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**An Analysis of the Government's Impact on Achieving the
SDGs in the Education Sector in Indonesia**

Sri Rahma Witta¹ and Hefrizal Handra²

^{1,2} Faculty of Economics and Business, Universitas Andalas, Indonesia

Corresponding authors: srirahmawitta@gmail.com

Abstract: This study aims to analyze the effect of government expenditure on the achievement of educational SDGs in Indonesia, measured by the completion rate senior high school/equivalent. Using panel data regression on 33 provinces from 2016–2023, the main variables are government expenditure on education, health, and social protection, with per capita income and poverty as controls. The results show that health function expenditure has a positive and significant effect on the SDGs 4 in education, while education and social protection expenditure are not significant. Per capita income has a positive significant effect, while poverty has a negative significant effect. The finding of this study indicate that investment in the health sector, increasing people's economic welfare and reducing poverty are more effective in advancing senior high school/equivalent completion, while also contributing to the literature and informing sustainable education policy strategies.

Keywords: SDGs Education Sector, Education Expenditure, Health Expenditure, Social Protection Expenditure

Introduction

Sustainable Development Goals (SDGs) is a global agenda launched by the United Nations (UN) on September 25, 2015. SDGs were declared at the UN Headquarters in New York by 193 countries including Indonesia as a commitment to the Global Development Agenda which is a continuation of the MDGs which were implemented in 2000–2015 (National Development Planning Agency, 2020b).

The SDGs include 17 goals, 169 targets, and 241 indicators for the period 2015– 2030. Indonesia has been actively involved in various international forums in formulating the SDGs. In line with the formulation of the SDGs at the global level, Indonesia has also prepared the National Medium-Term Development Plan (RPJMN) for 2015–2019,

2020–2024, and 2025–2029, ensuring that the content of the SDGs aligns with the RPJMN, which serves as the implementation of the President's Vision and Mission.

The SDGs targets have been integrated with the RPJMN as a form of government commitment to the success of the implementation of the SDGs. For Indonesia, implementing the SDGs essentially represents the implementation of the National Development Agenda and the country's support for the success of the 2030 Agenda at the global level (National Development Planning Agency, 2020b).

One of the 17 SDGs is quality education, which is goal 4 in the pillar of social development. Quality education is an important factor in the development of a country because it plays a role in improving the welfare of individuals and society as a whole. Good education can provide the skills and knowledge needed to increase labor productivity, create innovation, and reduce social and economic disparities. Quality education has a more fundamental and sustainable role in the long term (Frederich et al., 2023).

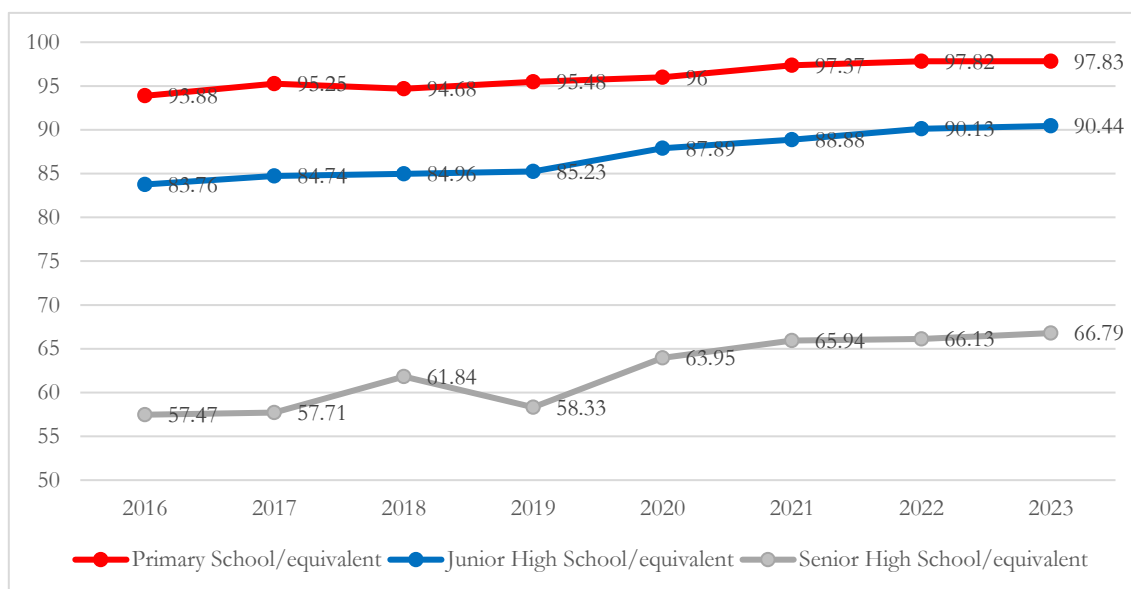
Education is one of the MDGs agendas that has not been fully achieved, especially related to increasing compulsory education from 9 years to 12 years. This agenda is continued in the SDGs which strengthen the MDGs and make education one of the main components to be achieved (Alisjahbana & Murniningtyas, 2021). In the SDGs, this agenda is continued in goal 4, which focuses on education. The first target to be achieved in this goal, namely target 4.1, which explains that by 2030, ensure that all girls and boys complete free, equitable, and quality primary and secondary education, leading to relevant and effective learning outcomes.

The achievement of this target uses several indicators. According to the SDGs indicator metadata, of the several indicators used in this target, there is one indicator that falls into the first category, namely the indicator with the * sign which is a national indicator that is in accordance with the global indicator. The indicator is indicator 4.1.2* which measures the level of completion of elementary school/equivalent, junior high school/equivalent and senior high school/equivalent. This reflects the importance of measuring the level of completion of education for the achievement of the SDGs in the education sector.

The level of education completion is one of the SDGs indicators in the education sector which is used to measure the progress of education in a country. The level of education completion shows the extent to which people can pursue formal education according to the established levels reflects the accessibility, availability, quality, cost, and motivation of the community towards education (Frederich et al., 2023).

The education completion rate measures how many children and adolescents successfully complete their level of education and progress to the next level without significant delays. If this rate reaches or approaches 100 percent, it indicates that nearly all children and adolescents have completed the education level appropriate for their age without substantial delays. Conversely, a low education completion rate indicates that many children and adolescents have not completed the education level corresponding to their age. This also reflects high dropout rates, grade repetition, low participation rates, or a combination of these factors (National Development Planning Agency, 2020a).

Figure 1. Education Completion Rate in Indonesia (%)



Source: Statistics Indonesia, 2016-2023

Figure 1 shows the level of education completion in Indonesia for elementary school, junior high school and senior high school/equivalent levels from 2016 to 2023 obtained from the publication of the Statistics Indonesia through the National Socio-Economic Survey. It is known that in general, there is an increasing trend in the level of education completion in Indonesia from 2016 to 2023 at all levels. However, it was found that the achievement of the level of education completion still faces serious challenges, especially at the senior high school/equivalent level.

During this period 2016-2023, the elementary school/equivalent completion rate was consistently above 93 percent, junior high school/equivalent was in the range of 83–90 percent, and senior high school/equivalent was only 57–66 percent. In fact, in 2023, senior high school/equivalent completion rate reached only 66.79 percent. This figure is still considerably below the government's target of 75.33 percent by 2045.

Then, when compared to other countries, it is evident that the senior high school/equivalent completion rate in Indonesia is relatively low, reaching only 66.79 percent in 2023. Meanwhile, in the ASEAN region, according to Education GPS-OECD data in 2023, countries such as Malaysia, Thailand, and Vietnam have much senior high school/equivalent completion rates, generally above 70–80 percent (OECD, 2023b). As a global comparison, the OECD average reports that upper secondary education completion rates in several developed countries, such as Canada, South Korea, and Japan, reach 90–95 percent, with an average of around 80 percent. This situation reflects that Indonesia is still lagging in senior high school/equivalent completion (OECD, 2023a).

The data in Figure 1 also shows that there are still gaps in education completion rates in Indonesia, particularly at the primary school/junior high school/senior high school/equivalent level. This indicates that although the government has established the 12-Year Compulsory Education program to ensure that all Indonesian children complete education up to the upper secondary level, its implementation has not yet been fully achieved.

This gap in educational achievement reflects the existence of structural barriers in the education system, which not only originate from internal aspects such as learning motivation or academic achievement, but also from external factors such as economic constraints, uneven educational infrastructure, and the quality of educational services. Therefore, the government continues to strive to improve this condition and strives to increase the level of education completion in order to achieve the SDGs goals in the field of education, especially at the senior high school/equivalent level which is still low compared to the elementary and junior high school/equivalent levels. One of the strategic steps taken is to allocate a budget in the education sector through government spending on basic services (education, health, and social protection) (National Development Planning Agency, 2020a).

Educational function spending is a budget allocation from the APBN and APBD which aims to improve access, quality and equality of education, in accordance with the mandate of Article 31 of the 1945 Constitution through the implementation of mandatory expenditure of at least 20 percent. The allocation of expenditure in the education sector represents the government's commitment to improving access to education in order to reduce social and economic inequality and to provide broad educational opportunities for the Indonesian population (National Development Planning Agency, 2020b).

When the government allocates sufficient budget for education, the education completion rate tends to increase. According to the Education Finance Watch 2023 report, countries that allocate more budget to education tend to have better education indicators (World Bank & UNESCO, 2023). Rahman (2023), in his research, found that as government expenditure on education increases, upper education attainment also improves. Duanti & Arifin (2020) similarly found that education expenditure has a positive and significant effect on achieving the SDGs in the field of education.

DJPk data shows that the realization of education function expenditure increased from IDR 63.92 trillion in 2016 to IDR 95.36 trillion in 2023. This increase is expected to improve the completion rate of senior high school/equivalent in Indonesia. However, despite the significant increase in education expenditure, the completion rate of senior high school/equivalent remains low, with an average growth of only 2.17 percent over the 2016–2023 period. Meanwhile, the realization of education function expenditure grew at an average rate of 5.88 percent during the same period. This growth has not been proportional to the increase in the completion rate of senior high school/equivalent.

In addition to education expenditure, health expenditure is also expected to improve the completion rate of senior high school/equivalent. This is because when government expenditure in the health sector increases, public access to better health services improves. Healthy children are more likely to concentrate during the learning process, have lower school absenteeism, and achieve better academic performance (Glewwe & Miguel, 2007).

The positive impact of health function expenditure on education completion, as described above, aligns with the increasing trend in health function expenditure in Indonesia during the 2016–2023 period. DJPK data shows that health function expenditure in Indonesia increased from IDR 28.14 trillion in 2016 to IDR 43.79 trillion in 2023, with an average growth rate of 6.52 percent.

The increase in health function expenditure is expected to improve education completion rates, as emphasized in School Feeding and the SDGs (2024) which highlights that investment in school meal and nutrition programs not only helps reduce child hunger but also contributes to improving educational continuity and access to senior high school/equivalent. Similarly, Kousar et al., (2023) found a positive and significant relationship between health expenditure and human capital formation. These results are reflected in achievements in primary, junior high school, and senior high school/equivalent, as well as in life expectancy at birth. Rahman et al. (2021) also found that health expenditure has a positive impact on educational outcomes in Indonesia. However, the education completion rate, particularly at the senior high school/equivalent in Indonesia, remains low, with an average growth of only 2.17 percent during the 2016–2023 period, despite the tendency for health function expenditure to increase.

In addition to education and health expenditure, social protection function expenditure is also expected to increase the completion rate of education at the high school/equivalent level. The Ministry of Finance of the Republic of Indonesia defines social protection as a government effort to help people face various dangers and shocks throughout life. Social protection expenditure plays an important role in increasing the completion rate of elementary, junior high, and senior high school education. According to the SMERU report published in 2024, social protection programs are instrumental in improving access to and participation in education in Papua, including at the junior high school and senior high school. Rahman (2021), in his study on factors contributing to secondary school dropout in Bangladesh (a challenge in achieving the SDGs), found that government social safety net programs are an important variable in reducing the likelihood of school dropout.

Kukla-Acevedo & Acevedo-Polakovich (2024) also reported that social expenditure has a positive effect on senior high school graduation rates. The study by Lestari, Achdiani & Nastia (2021) confirms that the Family Hope Program can improve educational access for beneficiary families while simultaneously promoting the development of better skills to leverage economic opportunities. This underscores that the effects of social expenditure extend beyond direct impacts on educational participation, providing long-term benefits related to household economic capacity.

DJPK data shows that the realization of social protection function expenditure increased from IDR 3.49 trillion in 2016 to IDR 4.66 trillion in 2023. The increase in social protection function expenditure is expected to increase the completion rate of education at the high school/equivalent level which is still low. However, the achievement of the high school/equivalent education completion rate is still low, which is below 70 percent with an average growth of only 2.17 percent.

Many factors can affect SDGs in the field of education, so control variables are used, namely per capita income and poverty. Per capita income is an indicator used to assess the level of economic prosperity. Per capita income describes the purchasing power of the population. Increasing per capita income can increase school enrollment rates at elementary, middle and high levels (Hajebi et al., 2023). However, Rahman (2023) stated that if per capita income increases, there will be a decrease in the achievement of upper secondary education.

Next is poverty which is also a control variable in this study. Poverty not only impacts access to education, but also the sustainability and completion of education, which ultimately affects the achievement of SDGs 4 targets, namely ensuring inclusive and quality education and encouraging lifelong learning opportunities for all. According to the World Bank (2022) in *The State of Global Learning Poverty: 2022 Update*, approximately 70 percent of 10-year-old children in low- and middle-income countries are unable to read or comprehend a simple text, an indicator known as "learning poverty." Children from poor households are more vulnerable to this situation, contributing to low secondary school completion rates. This condition indicates that poverty not only affects access to education but also its continuity and completion, ultimately impacting the achievement of SDG 4, which aims to ensure inclusive and quality education and promote lifelong learning opportunities for all. Rahman (2023) also found that when poverty increases, educational attainment for the upper level will decline.

Based on this phenomenon, it can be observed that the Indonesian government allocates expenditure to the education, health, and social protection sectors as an effort to expand public access to education. This measure is expected to promote an increase in education completion rates, particularly at the senior high school/equivalent, which serves as a key indicator for achieving the Sustainable Development Goals (SDGs) in the education sector. The focus on the senior high school/equivalent level is chosen because its completion rates remain relatively low compared to the primary and junior high school levels, even though this rate is an important benchmark for assessing the success of educational development. Furthermore, the senior high school/equivalent completion indicator is classified as a national indicator aligned with the global SDG indicators, making it relevant as a measure of sustainable development achievement in Indonesia.

Several previous studies have examined the effects of government expenditure on education, health, and social protection, as well as per capita income and poverty, on educational attainment. However, the results remain varied, showing different findings and most studies have not specifically investigated the relationship between these variables and the achievement of SDG 4, using senior high school/equivalent completion as the indicator. Many prior studies focused on only one or two types of government expenditure, employed varied educational indicators, or did not include the same control variables such as per capita income and poverty, which can also play a significant role.

Given these conditions, this study aims to comprehensively analyze how government expenditure across the three main functions education, health, and social protection simultaneously affects the completion rate of senior high school/equivalent in Indonesia. The study also includes per capita income and poverty as control variables, providing a more complete picture than previous research. In addition, the study period of 2016-2023 is particularly significant as it corresponds to the early phase of SDG implementation.

Thus, this study becomes important and is expected to provide theoretical contributions by enriching the literature on the cross-sectoral relationship between government expenditure and the achievement of the SDGs, as well as practical contributions for central and provincial governments in formulating more integrated budgeting strategies for education, health, and social protection to support the achievement of the SDG targets set by the government for 2030, particularly in the field of education.

Literature Review

The Influence of Educational Expenditure on SDGs in the Education Sector

Several studies have analyzed the impact of government expenditure on education functions on the completion rate of senior high school/equivalent completion rates, which are used as an indicator of SDG achievement in the field of education in this study. Rahman (2023) found that an increase in government expenditure on education leads to higher upper secondary education attainment. Megawati (2020) showed that education expenditure consistently has a positive effect on school participation rates in Indonesia.

According to Hajebi et al., (2023), government expenditure on education affects participation rates across various education levels in selected OECD countries from 2010 to 2023. However, the findings of Suharto, et al., (2024) emphasize that education expenditure has a greater impact on graduation rates rather than school participation. Meanwhile, Kushebayev & Nygymetov(2022) highlight that non-financial factors, such as education standards and teaching methods, play a crucial role in determining student success, even though education budgets continue to increase annually. Regression analysis in this study found no strong link between educational outcomes and government education expenditure, as funds were not efficiently utilized and had little impact on high school completion.

Farabiya et al., (2021) also reported that education expenditure did not significantly affect higher-level education outcomes, noting that its impact in Sub-Saharan Africa depends on the indicators used, with expenditure largely directed toward primary and secondary education. Improving outcomes requires removing barriers to basic education, addressing dropout rates, low enrollment, child labor, and involving the private sector. Similarly, Lesuisse (2022) found public expenditure significant only for primary education, while Wangui & Muthoga, (2023) showed that education expenditure had a small positive effect on primary school participation and a relatively minor impact on secondary school enrollment.

Given the differences in previous findings, this study seeks to address these gaps by analyzing the effect of government education expenditure on SDG indicators in the field of education, particularly senior high school/equivalent completion rates. Therefore, this research is important for providing empirical contributions while also addressing discrepancies in previous findings regarding the influence of education expenditure on achieving SDGs in education, especially for the indicator of senior high school/equivalent completion rates.

The human capital theory by Becker (1964) and Theodore Schultz (1961) states that education is a form of investment in human capital that will enhance productivity and future income. In this context, government expenditure on education is considered a public investment aimed at improving access, quality, and sustainability of education. Based on this, the hypothesis developed in this study is:

H1: Education function expenditure has a positive effect on the SDGs in the education sector

The Influence of Health Expenditure on SDGs in the Education Sector

Several studies have analyzed the influence of health expenditure on educational outcomes, particularly the completion rate of senior high school/equivalent, which serves as an indicator of education-related SDGs in this research. However, the findings remain varied in terms of methodology, scope of measurement, and conclusions drawn. The study School Feeding and the SDGs (2024) emphasizes that investments in school meals and nutrition programs not only help reduce child hunger but also contribute to improving educational continuity and access to senior high school/equivalent levels. In line with this, Kousar et al., (2023) found a positive and significant relationship between health expenditure and human capital formation. This result is reflected in achievements across primary, lower secondary, and upper secondary education, as well as life expectancy at birth.

Rahman et al., (2021) also found that health expenditure positively affects educational outcomes in Indonesia, ranging from school participation rates, expected years of schooling, to average years of schooling. These findings strengthen the argument that health expenditure can serve as an important instrument for improving educational outcomes at the aggregate level. Furthermore, Lee (2024), who analyzed the causal effects of health on educational outcomes, discovered that health interventions and health systems during the prenatal period, infancy, and childhood significantly impact long-term educational attainment and performance. The magnitude of this effect is statistically and economically significant, comparable to the impact of interventions on educational outcomes documented in the literature. By demonstrating the close linkage between health and education, this review highlights the importance of a comprehensive approach in policymaking that aligns with the Sustainable Development Goals (SDGs).

However, Suharto et al., (2025) reported contrasting findings. Their study showed that health expenditure had a negative effect on graduation rates and no significant effect on school participation in Indonesia. This raises debates regarding the role of health expenditure in improving educational outcomes.

From the above review, it is evident that the existing literature still shows divergence and inconsistency in results. Most studies affirm the positive influence of health expenditure on education, while others show negative or insignificant effects. Therefore, further research is crucial to analyze the impact of health expenditure on educational achievement, particularly senior high school/equivalent graduation rates in Indonesia. The results are expected to provide empirical contributions to cross-sectoral policies, so that health expenditure not only enhances public health but also supports the sustainable and inclusive achievement of education related SDGs.

Musgrave's public finance theory (1959) states that not all economic problems can be solved by market mechanisms, particularly social goods. The market mechanism is essentially used by individuals to seek personal profit, which makes collective, public, or non-profit-seeking economic activities unfeasible through the market. This fact requires government intervention in health services by increasing budget allocations for the health function. Based on this, the hypothesis developed in this study is:

H2: Health function expenditure has a positive effect on the SDGs in the education sector

The Influence of Social Protection Expenditure on SDGs in the Education Sector

Previous studies have also analyzed the impact of social protection function expenditure on the completion rate of senior high school/equivalent, which is used as an indicator of the education-related SDGs in this study. These studies present diverse findings. Rahman (2021), in his research on the causes of secondary school dropouts in Bangladesh (a challenge in achieving SDG targets), found that government social safety net programs are an important variable in reducing dropout rates. This study highlights that financial constraints are one of the main reasons students leave school, and government interventions through social assistance can reduce such barriers. The findings suggest that financial support from the government is a key component in lowering dropout rates, thereby contributing to the achievement of SDG targets.

Kukla-Acevedo & Acevedo-Polakovich (2024) also found that social expenditure has a positive effect on high school graduation rates. Their study underscores the importance of adequate public funding for a quality education system, particularly for previously underserved students. In other words, social spending not only expands access but also strengthens the quality of education through well-targeted financial support.

However, there are also findings that show the limited effects of social spending at higher education levels. Duanti & Arifin (2020), which revealed that social spending does not have a significant impact on achieving the SDGs in the education sector. Martsha (2024), examined the impact of the Family Hope Program on school participation among children in Indonesia. They found that program significantly increased student participation at the primary and junior secondary levels by providing financial support to low-income families. Nevertheless, its effect on senior high school students was relatively weaker, as many students faced economic pressures that pushed them into the labor market before completing upper secondary education. Other factors, such as access to technology and infrastructure, also influenced participation levels, suggesting that financial assistance alone is insufficient to ensure high school completion.

Research by Lestari, Achdiani & Nastia (2024), emphasizes that the Family Hope Program can improve educational access for beneficiary families while also fostering better skill development to take advantage of economic opportunities. This highlights that the effects of social expenditure extend beyond direct impacts on educational participation, offering long-term benefits for families' economic capabilities.

Meanwhile, Das & Sethi (2023), found that social protection spending consistently enhances educational access and reduces dropout risks among vulnerable groups, with government cash transfers having a positive effect on educational outcomes. These findings support the view that direct financial interventions can help reduce educational access inequalities, particularly for poor and vulnerable groups.

The main differences in these findings lie in the effect of social protection expenditure on the completion rate of senior high school/equivalent. Some studies show a significant impact on increasing participation and graduation, while others indicate weaker effects, primarily because family economic conditions, school access, and education quality also play crucial roles in determining students' success in completing upper secondary education. This reflects the divergence of results across previous research. In response, this study is needed to fill the empirical gap regarding the impact of social protection expenditure on high school graduation rates in Indonesia specifically and to provide evidence-based policy recommendations for the government in designing more effective social protection programs, particularly in relation to achieving education-related SDGs for poor and vulnerable groups. Based on this, the hypothesis developed in this study is:

H3: Social protection function expenditure has a positive effect on the SDGs in the education sector

Methods

This study uses quantitative research and covers 33 provinces in Indonesia from 2016 to 2023. Meanwhile, there are 5 provinces excluded from the study, 4 of which are Papua Selatan, Papua Pegunungan, Papua Tengah and Papua Barat Daya. These provinces were newly established in 2022 under Laws No. 14, 15, 16, and 29 of 2022. As a result, no data are available for the period 2016–2023 regarding the completion rate of senior high school/equivalent in these newly formed provinces.

Additionally, one more province not included in the study is DKI Jakarta. DKI Jakarta is structurally different from other provinces as it does not have regencies, but only administrative cities. Based on the division of authority within Indonesia's governance system, Jakarta is a special region with unique governance arrangements, including in the education sector. In the context of the indicator used namely, the completion rate of senior high school/equivalent, which falls under provincial authority and is usually implemented in coordination with district/city education offices, Jakarta is not comparable as a unit of observation with other provinces that have a regency/city structure.

The independent variables in this study are government expenditure on education, health, and social protection functions. The dependent variable in this study is the SDGs in education sector with indicators of the level completion rate of senior high school/equivalent serving as the sub-indicator of indicator 4.1.2* in the education SDGs. This indicator was chosen because, according to the SDGs indicator metadata, among the indicators used to measure the achievement of the first education related SDG target, only this indicator marked with an asterisk (*) represents a national indicator aligned with the global indicator. This study also employs per capita income and poverty as control variables.

The study uses secondary data in the form of panel data, combining cross-sectional and time-series data. Government expenditure data were obtained from the Directorate General of Fiscal Balance, while per capita income data and poverty were sourced from Statistics Indonesia. Data SDGs in the education sector, specifically the completion rate of senior high school/equivalent, were also obtained from Statistics Indonesia, which publishes educational attainment data by education level and province based on the Susenas KOR survey. Documentation was the method used to collect the data. The analysis was conducted using EViews-13, employing panel data regression and classical assumption tests (Ordinary Least Squares). The regression model used in this study is as follows:

$$sdgs_edu_{it} = \alpha + \beta_1 goveduexp_{it} + \beta_2 govhealthexp_{it} + \beta_3 govsoceexp_{it} + \beta_4 pci_{it} + \beta_5 pov_{it} + e_{it}$$

Where: *sdgs_edu* is the SDGs in the education sector (percent); α is a constant; β is the regression coefficient; *goveduexp* is the government expenditure on education function (rupiah); *govhealthexp* is the government expenditure on health function (rupiah); *govsoceexp* is the government expenditure on social protection function (rupiah); *pci* is per capita income (rupiah); *pov* is poverty (percent); *i* is 33 provinces in Indonesia; *t* is the year 2016-2023; *e* is error disturbance.

In this study, there are differences in the units and magnitudes between the independent and dependent variables. Therefore, the regression model was transformed into a linear form using the natural logarithm (ln). Referring to Sugiyono (2012), the application of the natural logarithm aims to reduce excessive data fluctuations. The natural logarithm itself can be classified into two forms, namely Semi-Log and Double-Log. This research employs the Double-Log approach, in which both the independent and dependent variables are transformed into natural logarithmic form (Ghozali, 2017). The regression model used in this study is as follows:

$$\ln sdgs_edu_{it} = \alpha + \beta_1 \ln goveduexp_{it} + \beta_2 \ln govhealthexp_{it} + \beta_3 \ln govsoceexp_{it} + \beta_4 \ln pci_{it} + \beta_5 \ln pov_{it} + e_{it}$$

Findings

In panel data, to determine the best model to use, a model selection test is carried out with the following test: The Chow test is conducted to choose between PLS and FE with the hypothesis H_0 : PLS and H_1 : FE. The results of the Chow Test can be seen in Table 1.

Table 1. **Model Selection Test Results with Chow Test**

Effects Test	Statistic	d.f.	Prob.
Cross-section F	35.170398	(32,226)	0.0000
Cross-section Chi-square	472.137702	32	0.0000

Based on the Chow test conducted, the Prob F value is $0.0000 < 0.05$. It can be concluded that H_0 rejected and H_1 accepted because the Chow test probability value is smaller than alpha. Therefore, the model Fixed Effect is the best model to use.

The Hausman test is conducted to choose between FE and RE with the hypothesis H_0 : RE and H_1 :FE. The results of the Hausman Test can be seen in Table:

Table 2. **Model Selection Test Results with Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.797407	5	0.1174

Based on the Hausman Test, the Prob>chi2 value was obtained as $0.1174 > 0.05$. It can be concluded that H_0 accepted and H_1 rejected because the probability value of the Hausman Test is greater than alpha so that Random Effect is the best model to use.

The Lagrange Multiplier test is performed to choose between PLS or RE with the hypothesis H_0 : PLS and H_1 :RE. The results of the LM test can be seen in Table 3.

Table 3. **Results of Model Selection Test with Lagrange Multiplier**

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	528.0338 (0.0000)	3.216095 (0.0729)	531.2499 (0.0000)
Honda	22.97899 (0.0000)	1.793347 (0.0365)	17.51668 (0.0000)
King-Wu	22.97899 (0.0000)	1.793347 (0.0365)	11.35971 (0.0000)
Standardized Honda	25.00432 (0.0000)	2.298901 (0.0108)	15.01639 (0.0000)
Standardized King-Wu	25.00432 (0.0000)	2.298901 (0.0108)	9.075130 (0.0000)
Gourieroux, et al.	--	--	531.2499 (0.0000)

In the LM Test in Table 3 which uses the Breusch Pagan Lagrange Multiplier The test obtained a Brousch-Pegan value of $0.0000 < 0.05$. The conclusion is that H_0 rejected and H_1 accepted meaning Random Effect is the best model to use.

After conducting a model selection test, it was found that the best model used in this study Random Effect, because the model results obtained are random effects, no classical assumption test was carried out because the model random effect is an estimation method Generalized Least Square (GLS). The following are the estimation results using the approach Random Effect Model:

Table 4. **Regression Results Random Effect Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.590507	0.582453	4.447584	0.0000
ln goveduexp	-0.022918	0.013650	-1.679026	0.0944
ln govhealthexp	0.032440	0.014056	2.307884	0.0218
ln govsocepx	0.011936	0.014740	0.809750	0.4188
ln pci	0.091140	0.030094	3.028525	0.0027
ln pov	-0.130810	0.052764	-2.479157	0.0138

The panel data regression estimation results equation presented in Table 4 can be formulated as follows:

$$\begin{aligned} \ln sdgs_edu_{it} = & 2.590507 - 0.022918 \ln goveduexp_{it} \\ & + 0.032440 \ln govhealthexp_{it} + 0.011936 \ln govsocepx_{it} \\ & + 0.091140 \ln pci_{it} - 0.130810 \ln pov_{it} + e_{it} \end{aligned}$$

It is known from the equation above that the constant value is 2.590507 and is positive. This means that if the variables of education function expenditure, health function expenditure, social protection function expenditure, per capita income and poverty are constant, then the SDGs in the education sector with the indicator of the completion rate of senior high school/equivalent education will increase by 2.590507. The education function expenditure variable has a negative coefficient value of -0.022918, health function expenditure has a positive coefficient value of 0.032440 and social protection function expenditure has a positive coefficient value of 0.011936. The control variable of per capita income has a positive coefficient value of 0.091140 and the poverty control variable has a coefficient value of -1.130810.

The F-test was conducted to examine the simultaneous effect of the independent variables on the dependent variable, with the results as follows:

Table 5. **Panel Data F Test Result**

F-statistic	9.863512
Prob(F-statistic)	0.000000

Table 5 provides information that the estimated value of the F-Test is $0.0000 < 0.05$, then H_0 rejected and H_1 accepted. This means that from the F-Test, the variables of education function expenditure, health function expenditure, social protection expenditure, per capita income and poverty together significantly affect the SDGs in the education sector in 33 provinces in Indonesia during 2016-2023.

The t-test was conducted to examine the partial effect of each independent variable on the dependent variable, with the results as follows:

Table 6. **Panel Data t-Test Result**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ln goveduexp	-0.022918	0.013650	-1.679026	0.0944
ln govhealthexp	0.032440	0.014056	2.307884	0.0218
ln govsoceexp	0.011936	0.014740	0.809750	0.4188
ln pci	0.091140	0.030094	3.028525	0.0027
ln pov	-0.130810	0.052764	-2.479157	0.0138

Table 6 shows the results of the t-test for each variable that can be seen from the probability value. It is known that from the results of the t-test, the probability value of the education function expenditure variable is $0.0944 > 0.05$ so that H_0 accepted and H_1 unacceptable. Based on this value, it is known that individually there is no significant influence of educational function expenditure on the completion rate senior high school/equivalent education as an indicator of SDGs in the field of education in this study. So, the conclusion is that there is no significant influence of educational function expenditure on SDGs in the field of education.

The health function expenditure variable has a probability value of $0.0218 < 0.05$ so that H_0 rejected and H_1 accepted, meaning that individually the health function expenditure variable has a significant influence on the SDGs in the education sector. The health function expenditure variable has a coefficient value of 0.032440, meaning that an increase of 1 unit of health function expenditure will increase the completion rate of senior high school/equivalent education as an indicator of the SDGs in the education sector in this study by 0.032440.

The social protection function expenditure variable has a probability value of $0.4188 > 0.05$, so H_0 accepted and H_1 rejected means that individually the variable of social protection function expenditure does not have a significant influence on the completion rate of senior high school/equivalent education as an indicator of SDGs in the field of education in this study. So, the conclusion is that there is no significant influence of social protection function expenditure on SDGs in the field of education.

The control variable per capita income has a probability value of $0.0027 < 0.05$, so that H_0 rejected and H_1 accepted, meaning that individually the per capita income variable has a significant influence on the SDGs in the field of education. The per capita income variable has a coefficient value of 0.091140, meaning that an increase of 1 unit of per capita income will increase the completion rate of high school/equivalent education as an indicator of the SDGs in the field of education in this study by 0.091140.

The poverty control variable has a probability value of $0.0138 < 0.05$, so H_0 rejected and H_1 accepted, meaning that individually the poverty variable has a significant influence on the SDGs in the field of education. The poverty variable has a coefficient value of -0.130810, meaning that an increase of 1 unit of poverty will reduce the level of

completion of high school/equivalent education as an indicator of SDGs in the field of education in this study by 0.130810.

The coefficient of determination (R^2) is a measure used in regression analysis to indicate the extent to which variations in the dependent variable (Y) can be explained by variations in the independent variable (X) within a model. Based on the test conducted, the R^2 value can be seen in the following table.

Table 7. **Coefficient of Determination Result**

R-squared	0.160478
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Based on the test conducted, it can be seen in Table 7 that the R^2 value obtained is 0.160478. This means that 16.06 percent of the variation in education-related SDGs can be explained by the independent variables, while the rest is explained by other factors outside the model. Such an R^2 value is considered low. In the social and economic sciences, relatively low R^2 values are common because human behavior is highly complex and influenced by many factors that are difficult to fully capture in a model (Gujarati & Porter, 2009). This is especially true for studies that use cross-sectional data, which often result in lower R^2 values due to differences across regions (Kuncoro, 2013).

Based on the results of the panel data regression that has been carried out, it is known that the variable of educational function expenditure does not have a significant effect on the SDGs in the education sector. This means that the variable of educational function expenditure does not affect the SDGs in the education sector. The insignificance of education expenditure on the completion rate of senior high school/equivalent used as the education SDG indicator in this study can be attributed to various structural and implementation factors.

Data from Statistic Indonesia and the Ministry of Finance of Indonesia show that national education expenditure has consistently increased each year, with a mandated allocation of 20 percent of the state budget APBN as stipulated in the 1945 Constitution. Although actual education expenditure continues to rise, reaching IDR 95.36 trillion in 2023, this increase has not shown a strong correlation with the successful completion of upper secondary education.

The World Bank (2020), in its report “Revealing How Indonesia’s Subnational Governments Spend Their Money on Education: Subnational Education Public Expenditure Review 2020,” highlights that despite the substantial allocation of education funds, their effectiveness remains challenged by issues such as mistargeting and the dominance of personnel expenditure.

This is reflected in the Ministry of Education and Culture (2016) report, which stated that the 2016 education budget amounted to IDR 419.2 trillion. Of this, IDR 146.29 trillion was

allocated to ministries/agencies and IDR 267.89 trillion for transfers to regional governments and village funds. The Ministry of Education and Culture itself managed only IDR 49.23 trillion, which was directly used for education and cultural programs. The allocation included IDR 28.52 trillion for goods expenditure, IDR 1.33 trillion for capital expenditure, IDR 10.27 trillion for social assistance, and IDR 9.09 trillion for personnel expenditure.

In 2023, according to the Ministry of Finance report, the education budget reached IDR 608.3 trillion, with IDR 233.9 trillion allocated for central government expenditure, IDR 305.0 trillion for transfers to regions, and IDR 69.5 trillion for financing. The Ministry of Education, Culture, Research, and Technology received only IDR 80 trillion of this allocation.

Furthermore, a report from E-Media DPR (2022) revealed that a substantial portion of the education budget was used for road and bridge repairs, categorized as supporting infrastructure for education. This practice blurred the classification and objectives of the budget, resulting in ambiguous outcomes. This misalignment is problematic, as the core purpose of education funding should be to ensure that students are knowledgeable and skilled, able to pursue higher education, and capable of improving academic achievement in line with current developments.

Similarly, the Ministry of Education, Culture, and Research (2022) reported that although infrastructure development has improved, it has not significantly reduced regional disparities nor directly increased upper secondary graduation rates. Therefore, to achieve the education-related SDGs, fiscal interventions through education expenditure must be accompanied by better governance, performance-based monitoring, and program designs tailored to the root challenges of secondary education completion. In conclusion, the insignificance of education expenditure on education SDGs does not necessarily indicate a flawed policy, but rather underscores the need for more strategic, efficient, and locally responsive budget allocation and implementation.

The findings of this study are consistent with several previous studies that emphasize that increased government expenditure on education has not significantly improved educational attainment at the senior high school/equivalent level. Kushebayev & Nygymetov(2022) highlight that although education budget allocations have continued to increase each year, non-financial factors such as education standards and teaching methods play a more crucial role in determining student success. This supports the results of the present study, which show that education funds have not been utilized efficiently and therefore have not had a strong impact on upper secondary school completion rates.

Furthermore, Farabiya et al., (2021) also found that education expenditure does not have a significant effect on higher-level educational outcomes, which aligns with this study's findings. Studies in Sub-Saharan Africa even suggest that the impact of government

education expenditure largely depends on the indicators used, with budget allocations being more focused on primary and lower secondary education.

Additionally, research by Wangui & Muthoga (2023) supports these results, showing that while education expenditure has a positive effect on primary school participation, its impact on secondary education is relatively small. Thus, the findings of this study reinforce the view that government education expenditure, although important, is not the sole determinant of success in upper secondary education. Greater attention must be given to non-financial aspects as well as to more integrated strategies to address barriers to access, improve budget utilization efficiency, and encourage private sector participation in order to achieve better educational outcomes. The government must also ensure that education expenditure is not limited to financial inputs but directed toward programs that genuinely contribute to improving upper secondary education completion.

Based on the results of the panel data regression that has been carried out, it is known that the variable of health function expenditure has a significant effect on the SDGs in the education sector. This means that, statistically, the variable of health function expenditure affects the SDGs in the education sector. This finding supports Musgrave's theory of public finance, which argues that not all economic problems can be resolved through market mechanisms, especially those related to social goods. Markets essentially operate on individual profit motives, while collective, public, or non-profit economic activities require government intervention.

Expenditure on health functions shows a positive and significant effect on senior high school/equivalent completion rates in Indonesia, which serves as the education related SDG indicator in this study. This is due to the close interconnection between health and education, as good health supports optimal learning processes. When the government increases its allocation to the health sector, programs such as immunization, stunting prevention, supplementary feeding, free health services for students, and nutrition education can be expanded.

According to data from the Directorate General of Fiscal Balance (2023), Indonesia's realized health expenditure reached IDR 94.57 trillion, with the majority allocated to the National Health Insurance (JKN), where contributions for 75.67 percent of participants are covered by the state budget (APBN) or regional budgets (APBD). This large allocation to JKN reduces the risk of school dropouts due to illness. Families are less likely to withdraw children from school because of sudden medical costs. Furthermore, the availability of community health center supported by vaccines, medical check-ups, and nutrition programs helps reduce absenteeism and improve students' readiness to learn. With better health conditions, the likelihood of completing secondary education increases significantly.

Findings from the Indonesia Nutrition Status Survey (SSGI) released by the Ministry of Health (2023) also show that the prevalence of stunting among school-age children declined from 24.4 percent in 2021 to 21.6 percent in 2023. Therefore, this study demonstrates that

increased health expenditure not only improves public health but also significantly contributes to the achievement of education-related SDGs, particularly by enhancing the likelihood of students completing upper secondary education.

These results are consistent with previous studies such as School Feeding and the SDGs (2024), which emphasized that investment in school feeding and nutrition programs not only helps reduce child hunger but also promotes educational continuity and access to upper secondary education. Similarly, Kousar et al., (2023) found a positive and significant relationship between health expenditure and human capital formation, reflected in primary, junior secondary, and senior secondary education outcomes, as well as life expectancy at birth. Rahman et al., (2021) also found that health expenditure positively affects education outcomes in Indonesia, including school participation rates, expected years of schooling, and average years of schooling.

Based on the estimation results that have been carried out, it is known that social protection function expenditure does not significantly affect SDGs in the education sector. Social protection function expenditure in Indonesia has not shown a significant influence on the completion rate of high school/equivalent education.

Although programs such as Family Hope Program and Smart Indonesia Program are designed to support children from poor families, their impact on completion of secondary education is still limited. One of the factors influencing this issue is the mistargeting in the distribution of assistance. According to the report from the Education Financing Service Center (2023), although the Smart Indonesia Program has succeeded in reducing the dropout rate, challenges remain in ensuring equitable and well targeted distribution of aid. In addition, the amount of assistance provided is often insufficient to cover the full cost of education, particularly at the senior high school level, which entails higher expenses compared to the previous levels.

At the high school level, the need for higher costs is also an obstacle, because the assistance provided does not fully cover all educational needs. In addition, the success of completing secondary education is also influenced by the quality of educational services, family support, and the availability of facilities and infrastructure. Thus, although social protection expenditure has the potential to support education, its effectiveness in encouraging completion of senior secondary education is not optimal.

The findings of this study are consistent with previous research by Dianti & Arifin (2020), which revealed that social expenditure does not have a significant impact on achieving the SDGs in the education sector. Martsha & Disman (2024), who examined the effect of the Family Hope Program on school-age children's participation in Indonesia, found that program has a significant influence on increasing student participation at the elementary and junior high school levels, through financial support for underprivileged families. However, its effect on senior high school students is relatively lower, as many of them face economic

pressures that drive them to enter the workforce before completing senior high school/equivalent level.

Based on the estimation results that have been carried out, it is known that the control variable of income per capita has a significant positive effect on SDGs in the field of education. This reflects that better household economic capacity allows for the fulfillment of educational needs such as school fees and learning equipment. When economic capacity improves, income increases and income inequality decreases, it can improve educational achievement (Garg et al., 2022). BPS data shows that provinces with higher per capita income generally have higher levels of completion better secondary education.

The increase in GDP per capita is correlated with an increase in the number of senior high school enrollments, because the increasing purchasing power of the community allows them to continue their education to a higher level (Hajebi et al., 2023). In line with previous studies which also found that per capita income has a positive and significant effect on the HDI. Given that the HDI includes education indicators such as average length of schooling, this finding supports that an increase in per capita income can contribute to an increase in the completion rate of high school education. Thus, an increase in per capita income significantly supports the successful completion of senior high school education and the achievement of the SDGs targets in the education sector in Indonesia.

Based on the estimation results that have been carried out, it is known that the negative poverty control variable significantly affects the SDGs in the education sector. Data from the Statistics Indonesia in 2023 supports this finding, the school participation rate of the population aged 16-18 years from the poorest household group is only around 67 percent, much lower than the richest household group which reached more than 85 percent. This shows that children from poor families have limited access to education, either due to financial constraints, the distance of the school, or because they have to help the family economy. The results of this study are in line with previous research from Rahman (2023) which explains that when poverty increases, educational attainment at the upper level will decrease.

Conclusion

This study aims to analyze the influence of government expenditure on SDGs in the field of education in Indonesia, especially in the indicator of the level of completion of senior high school education/equivalent. Government spending used is education function expenditure, health function expenditure and social protection function expenditure. This study also uses control variables, namely per capita income and poverty. Based on the results of the analysis that has been carried out, it was found that educational function expenditure did not have a significant effect on the SDGs in the education sector using the indicator of the level of completion of senior high

school/equivalent education. This indicates that the increase in the education budget has not had a direct impact on the expected educational outcomes. On the other hand, health function expenditure showed a positive and significant effect on the completion of high school education. Optimizing the health budget has been proven to improve the quality of student health, reduce the number of stunting, and reduce the economic burden households, thus contributing to educational success. Meanwhile, social protection function expenditure did not show a significant influence on the SDGs in the education sector. Existing social assistance programs have not been able to provide a direct impact on the completion of secondary education due to various constraints, such as limited assistance and implementation that has not been fully targeted.

Meanwhile, per capita income as a control variable has a positive and significant effect on the completion of high school/equivalent education. Areas with higher per capita income levels tend to have better high school completion rates because more stable economic conditions allow households to meet their children's educational needs. Poverty as a control variable has a negative and significant effect. This shows that poverty is one of the main factors that hinders access to and sustainability of education, especially for low-income groups. Therefore, poverty reduction is not only important for improving economic welfare, but also plays a very important role in expanding access to education and achieving sustainable development targets in the education sector.

The recommendation from this study is for the government to strengthen the effectiveness of education expenditure through local needs-based planning, improved management, and reduced non-productive expenditure. Health expenditure also needs to be increased and integrated with education programs, especially related to nutrition and health of school children. Social protection programs must be more accurate and integrated with the education system, and involve schools in monitoring so that assistance is right on target. In addition, increasing community income through regional economic development needs to be prioritized to support the sustainability of education. The government also needs to ensure the accuracy of targeting and expanding the Smart Indonesia Program (PIP) for children from poor families. Finally, further research is recommended that explores the qualitative and micro aspects of the relationship between fiscal expenditure and education achievement in order to produce more precise and inclusive policies.

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