., 2019; Liu et al., 2020; Elshahawany & Elazhary, 2023).

b. Mandatory spending by function: health

Mandatory spending by function of health is the amount of funds allocated in the APBD to finance the implementation of government affairs in health. Based on Law number 36 of 2009, the government's health budget allocation should be at least 10%. The data used is expenditure by function of health contained in the APBD in the form of annual data expressed in nominal rupiah. Based on previous researches (Arham & Naue, 2015; Omari & Muturi, 2016; Niuwa et al., 2020).

c. Mandatory spending by function: infrastructure

Mandatory spending by function of infrastructure is the amount of funds allocated in the APBD to finance the implementation of government affairs in infrastructure. The data used is expenditure by function of housing and public facilities contained in the APBD in the form of annual data expressed in nominal rupiah. Based on previous researches (Arham & Naue, 2015; Asrol & Ahmad, 2018; Alamanda, 2020).

2.3.3 Output (Independent Variable)

a. Average years of schooling

Average years of schooling is the average number of years completed by the population across all levels of formal education attended. This study uses data on the average years of schooling itself, sourced from BPS.

Based on previous researches (Faritz & Soejoto, 2020; Jolliffe & Baah, 2024).

b. Women currently using contraception/family planning

Women currently using contraception/family planning are women of reproductive age (15–49 years) who are currently using modern or traditional contraceptive methods to delay, space, or stop pregnancies. This study uses data on women aged 15–49 years who are married or in a civil union and currently using contraception, expressed as a percentage. Based on previous researches (Maizunati, 2015; Wahyuni et al., 2021).

c. Households by province, type of area, and adequate sanitation

Households by province, type of area, and adequate sanitation are households that have access to sanitation facilities that meet established cleanliness and health standards. This study uses data on households by province, type of area, and adequate sanitation, expressed as a percentage and sourced from BPS. Based on previous researches (Andrianus & Alfatih, 2023; Carla et al., 2024).

2.3.4 Control Variable

a. Unemployment

Unemployment is the inability of the workforce to find desired and suitable employment. Unemployment is typically associated with individuals lacking opportunities for work. This study uses the open unemployment rate sourced from BPS and expressed as a percentage (%). Based on previous researches (Akbar et al., 2019; Alamanda, 2020; Elshahawany & Elazhary, 2023).

b. GRDP

Gross Domestic Product (GDP) is the total added value of goods and services produced by various production units in the region of a country over a specific period (usually within one year). This study uses the growth rate of GDP per capita at constant prices of 2010, sourced from BPS and expressed as a percentage (%), and based on previous researches (Liu et al., 2020; Elshahawany & Elazhary, 2023).

c. Covid-19 Pandemic

The COVID-19 pandemic is a dummy variable. This variable is used to observe the before and after the COVID-19 pandemic. The number one represents the period after the pandemic, from 2020 to 2022. The number zero represents the period before the pandemic, from 2011 to 2019. Based on previous researches (Andika et al., 2022; Sani et al., 2022; Langi et al., 2023; Bracco et al., 2024).

The research model is as follows.

$$\begin{aligned} \text{Pov}_{it} = & \alpha_1 + \beta_1 \ln \text{EDUC}_{it} + \beta_2 \ln \text{HEAL}_{it} + \beta_3 \ln \text{INFR}_{it} + \beta_4 \text{RLSK}_{it} + \beta_5 \text{PDKS}_{it} \\ & + \beta_6 \text{PDSL}_{it} + \beta_7 \text{IPDR}_{it} + \beta_8 \text{IKDS}_{it} + \beta_9 \text{IFDS}_{it} + \beta_{10} \text{UNMP}_{it} + \\ & \beta_{11} \text{PDRB}_{it} + \beta_{12} \text{COVD}_{it} + \varepsilon_{it} \quad (1) \end{aligned}$$

In the model of this study, an interaction between two variables is conducted, namely between the input and output variables of each government expenditure sector. Interaction between variables allows for partial effects on an explanatory variable, for example, variable X1 depending on the level of another variable, such as X2 or vice versa (Woolridge, 2016). In this study, an interaction between two input and output variables in the education sector, consisting of expenditure and average years of schooling, an interaction between input and output variables in the health sector, consisting of expenditure and women currently using contraception/family planning, and an interaction between input and output variables in the infrastructure sector, consisting of expenditure and households with adequate sanitation, is conducted.

After the interaction, the model used in this study potentially leads to endogeneity issues. This endogeneity issue arises due to reverse causality, where there is a possibility that poverty can also affect government expenditure.

This means that not only does government expenditure affect poverty, but the poverty level can also affect government expenditure. This is certainly an endogeneity issue because the relationship between the two variables mutually influences each other simultaneously and their effects are difficult to separate.

To identify this reverse causality, the study creates a variable for government expenditure in the period (t-1) or the previous year from the observed year based on researches (Cammeraat, 2020; Xie et al., 2023) that use the social expenditure variable in the period (t-1) to reduce endogeneity issues. By using the Arellano and Bond (1991) strategy using the GMM estimator, the model is modified as follows.

$$\begin{aligned} \text{POV}_{it} = & \alpha_1 + \beta_1 \text{POV}_{it-1} + \beta_2 \ln \text{EDUC}_{it} + \beta_3 \ln \text{HEAL}_{it} + \beta_4 \ln \text{INFR}_{it} + \beta_5 \text{RLSK}_{it} \\ & + \beta_6 \text{WDMK}_{it} + \beta_7 \text{PDSL}_{it} + \beta_8 \text{IPDR}_{it} + \beta_9 \text{IKDS}_{it} + \beta_{10} \text{IFDS}_{it} + \beta_{11} \text{UNMP}_{it} \\ & + \beta_{12} \text{PDRB}_{it} + \beta_{13} \text{COVD}_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

III. Results and Discussion

This study uses panel data to examine how independent variables affect the dependent variable. The use of panel data includes cross-sectional data from 33 provinces in Indonesia and time-series data for a five-year period from 2011 to 2022. One province, North Kalimantan, is not included in the data due to unavailable data as it became a new province in 2014, and data from 2011 to 2013 on expenditure functions were still combined with East Kalimantan Province.

3.1 Results

3.1.1 Statistic Descriptive

The dependent variable used is poverty, measured as the percentage of the population living below the poverty line. The independent variables are divided into two categories: input and output. The input variables consist of government expenditure in the fields of education, health, and infrastructure. The output variables consist of the outcomes of this government expenditure, including average years of schooling, women currently using contraception/family planning, and households with adequate sanitation. This study also includes control variables such as unemployment, GDP, and the COVID-19 pandemic. Descriptive statistics provide a summary and presentation of information used in the study, as shown in Table 1.

Variables	Obs	Mean	Std. Dev.	Min	Max
Poverty (Percent)	396	11.46	5.99	3.47	31.52
Education Expenditure (billion)	396	6,990,000	13,300,000	1,010,000	91,600,000
Health Expenditure (billion)	396	7,680,000,000	16,500,000,000	684,000,000	99,700,000,000
Infrastructure Expenditure (billion)	396	8,230,000,000	16,200,000,000	823,000,000	98,000,000,000
Average Years of Schooling (years)	396	8.21	1.02	5.6	11.31
Women Currently Using Contraception/Family Planning (percent)	396	55.62	10.49	20.46	72.88
Households with Adequate Sanitation (percent)	396	66.87	16.50	16.12	97.12
Unemployment Rate (percent)	396	5.42	2.05	1.4	13.74
GDP (percent)	396	3.37	3.72	-20.13	21.06
COVID-19	396	0.25	0.43	0	1

Table 1. Statistic Descriptive

Source: Stata 14, output

After describing each variable, the next step is to create a quadrant chart between the input variables, namely expenditure on the horizontal axis, and the output variables, as well as poverty on the vertical axis. The graph is as follows.

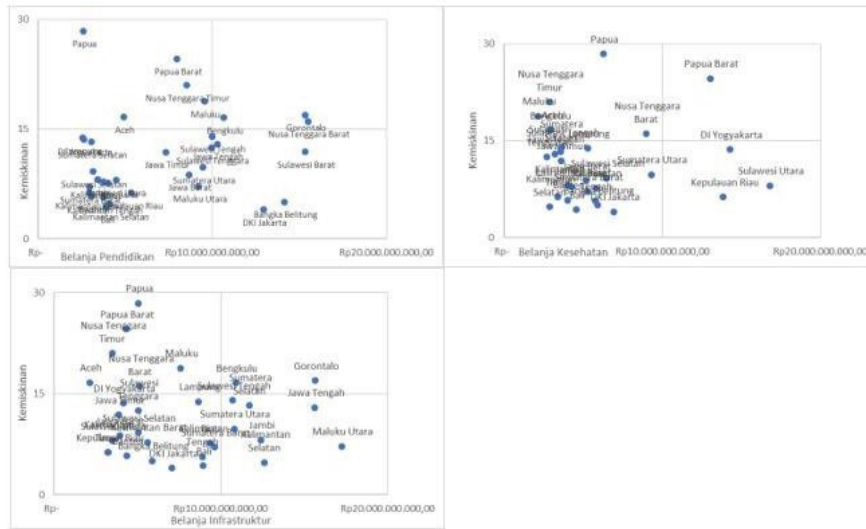


Figure 2. Expenditure and Poverty Quadrant Chart

Source: Processed data

This figure shows that the relationship between the poverty rate and government expenditure in education, health, and infrastructure varies across different provinces in Indonesia. While provinces like Papua demonstrate high poverty rates despite having high government expenditure in these three sectors, other provinces exhibit more diverse patterns. Some provinces with high government expenditure still have high poverty rates, while provinces with lower expenditure show variations in poverty rates. This indicates that besides government expenditure, there are other factors influencing the poverty rate in various provinces.

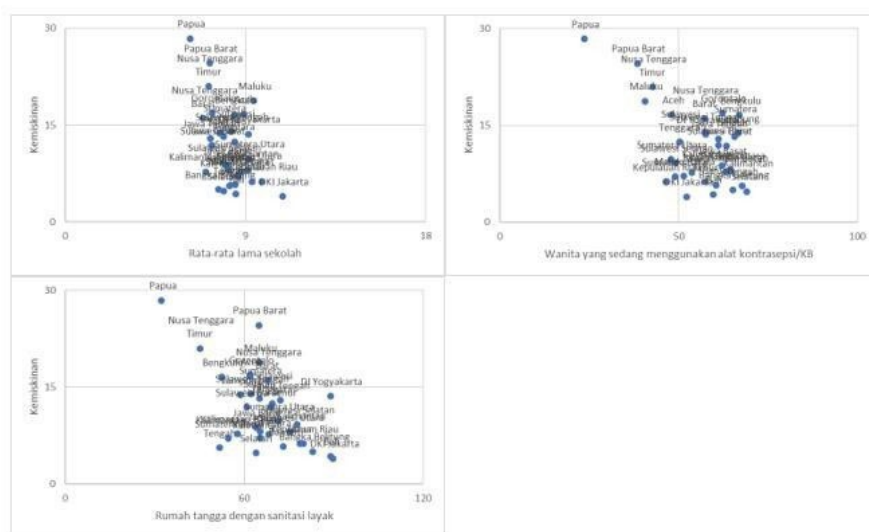


Figure 3. Output and Poverty Quadrant Chart

Source: Processed data

This graph illustrates the relationship between poverty rates and average years of schooling, use of contraceptives, and access to adequate sanitation in various provinces in Indonesia. Papua consistently shows a high poverty rate despite low social indicators such as years of schooling, use of contraceptives, and sanitation

access. Meanwhile, other provinces exhibit more varied patterns, with some provinces showing a decrease in poverty rates alongside improvements in social indicators. This suggests that social factors have varying impacts on poverty rates in each province.

3.1.2 Regression Estimation Results

Variabel	CEM	SysGMM	FEM
L.Poverty	0.962*** (0.007)	0.929*** (0.018)	0.612*** (0.036)
Education expenditure (leduc)	-0.293 (0.227)	-0.850** (0.359)	-0.342 (0.248)
Health expenditure (lhealth)	-0.019 (0.034)	-0.643*** (0.216)	0.065* (0.035)
Infrastructure expenditure (linfra)	0.061 (0.162)	-0.050 (0.193)	0.355** (0.152)
Average years of schooling	-0.828 (0.613)	-2.526*** (0.975)	-1.342* (0.683)
Percentage of women using contraception/KB	-0.006 (0.004)	-0.294*** (0.084)	0.009 (0.015)
Percentage of households with adequate sanitation	-0.010 (0.048)	-0.024 (0.057)	0.065 (0.046)
Interaction between expenditure and average schooling (New educ)	0.036 (0.028)	0.101** (0.044)	0.042 (0.031)
Interaction between expenditure and percentage of women using contraception/KB (New health2)	0.000 (0.002)	0.001 (0.003)	-0.003 (0.002)
Interaction between expenditure and percentage of households with adequate sanitation (New infra)	0.000 (0.000)	0.012*** (0.000)	-0.001** (0.000)
Unemployment	0.014 (0.017)	0.151*** (0.029)	0.109*** (0.031)
GRDP	-0.003 (0.008)	-0.003 (0.008)	0.011 (0.008)
Covid	0.226*** (0.080)	0.093 (0.082)	0.106 (0.098)
Constant	6.421 (6.480)	36.269*** (10.656)	5.859 (6.888)
<i>Number of Province</i>	33	33	33

Note:

***p < 0.01, **p < 0.05, *p < 0.1

Table 2. Regression Estimation Results

Source: Stata 14, output

3.1.3 Sargan Tests Results

The Sargan test is used to assess the validity of instrumental variables, as shown in Table 3 below.

Sargan Test	Variable
Chi^2 (246)	275.6999
Prob > Chi^2	0.0937

Table 3. Sargan Test Results

Source: Stata 14, output

The Sargan test result shows a chi-square probability value of 0.0937, which is greater than the significance level of five percent, thus failing to reject the null hypothesis. This indicates that the instrumental variables in the model are considered valid.

3.1.4 Arellano Bond Tests

The Arellano-Bond test is used to test the consistency of GMM estimation by examining the presence of correlation among error terms. The results of the Arellano-Bond test are shown in the following table.

Order	Z value	Prob > z
1	-3.108	0.0019
2	0.30493	0.7604

Table 4. Arellano Bond Tests

Source: Stata 14, output

The first-order test in the Arellano-Bond test shows a z probability value of 0.0019, which is which is smaller than the significance level alpha of five percent, leading to the rejection of H₀. However, for the second-order test second-order test, the z probability value is 0.7604, which is greater than the significance level alpha of five percent, leading to the failure to reject H₀. This condition is expected in the Arellano-Bond test, indicating no autocorrelation among error terms in the model.

3.1.5 Model Unbiasedness Tests

The next step to obtain the best GMM estimation is to test the unbiasedness of the model by comparing GMM, CEM, and FEM estimations. The coefficient estimation results of the lagged poverty variable in Table 2 show a value of 0.929, which falls between the values of FEM and CEM. Therefore, it can be concluded that there is no bias in the model.

3.1.6 Partial Tests

Partial test or commonly known as t-statistic test is used to determine the significance level of independent variables on each individual in influencing the dependent variable. Based on the information obtained from the t-statistic test results as presented in Table 5, the lag poverty variable has a coefficient of 0.9294 with a p-value of 0.000 which is smaller than the significance level ($\alpha = 0.05$), therefore H₀ must be rejected.

Variables	Coefficient	z-value	p-value
Poverty (Percent)	0.9294	51.16	0.000
Education Expenditure (leduc)	-0.8502	-2.37	0.018
Health Expenditure (lhealth)	-0.6432	-2.97	0.003
Infrastructure Expenditure (linfra)	-0.0501	-0.26	0.795
Average Years of Schooling (years)	-2.5262	-2.59	0.010
Women Currently Using Contraception/Family Planning (percent)	-0.2935	-3.48	0.000
Households with Adequate Sanitation (percent)	-0.0243	-0.32	0.672
Unemployment Rate (percent)	0.1510	5.28	0.000
GDP (percent)	-0.0034	-0.41	0.682

Table 5. Partial Tests Results

Source: Stata 14, output

The variable of education expenditure shows a coefficient of -0.8502 with a p-value of 0.018, which is smaller than $\alpha = 0.05$, therefore H_0 must be rejected. The health expenditure variable has a coefficient of -0.6432 with a p-value of 0.003, which is smaller than $\alpha = 0.05$, therefore H_0 must be rejected. The infrastructure expenditure variable shows a coefficient of -0.0501 with a p-value of 0.795, which is larger than $\alpha = 0.05$, therefore H_0 is accepted or H_a is rejected. The average length of schooling variable has a coefficient of -2.5262 with a p-value of 0.010, which is smaller than $\alpha = 0.05$, therefore H_0 must be rejected. The variable of women using contraception/KB has a coefficient of -0.2935 with a p-value of 0.000, which is smaller than $\alpha = 0.05$, therefore H_0 must be rejected. The variable of households with proper sanitation shows a coefficient of -0.0243 with a p-value of 0.672, which is larger than $\alpha = 0.05$, therefore H_0 is accepted or H_a is rejected. The unemployment variable has a coefficient of 0.1510 with a p-value of 0.000, which is smaller than $\alpha = 0.05$ therefore H_0 must be rejected. The GDP variable has a coefficient of -0.0034 with a p-value of 0.682. Lastly, the Covid variable has a coefficient of 0.093 with a p-value of 0.256, which is larger than $\alpha = 0.05$, therefore H_0 must be accepted.

3.1.7 Simultaneous Tests

The simultaneous test is used to observe the relationship of all independent variables together against the dependent variable. The simultaneous test uses the Wald test, which is determined by comparing the probability value of the chi-square to a certain significance level alpha. The results of the simultaneous test can be seen and presented in the following table.

Simultaneous test	Value
Prob. <i>chi square</i>	0.0000
Decision	H_0 rejected

Table 6. Simultaneous Tests Results

Source: Stata 14, output

Table 6 provides information that the result of the simultaneous test yields a chi-square probability value of 0.000, which is lower than the significance level of alpha five percent. Therefore, the decision is to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_a).

3.1.8 Long-Term Tests

In addition to determining the short-term effects of an independent variable on its dependent variable, the Generalized Method of Moments (GMM) analysis technique can also be used to understand the long-term relationships in an econometric model. Table 7 shows the results of the long-term estimation.

Variables	sysGMM	P-value
Education Expenditure (leduc)	-1.255*** (0.22)	0.000
Health Expenditure (lhealth)	-0.980*** (0.03)	0.000
Infrastructure Expenditure (linfra)	-0.900*** (0.16)	0.000

Table 7. Long-Term Results

Source: Stata 14, output

3.1.9 Robustness Check

Robustness checks are conducted to examine the model's robustness. The purpose of conducting robustness checks in this study is to ensure the transmission between input and output variables of government expenditure in

the fields of education, health, and infrastructure on poverty. According to Lu & White (2014), robustness checks can be performed by adding or reducing the number of covariates. This study will add output variables for each input to be estimated.

Variables	Index Severity Poverty (P1)	Index Severity Poverty (P1)	Index Severity Poverty (P1)
Education Expenditure (leduc)	-0.014*** (0.025)		
Health Expenditure (lhealth)		-0.053* (0.028)	
Infrastructure Expenditure (linfra)			-0.002 (0.028)
Average Years of Schooling (years)	-0.139*** (0.028)		
Women Currently Using Contraception/Family Planning (percent)		-0.024*** (0.002)	
Households with Adequate Sanitation (percent)			-0.002 (0.001)
<i>Constant</i>	1.782*** (0.644)	2.912*** (0.620)	0.559*** (0.402)

Table 8. Robustness Check

Source: Stata 14, output

The estimation results with the addition of covariates in Table 4.8 show that the mandatory spending variables in education and health have a negative and significant effect in reducing poverty in Indonesia. However, the mandatory spending variable in infrastructure does not show a negative and significant effect on poverty. The output variables of mandatory spending in education and health, which include average years of schooling and women's contraceptive use, also have a negative and significant effect on poverty. The mandatory spending variable in infrastructure, namely households with proper sanitation, does not show a negative and significant effect on poverty. This result shows that there is no change after the robustness check is conducted so that each independent variable remains consistent with the estimation results. This indicates that the model used in this study is good enough.

3.2 Discussion

3.2.1 The Influence of Government Expenditure in Education Sector on Poverty

The GMM estimation results indicate that government spending on education, health, and infrastructure has coefficients and p-values, where education spending has a coefficient of -0.8502 with a p-value of 0.018, showing a significant negative impact on poverty levels in Indonesia. This means that each one percent increase in education spending will reduce poverty by 0.8502 percent. In the long-term education spending has a coefficient of -1.255, which is significant at the one percent level, indicating that a one percent increase in education spending will reduce poverty by 1.255 percent. The average length of schooling also shows a coefficient of -2.5262 with a p-value of 0.010, indicating that a one percent increase in the average length of schooling will reduce poverty by 2.5262 percent. These results are consistent with a study by Akbar et al. (2019) in Asian countries, which found

that education expenditure has a significant negative effect on poverty reduction. The studies by Arham & Naue (2015) in Gorontalo Province and Faritz & Soejoto (2020) in Central Java also support the finding that education spending and the average length of schooling have a significant negative impact on poverty alleviation.

3.2.2 The Influence of Government Expenditure in Health Sector on Poverty

The GMM estimation results indicate that health spending has a coefficient of -0.6432 with a p-value of 0.003, showing a significant negative impact on the poverty level in Indonesia, where each one percent increase in health spending will reduce poverty by 0.6432 percent. In the long term, health spending has a coefficient of -0.980, which is significant at the five percent level, meaning that a one percent increase in health spending will reduce poverty by 0.980 percent. The variable representing women using contraceptives has a coefficient of -0.2935 with a p-value of 0.000, indicating a significant negative impact on poverty, where each one percent increase in contraceptive use will reduce poverty by 0.2935 percent. These findings are consistent with a study by Arham & Naue (2015) in Gorontalo Province, which showed that health spending is important for poverty alleviation, and the research by Liu et al. (2020) in China, which found that health spending significantly reduces poverty by improving health and workforce productivity. The study by Wahyuni et al. (2021) also supports the finding that participation in the Family Planning Program has a significant negative impact on reducing urban poverty in Central Java Province, helping families plan the number of children and allocate greater resources per child for education, health, and other basic needs.

3.2.3 The Influence of Government Expenditure in Infrastructure Sector on Poverty

The GMM estimation results for infrastructure spending show a coefficient of -0.0501 with a p-value of 0.795, which is greater than the five percent significance level (rejecting H₀). This suggests that infrastructure spending does not have a negative and significant correlation with poverty levels in Indonesia, meaning that a one percent increase in infrastructure spending only reduces poverty by 0.0501 percent, which indicates no significant relationship between infrastructure spending and poverty reduction. In the long term, however, infrastructure spending shows a coefficient of -0.900 that is significant at the five percent level, indicating that a one percent increase in infrastructure spending can reduce poverty by 0.900 percent, as shown in Table 4.7. The output of allocated infrastructure spending is represented in the variable for households with access to adequate sanitation, which has a coefficient of -0.0243 and a p-value of 0.672. This suggests that households with adequate sanitation do not have a negative and significant impact on poverty levels in Indonesia, implying that an increase in the percentage of households with adequate sanitation does not contribute to reducing poverty. This finding contrasts with Adhitya et al. (2022), who identified that sanitation had a negative and significant effect on poverty reduction in Indonesia from 2013 to 2020. It is consistent, however, with the study by Arham and Naue (2015), who found that infrastructure spending did not have a significant negative impact on poverty reduction in Gorontalo Province. One primary reason why infrastructure expenditure does not significantly impact poverty may be related to anomalies in budget allocations, indicating that the funds used may not be appropriately targeted.

Overall, government expenditure, including spending on education, healthcare, and infrastructure, plays an important role in the effort to reduce poverty in Indonesia. This is consistent with Keynesian Theory (1936) (via Omosivie, 2021), which posits that government spending can stimulate economic activity, which in turn is expected to reduce poverty. Patricia et al. (2019) noted that government spending in education, healthcare, and infrastructure reduces poverty both in the short and long term in Nigeria. Similarly, Taruno (2019) argued that investments in education and healthcare improve quality of life, which subsequently increases productivity, promotes economic performance, and alleviates poverty. Furthermore, investment in physical infrastructure is expected to be complementary to the previous two types of spending, such as by improving accessibility, which can drive economic activities in line with the objectives of the 2005–2025 long-term development plan.

3.2.4 The Influence of Unemployment Sector on Poverty

The test results for the unemployment variable on poverty levels show a positive relationship with a coefficient of 0.1510. Thus, it can be concluded that unemployment has a positive and significant effect on poverty levels in Indonesia. This can be interpreted to mean that every one percent increase in unemployment will raise the poverty rate by 0.1510 percent. These results align with the perspective of Elshahawany and Elazhary (2023), who stated that unemployment does not contribute to reducing poverty but rather increases the number of poor people in Egypt. Additionally, research by Akbar et al. (2019) identified that unemployment contributes to rising poverty levels in 20 Asian countries during the 1976–2017 period. Furthermore, research by Mardiatillah et al. (2021) found that unemployment has a positive and significant effect on poverty levels in South Sumatra Province. Unemployment is indeed a major issue that needs urgent attention and has been targeted in the National Long-Term Development Plan (RPJPN) 2005–2025 to be tackled alongside poverty, aiming for both to remain below five percent.

3.2.5 The Influence of GRDP on Poverty

The GMM estimation results of GRDP in the model show a coefficient of -0.0034, which is not significant at the five percent alpha level. This means that GRDP does not have a negative and significant correlation with poverty levels. It also implies that a one percent increase in GRDP will not reduce poverty levels by 0.0034 percent. These results are not consistent with previous studies. For instance, Liu et al. (2020) analyzed the correlation between government spending and poverty alleviation in China. By including per capita GRDP as a control variable, their study found that this variable also affects poverty reduction. Similarly, research by Sasana and Kusuma (2018) also identified that economic growth has a negative and significant correlation with poverty.

3.2.6 The Influence of Covid-19 Pandemic on Poverty

The GMM estimation results of the Covid-19 pandemic in the model show a coefficient of -0.0930 which is not significant at the five percent alpha level. This means that the Covid-19 pandemic does not have a positive and significant correlation with poverty levels. It also interprets that a one percent increase in the Covid-19 pandemic will not increase poverty levels by 0.0930 percent. Research conducted by Sani et al. (2022), examining the impact of the pandemic on poverty levels in both urban and rural areas, shows that the Covid-19 pandemic tends to have a greater effect in urban areas compared to rural areas. This indicates that the increase in total poverty in a region in Indonesia is not solely caused by the Covid-19 pandemic as the main factor, but there are other factors that may also influence poverty, especially for those living in rural areas.

IV. Conclusion

4.1 Recommendation

The analysis using Generalized Method of Moments (GMM) estimation for the impact of government expenditure on poverty in Indonesia from 2011 to 2022 concludes that expenditure in the education and health sectors has a negative and significant effect on poverty reduction, indicating that increased budget allocations for these sectors are effective in reducing poverty. However, expenditure in the infrastructure sector does not show a negative and significant impact on poverty, indicating that infrastructure spending is not effective in reducing poverty in Indonesia.

Based on these conclusions, the government can reduce the poverty rate in Indonesia by increasing the budget allocation for education and health, which have been proven to have a negative and significant impact on poverty. Referring to Law Number 20 of 2003 Article 49, the government is expected to allocate 20% of the education budget to help reduce poverty. Similarly, according to Law No. 36 of 2009 Article 171, the allocation of 10% of the health budget from the state and regional budgets is expected to contribute to poverty reduction.

However, infrastructure spending has not been effective in reducing poverty, indicating the need for more targeted budgeting policies to achieve better distribution. Overall, the government needs to implement more targeted policies and budgeting in these three sectors, in line with the constitutional mandate on mandatory spending.

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