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ANALYZING THE ROLE OF HEALTH EXPENDITURE IN DRIVING INDONESIA'S ECONOMIC GROWTH

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Abstract

This study analyzes the effect of budget realization of health deconcentration funds and the percentage of population with health insurance on the growth of Gross Domestic Product (GDP) per capita at the provincial level in Indonesia. Investment in public health is believed to be a catalyst for long-term economic growth because it can increase labor productivity, reduce mortality, and extend life expectancy. While some previous studies have shown a positive relationship between public health expenditure and GDP, the context of fiscal decentralization and the post-pandemic recovery period require specific analysis.

The present study employs a quantitative approach, utilizing an explanatory method and panel data from 33 provinces in Indonesia for the period 2021-2023. The dependent variable in this study is provincial GDP per capita, while the independent variables are the logarithm of health deconcentration fund realization and the logarithm of the percentage of population with health insurance. The analysis was conducted using the Fixed Effect Model (FEM) panel regression model.

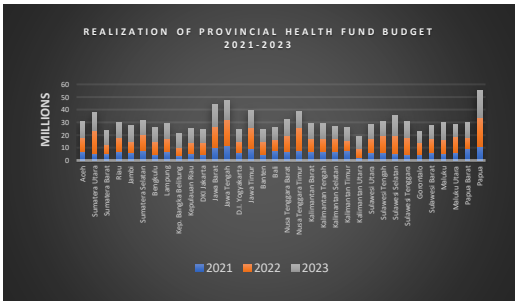
The regression results show that the realization of health deconcentration funds and the percentage of population with health insurance have a positive and significant relationship with GDP per capita growth in the provinces of Indonesia.

This finding is consistent with endogenous growth theory and supports the crucial role of health investment as an economic driver, especially in the post-pandemic recovery phase. Policy implications suggest that provincial governments need to continue to increase budget allocations and expand health insurance coverage efficiently and strategically. This is not only to improve social welfare, but also as a vital instrument to accelerate sustainable regional economic growth.

INTRODUCTION

Economic growth is a key indicator in assessing a country's progress and a central objective in public policy formulation. In the midst of efforts to promote inclusive and sustainable development, one of the strategic issues that continues to be highlighted is the effectiveness of government spending on vital sectors, especially the health sector. Government spending in this sector is not only seen as a social instrument to improve people's welfare, but also as a form of productive investment that can accelerate economic growth through improving the quality of human capital.

The following is data on the realization of the Ministry of Health's budget from 2021-2025.

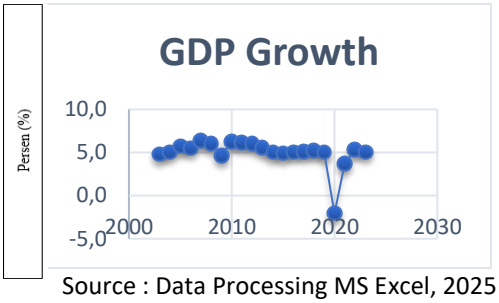


Source : Data processing MS Excel, 2025

Figure 1

Health Fund Budget Realization 2021-2023.

The phenomenon that occurred in Indonesia during the 2019-2023 period shows an increasing trend in budget allocations for the health sector. Based on data from the Indonesian Ministry of Health (2023), government spending on health increased sharply from IDR 75.4 trillion in 2019 to IDR 165.1 trillion in 2023. This increase occurred in parallel with the pressure caused by the COVID-19 pandemic, which demanded additional budgets for emergency health services, vaccinations, and strengthening medical facilities..



Source : Data Processing MS Excel, 2025

Figure 2

GDP Growth Indonesian From 2003 - 2023.

However, data from the Central Bureau of Statistics (2024) shows that Indonesia's economic growth contracted by -2.07% in 2020 before gradually recovering to 5.05% in 2023. This phenomenon raises fundamental questions regarding the effectiveness of government health spending in driving national economic growth.

Theoretically, there are two main views on the relationship between health spending and economic growth. The endogenous growth theory developed by Romer (1990) and Lucas (1988) emphasizes that investment in human capital, including health, is the main driver of long-term growth. On the other hand, the classical public expenditure theory (Musgrave, 1959) argues that the government should allocate budget to strategic sectors that are not efficiently provided by market mechanisms, including health, to achieve economic efficiency and stability. However, Baumol's Cost Disease theory (Baumol & Bowen, 1966) argues that the health sector tends to experience structural cost increases without a commensurate increase in productivity, which in turn can put a fiscal burden on the state and hinder economic growth.

In practice, a comparison between endogenous growth theory and Baumol's theory shows a tension between the expectation of the productive function of health spending and the reality of the fiscal burden due to structural inefficiencies in the health sector. Therefore, empirical validation is important to understand how these dynamics work in the context of a

developing country like Indonesia.

Various studies have tried to answer this question with mixed results. A review of several reputable scientific publications published in the last five years shows complex results. The studies of Liu et al. (2025), Chen et al. (2025), and Zhu et al. (2025) show that public health spending is positively correlated with economic growth through increasing labor productivity, household resilience, and life expectancy. Gu (2022) emphasized the contribution of health to human capital on a macro scale, while Wang (2021) and Hu & Wang (2024) identified a non-linear relationship between health spending and economic growth with a threshold effect. Research by Sadeghi & Mila (2017), Apeagyei et al. (2025), and Mossialos et al. (2025) also underline the importance of efficiency in health spending to generate positive economic impact.

In the Indonesian context, research results still show inconsistencies. The study by Sari and Santosa (2023) using ECM and Granger causality models showed a positive and significant relationship between health expenditure and economic growth in the long run. However, Hanifiah et al. (2023) using simple linear regression for the period 1990-2021 found that the relationship was not statistically significant. This finding was reinforced by the study of Yazdi-Feyzabadi et al. (2025) who emphasized that an increase in health spending without efficiency can actually burden the economy.

In a more recent study, Banik et al. (2023) revealed that high health expenditure allocation does not automatically improve human development, unless it is accompanied by good governance quality. Similarly, Ozyilmaz et al. (2022) in EU countries who showed a bidirectional causal relationship between health spending and economic growth, and confirmed that government spending in the health sector is the most important component in influencing GDP growth. Kabir et al. (2024) in a study of SAARC countries also showed a short-run causal relationship and a long-run significant effect between health expenditure, human development index (HDI), and economic growth. Similar findings were obtained from a cross-country study by Ustaoğlu and Demez (2024), who noted that public spending in the health sector has a positive impact on labor productivity and other macroeconomic indicators. Akter et al. (2023) in G7 countries also stated that health spending contributes to a decrease in child mortality, which in turn can increase life expectancy and economic productivity.

In addition, the literature also presents more complex nuances regarding the conditions under which health spending may not always promote economic growth. For example, Yang's (2020) study, which uses a threshold panel approach, shows that the positive effect of health spending on economic growth only holds up to a certain threshold point; once this threshold is exceeded, additional spending can actually be counterproductive. This is particularly true in countries with already high life expectancy indices, where additional spending may face diminishing returns or be allocated to less productive areas. Consistent with this view, a study by Hosseini and Ramezani (2024) using a Computable General Equilibrium (CGE) model in Iran, found that an increase in government health spending, without being supported by adequate fiscal expansion, can actually depress output in the industrial and agricultural sectors and reduce aggregate welfare. This indicates that health spending that is not integrated into a comprehensive financing strategy can divert resources from productive sectors.

Furthermore, several other literatures provide crucial perspectives on efficiency and governance challenges that may explain the variation in findings. Grigoli and Kapsoli (2013), in their study on the efficiency of health spending in developing countries and emerging economies, empirically show significant inefficiencies that limit the positive impact of budget increases. These efficiency gaps are often the result of various factors, including weak governance and potential corruption. In this regard, fundamental research by Mauro (1995) confirms that corruption can alter the composition of government spending, diverting it from productive sectors towards areas prone to fraud, ultimately reducing the effectiveness of public investment. Similarly, Gupta, Davoodi, and Alonso-Terme (2002) specifically link corruption to

a decrease in the effectiveness of public spending, including in the health sector, by reducing allocations for essential operations and maintenance.

In Indonesia's fiscal decentralization landscape, efficiency issues are increasingly complex. A study by Iskandar and Saragih (2019) analyzing the efficiency of health and education spending at the local government level in Indonesia, found that many regions have not reached the maximum level of efficiency. They emphasized that bureaucratic inefficiencies have resulted in inadequate public services, including in the health sector, indicating waste and irregularities in the use of public resources at the local level. In fact, findings from Najmah and Sihaloho (2025) who examined the efficiency of government health expenditure in ASEAN countries, also showed that most countries have not reached maximum efficiency, emphasizing the need for improved budget management and health policy reform. This challenge is reinforced by observations from the OECD (2023) Government at a Glance report, which underscores the importance of strong public governance, transparency and accountability in the budgeting cycle to ensure the effectiveness of government spending and its impact on public welfare. Imperfections in these aspects can significantly reduce the return on investment from health spending.

This study aims to fill this gap by empirically examining the relationship between government spending in the health sector (through the realization of health deconcentration funds) and health insurance with GDP at the provincial level in Indonesia in the 2021-2023 period using panel regression methods. The novelty of the study lies in the utilization of the latest panel data that includes pandemic expectations, simultaneous analysis of two key health policy variables, and a focus on assessing the impact of health spending in the context of fiscal decentralization in developing countries. This study also contributes to the development economics literature, particularly in understanding how public investment in the health sector can be optimized as a policy instrument for economic growth. Practically, the findings of this study are expected to serve as a reference for local governments in Indonesia in designing health sector budget allocation policies that are not only responsive to public service needs, but also economically productive and improve community welfare. Thus, health spending can be transformed from a budget burden to a catalyst for sustainable national development.

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METHODOLOGY

This study uses a quantitative approach with an explanatory method to examine the effect of the health budget and the number of health care facilities on the economic performance of the economy in Indonesia. The research design is causal correlation, focusing on the functional relationship between the independent variables, namely the health budget (expressed in logarithms) and Health Insurance, and the dependent variable, namely the Gross Domestic Product (GRDP) of Provinces in Indonesia.

The data used is secondary and obtained from official institutions, namely the Central Statistics Agency (BPS), word banks and the Ministry of Health of the Republic of Indonesia (Kemenkes RI). The data is organized in the form of panel data with coverage of 33 provinces in Indonesia and a time period of 3 years, resulting in a total of 99 observations. The utilization of panel data allows for a more in-depth analysis because it is able to combine the advantages of time series and cross-section data at once.

Prior to regression estimation, all variables were first transformed into natural logarithm (ln) to reduce the scale of the data, overcome potential heteroscedasticity, and so that the estimation results can be interpreted as elasticity (Wooldridge, 2012). The variables are:

1. lnpdb: logarithm of the GRDP of the provinces in Indonesia.
2. lnrag: logarithm of the provincial health budget.
3. lnjk: logarithm of the health index in each province.

The estimation is done using panel regression model. Before determining the appropriate panel regression model, a

Chow test was conducted to choose between the common effect and fixed effect models, followed by a Hausman test to determine whether the most appropriate model is fixed effect or random effect (Baltagi, 2008). The results of these two tests form the basis for selecting the final regression model used in the study.

The general equation of the panel regression model in this study is written as follows:

$$Lnpdbit = \beta0+\beta1 \cdot lnragit+\beta2 \cdot lnjkit+ui+\epsilon it$$

Description:

1. lnpdbit: log of health sector GDP in province i in year t
2. lnragit: log of health budget in province i in year t,
3. lnjkit: log of health insurance coverage in province i in year t,
4. β0: Constanta,
5. β2: Coefisien regresi,
6. uiu_iui: individualized effect (random/fixed effect),
7. ϵit: error TERM.

To ensure the validity of the model, a series of classical assumption tests were conducted, namely:

1. **Multicollinearity Test**
   using Variance Inflation Factor (VIF), with VIF threshold limit <10 as an indication of no multicollinearity
2. **Heteroscedasticity Test**
   using the Breusch-Pagan/Cook-Weisberg test, to ensure that the residual variance is constant.

The entire analysis process was conducted using Stata statistical software, which supports panel modeling in a comprehensive and efficient manner. The choice of this approach was based on the need to empirically and quantitatively identify the effect of health budget policy and the availability of health bureaucracy on economic output at the provincial level. With this approach, the study is expected to contribute in supporting data-based fiscal policy and empirical evidence.

RESULT AND DISCUSSION

a. Classical Assumption Test

A simple linear regression model was used in this study. Before interpreting the model, classical assumption testing is first carried out to ensure the validity of the model. According to Gujarati, D. N., & Porter, D. C. (2009) Classical assumption test is a series of statistical tests that must be met in multiple linear regression analysis. The goal is to ensure that the regression model used produces estimates that are unbiased, consistent, and efficient. In other words, this classic assumption test helps ensure that the results of regression analysis are reliable and the conclusions drawn are valid. The following are the test results:

Table.1 Multikoliniearity Test

Variable	lnrag	lnjk
lnrag	1.00	
lnjk	0.0436	1.00

Based on the results of the Pearson correlation analysis, the correlation coefficient between lnrag and lnjk is 0.0436. This value indicates that the two variables have a very weak and statistically insignificant relationship. Thus, it can be concluded that there is no significant correlation between the budget and the number of hospitals in the context of this study. This result also indicates that there is no multicollinearity problem between the independent variables in the model.

Table.2 Heteroscedasticity Test

Hipotesis Test	Statistic Test (chi2)	Degrees of Freedom (df)	Prob > chi2
H0: Constant variance	0.05	1	0.8267

Breusch-Pagan/Cook-Weisberg test is conducted to detect heteroscedasticity. The Prob > chi2 value of 0.8267 > 0.05 indicates that there is no heteroscedasticity in the model.

b. Panel Regression Model Selection

1. Chow Test

The Chow test is used to choose between Pooled OLS and Fixed Effect Model

(FEM). The null hypothesis (H0) of this test is that Pooled OLS is more appropriate (no significant differences between entities/provinces), while the alternative hypothesis (Ha) is that FEM is more appropriate (significant differences between entities).

Table.3 Chow Test

Test	Statistik F	Degrees of Freedom (df1, df2)	Prob > F
F test that all u_i=0	2021.93	(32, 64)	0

With a Prob > F value of 0.0000, which is much smaller than the significance level of 0.05, we reject H0. This indicates that there is a significant difference between group (province) intercepts, so the Fixed Effect Model (FEM) is more appropriate than Pooled OLS.

2. Hausman Test

After choosing between Pooled OLS and FEM, the Hausman Test was conducted to choose between the Fixed Effect Model (FEM) and the Random Effect Model (REM).

Table.4 Hausman Test

Uji Hausman	Statistik Uji	Degrees of Freedom (df)	Prob > chi2
Wald chi2	75.27	2	0
Asumsi H0	corr(u_i, X) = 0		

Since the p value (Prob > chi2) is 0.0000, which is much smaller than the general significance level (e.g., 0.05 or 5%), we reject the null hypothesis (H0).

Rejection of H0 indicates that there is a significant correlation between individual errors (u_i) and predictors (X). Therefore, the Fixed Effect Model (FEM) is a more appropriate model for this data compared to the Random Effect Model (REM), as the FEM can control the bias arising from such correlation.

c. FEM Panel Data Regression Results

The following are the results of panel data regression from the coefficient, R squared value and F statistic value.

Table 5. FEM Coeficient

Variable	Coeficient	Std. Err.	t	P >
lnpdb				
lnrag	0.0752343	0.0145	5.22	0
lnjk	0.6807237	0.144	4.73	0
_cons	7.993.269	0.5795	13.79	0

The resulting regression equation is as follows:

$$Lnpdbit = 7.993269 + 0.0752343 \cdot lnragit + 0.6807237 \cdot lnjkit + ui + \epsilon it$$

The regression coefficient for lnrag (natural logarithm of health deconcentration fund realization) is 0.0752343. This indicates that every 1% increase in health deconcentration fund realization is followed by an increase of about 7.52% in provincial GDP per capita (after logarithm), ceteris paribus. The coefficient is statistically significant with a p-value of 0.000, which is well below the 5% significance level (α=0.05). This means that there is a positive and significant relationship between health deconcentration fund realization and provincial GDP per capita in this model.

Furthermore, the regression coefficient for lnjk (natural logarithm of percentage of population with health insurance) is 0.6807237. This indicates that every 1% increase in the percentage of population with health insurance is followed by an increase of about 68.07% in provincial GDP per capita (after logarithm), ceteris paribus. The coefficient is also statistically significant with a p-value of 0.000, which is also well below the 5% significance level (α=0.05). This indicates a positive and significant relationship between the percentage of population with health insurance and provincial GDP per capita in the model.

Tabel 6. R Squared Value

R squared
Within = 0.5417
Between = 0.0169
Overall = 0.0170

The Within R-squared (R^2) value of 0.5397 means that about 53.97% of the variation in GDP per capita within each province can be explained by changes in the realization of health deconcentration funds and the percentage of the population with health insurance. This value is quite good for panel data and indicates that the two independent variables have sufficient explanatory power for the variation in GDP per capita over time at the provincial level.

Table 7. F Statistic Value

F(2,64)	=	37.82
Prob > F	=	0.0000

The F-statistic value of 37.52 with Prob > F of 0.0000 indicates that the overall regression model is highly statistically significant. This confirms that the relationship between the independent variables (health deconcentration fund realization and percentage of population with health insurance) and the dependent variable (provincial GDP per capita) in this model does not occur by chance.

DISCUSSION

The panel regression results that have been estimated using the Fixed Effect Model show significant findings and are consistent with most of the development economics literature.

This finding is in line with the endogenous growth theory that emphasizes the importance of investment in human capital as a driver of long-term economic growth (Romer, 1990; Lucas, 1988). In the context of health, an increase in budget and coverage of health insurance is assumed to improve the quality of human capital through several mechanisms:

1. Increased Labor Productivity: Healthier people tend to have higher productivity levels. Access to adequate health services, whether through increased budgets or health insurance, reduces the incidence of illness, speeds up recovery from illness, and lowers work absenteeism. A productive workforce directly contributes to increased economic output.
2. Extension of Life Expectancy and Decrease in Mortality Rates: Increased investment in health, reflected in health budgets and insurance, correlates with increased life expectancy and reduced mortality, especially at the productive age. This means that the workforce has a longer productive life, higher accumulation of knowledge and experience (human capital), and reduced demographic burden due to chronic diseases.
3. Improved Household Resilience: Health insurance provides financial protection for households from unexpected health shocks. It reduces large out-of-pocket expenses for medical costs, leaving households with more resources for other investments (e.g. education, small business) or consumption that can stimulate the local economy.
4. Economic Multiplier Effect: Government health spending not only has a direct impact on health, but also creates demand in related sectors such as pharmaceuticals, medical devices, construction of medical facilities, and provision of medical services. This creates jobs and stimulates local economic activity, resulting in a positive multiplier effect on GDP.

The results of this study are in line with previous empirical studies that found a positive relationship between health expenditure and economic growth, especially in developing countries. For example, Liu et al. (2025), Chen et al. (2025), and Zhu et al. (2025) consistently show that public health spending is positively correlated with economic growth

through increased labor productivity, household resilience, and life expectancy. Gu (2022) also underlines the contribution of health to human capital on a macro scale. In the Indonesian context, a study by Sari and Santosa (2023) using ECM and Granger causality models also showed a positive and significant relationship between health expenditure and economic growth in the long run.

Nonetheless, it is important to recognize that efficiency and governance remain crucial factors. While our results show an aggregate positive impact, literature such as Grigoli and Kapsoli (2013) remains relevant in emphasizing that inefficiencies may limit the magnitude of the positive impact. This means that the optimization potential of increasing the budget and coverage of health insurance can still be enhanced with improvements in management, accountability, and prevention of irregularities.

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CONCLUSION

This study analyzes the effect of health deconcentration fund budget realization and the percentage of population with health insurance on provincial GDP per capita in Indonesia during the period 2021-2023. Using panel regression analysis (Fixed Effect Model), the results show that both independent variables have a positive and significant relationship with provincial GDP per capita.

The findings strongly support the view that investment in the health sector, both through government budget and expansion of health insurance coverage, acts as a catalyst for economic growth at the local level, especially in the post-pandemic recovery phase. This suggests that improving the quality of human capital through health contributes significantly to improving productivity and regional economic performance.

As a policy implication, it is recommended that governments, both central and local, continue and strengthen their commitment to the health sector. Efficient and strategic investment in health is key to creating quality human capital and promoting sustainable economic growth in Indonesia.

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