

Good Governance and Sustainable Development Index in Indonesia: Panel Data Evidence from 34 Provinces

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Abstract

This study examines the influence of good governance indicators, including corruption, democracy, law enforcement, and budget realization, on sustainable development in Indonesia. The research covers 34 provinces during the period 2020–2023. A quantitative approach was employed using a fixed-effects panel regression model. The findings indicate that the number of corruption cases has a significant positive effect on sustainable development, while democracy shows a positive but statistically insignificant relationship. In contrast, law enforcement, measured by the completion rate of criminal cases, and budget realization, both demonstrate significant negative effects on sustainable development. These results provide empirical grounds for designing adaptive and integrative policies that emphasize preventive measures, institutional innovation, and environmental incentives to achieve sustainability goals effectively. This study is limited by its short observation period, bias from the use of secondary data, limited variables, and a purely quantitative approach. Therefore, further research needs to extend the period, enrich the variables, and integrate mixed methods.

Keywords: *Good Governance; Corruption; Democracy; Law Enforcement; Budget Realization; Sustainable Development Index*

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Introduction

Achieving sustainable development requires more than economic growth and effective environmental management; it equally depends on the quality of governance. Good governance, characterized by transparency, accountability, participation, law enforcement, and effective policymaking, forms the institutional foundation for sustainable progress (Kaushik, 2023).

Indonesia faces a dual challenge. On one side, the national economy grew at an average annual rate of 5% between 2022 and 2024 (BPS, 2025b). On the other hand, environmental degradation remains severe, as illustrated by a net deforestation rate of 175.4 thousand hectares in 2024 (Kementerian Kehutanan, 2025). According to the latest Sustainable Development Report (SDSN, 2025), Indonesia's Sustainable Development Index (SDI) stands at 70.22. However, the Corruption Perception Index remains volatile, showing no consistent upward trend (Transparency International, 2025). This contrast reveals a governance paradox: tangible progress in sustainability has not been accompanied by corresponding gains in governance integrity and effectiveness. Furthermore, persistent disparities in SDI scores across provinces highlight notable regional variations in governance performance, underscoring the need for deeper empirical inquiry.

The quality of a country's institutions is key to achieving the Sustainable Development Goals (SDGs), especially Goal 16 on peace, justice, and strong institutions. When institutions are transparent, free from corruption, and perform their duties effectively, sustainability targets are far more likely to be met (Haghighi & Takian, 2024). Research by Gündoğdu & Aytekin, (2022) shows that governance has a significant positive effect on the achievement of the SDGs in various countries. Developed countries that generally have strong democracies and high institutional capacity show better performance in governance and sustainable development than developing countries. Knox & Orazgaliyev, (2024) reinforce this by showing that autocratic countries tend to have weak governance and are a major obstacle to long-term sustainability.

While prior research has often examined governance through single dimensions, relatively few studies have explored how multiple governance aspects interact to shape sustainability outcomes. Addressing this gap requires a holistic approach that integrates the interconnected dimensions of governance. This study aims to provide a new perspective on the comprehensive relationship between various indicators of good governance, including corruption, democracy, law enforcement, and budget realization, and their influence on achieving the Sustainable Development Index, particularly in 34 provinces in Indonesia.

Based on the background of these problems, the present study addresses five key questions:

1. How does the number of corruption cases affect the Sustainable Development Index?
2. How does the level of democracy affect the Sustainable Development Index?
3. How does law enforcement, measured through criminal case resolution rates, affect the Sustainable Development Index?
4. How does the realization of regional budgets affect the Sustainable Development Index?
5. How do these governance dimensions collectively influence the Sustainable Development Index?

The research question in this study is how corruption, democracy, law enforcement, and budget realization affect the Sustainable Development Index, both partially and simultaneously. Thus, the purpose of this study is to analyze the influence of each indicator and the simultaneous influence of the four dimensions of good governance on the IPB in 34 provinces in Indonesia. The novelty of the research lies in the simultaneous testing of the four dimensions of good governance at the provincial level using a composite Sustainable Development Index that includes economic, social, and environmental dimensions. This approach provides a comprehensive overview of sustainable development disparities and enriches the governance literature through the endogenous growth framework.

Sustainable development is commonly understood as balanced progress across economic, social, and environmental domains (Apostu & Gigauri, 2023; Meliza Sari, 2020). Meanwhile, the concept of good governance was introduced by the World Bank in 1989-1990 and later adopted by the United Nations, the IMF, the UNDP, and most Western countries. They believe that development failures are caused by the lack of good governance of the government (Prasetya, 2023). Good governance is defined as the administration of government based on the principles of transparency, accountability, the rule of law, participation, efficiency, and the effectiveness of policies (Alfiana et al., 2021; Sari et al., 2024).

Endogenous growth theory posits that economic expansion is shaped by technological advancement and other endogenous factors that can be influenced through targeted domestic policies, including investments in research and development, innovation, and improvements in educational quality (Benjamin et al., 2023; Cristescu & Nerişanu, 2021). In this study, sustainable development is conceptualized as the dependent variable, determined by governance-related human capital indicators, specifically, corruption, democracy, law enforcement, and regional expenditure.

The dimensions of good governance, investment, and labor have been shown to drive higher economic growth, particularly in ASEAN countries (Andesta et al., 2022). Other findings confirm that governance variables, including voice and accountability, political stability, and regulatory quality, have a significant positive effect on economic growth (Febrian & Satria, 2025).

Research by Hope (2022) proves that corruption has a negative impact on almost all sectors of the SDGs in Africa. Uzar (2024) shows that democracy and green innovation can significantly reduce the ecological footprint in developing countries. Meanwhile, in the law enforcement dimension, in the short term, law enforcement tends to put pressure on the environment, but in the long term, it can contribute positively to sustainability (Li et al., 2025; Massonini Ngoma et al., 2024). The effectiveness of budget use is explained by the Kuznets Curve Environmental Hypothesis, which states that economic growth accompanied by investment in green technology can reduce carbon emissions and promote sustainability. The success of this sustainable development depends on the role of public policies, fiscal incentives, and social norms in the efficiency of budget use (Huang et al., 2025). The findings confirm that the quality of governance and institutional integrity have a significant impact on sustainability, but the relationship is complex and varies across regions.

Methods

This study adopts a quantitative approach to test the hypothesized relationship between good governance indicators and the Sustainable Development Index (SDI). The analysis covers 34 provinces in Indonesia over the period 2020–2023. A relatively short research period was chosen due to limited data availability over a longer time period. Secondary data were obtained from several official sources, including the Central Statistics Agency (BPS), the Directorate General of Fiscal Balance (DJPK), the Ministry of Environment and Forestry (KLHK), and Indonesia Corruption Watch (ICW).

The dependent variable, the SDI, is a composite measure constructed from three indicators: Gross Regional Domestic Product (GRDP) per capita, the Human Development Index (HDI), and the Environmental Quality Index (EQI). The three indicators were processed into an index, specifically the GRDP, as the other two indicators were already in index form. Weighting was then carried out using a moderate approach, which involved giving equal weight to each indicator (Meliza Sari, 2020). The independent variables comprise the number of corruption cases, the Indonesian Democracy Index (IDI), the percentage of resolved criminal cases as a proxy for law enforcement, and the realization of regional expenditure.

Panel data regression analysis was performed using EViews 13. Model selection was guided by a series of specification tests, the Chow test, the Hausman test, and the Lagrange Multiplier test, to identify the most appropriate specification among the common effect,

fixed effect, and random effect models. The analytical process was conducted sequentially, beginning with raw data processing and the computation of the composite SDI, followed by diagnostic assumption testing, and concluding with model estimation.

Table 1 Definition of Variable Operations

Variable	Indicators	Definition of indicators	Unit	Source
Sustainable development	Sustainable development composite index	A single metric from a combination of various development indicators to assess the progress of an area in achieving sustainable development goals.	Index	PDRB per capita (BPS, 2025), HDI (BPS, 2025), EQI (KLHK, 2025).(data processed by the author)
Corruption	Number of Corruption Cases	The number of corruption cases followed up by law enforcement officials includes the prosecutor's office, the police, and the KPK.	Case Units	ICW(2025)
Democracy	Indonesian Democracy Index	An objective and empirically-based measurement instrument to assess the level of political democracy in each province.	Index	BPS (2024)
Law enforcement	Settlement of criminal acts	The percentage of the crime settlement rate in each region.	Percent	BPS (2024)
Budget Realization	Total amount of the realization of regional expenditure	The amount of all actual expenditures that have been made by the local government in one budget year according to the APBD that has been determined.	Billion rupiah	DJPk (2025)

Result and Discussion

Research Results

Estimation Model Selection

The selection of the estimation model was determined through a series of specification tests, namely the Chow, Hausman, and Lagrange Multiplier tests, to identify the most suitable specification among the common effect, fixed effect, and random effect models.

1. Chow Test

Table 2 Result of Chow Test

Effects Test	Statistics	D.F.	Prob.
Cross-section F	137.958164	(33,98)	0.0000
Cross-section Chi-square	524.931198	33	0.0000

Source: Data processed by the author with Eviews 13, 2025

The Chow test results indicated rejection of the null hypothesis ($p < 0.05$), suggesting that the Fixed Effect Model was the most appropriate specification.

2. Hausman Test

Table 3 Hausman Test

Test Summary	Chi-Sq. Statistics	Chi-Sq. D.F.	Prob.
Cross-section random	14.808836	4	0.0051

The Hausman test results also indicated rejection of the null hypothesis ($p < 0.05$), confirming the Fixed Effect Model as the most appropriate specification. Since both the Chow and Hausman tests identified the same model, the Fixed Effect Model was selected for the

analysis.

Classic Assumption Test

Gujarati (2002), as cited in (Basuki & Prawoto (2019), explains that for panel data regression, a normality test is not required to meet the Best Linear Unbiased Estimator (BLUE) criteria and is therefore unnecessary in the analysis. A multicollinearity test, however, is essential when the model contains more than one independent variable. Heteroscedasticity is more common in cross-sectional data, and since panel data tends to share similar characteristics, testing for heteroscedasticity is still relevant. In contrast, autocorrelation is generally a problem in time series data, making it less applicable to panel data analysis. Based on the Central Limit Theorem, if the sample size exceeds 30, the data distribution can be considered to be close to normal. With a sample size of 136, the data is assumed to have a normal distribution (Ghasemi & Zahediasl, 2012). Reinforced by (Ghozali & Ratmono, 2022), the classical data panel assumptions tests that must be used are the multicollinearity and heteroscedasticity tests. Based on these considerations, this study applied only multicollinearity and heteroscedasticity tests to the panel regression model.

1. Multicollinearity Test

Table 4 Multicollinearity Test

	Corruption	Democracy	Law Enforcement	Budget Realization
Corruption	1.000000	0.143547	0.012362	0.343745
Democracy	0.143547	1.000000	0.238397	0.328406
Law Enforcement	0.012362	0.238397	1.000000	0.129349
Budget Realization	0.343745	0.328406	0.129349	1.000000

Source: Data processed by the author with Eviews 13, 2025

As all Variance Inflation Factor (VIF) values were below 10, the null hypothesis was accepted, indicating the absence of multicollinearity.

2. Heteroscedasticity Test

Table 5 Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.433962	1.672981	0.259395	0.7959
Corruption	0.001310	0.009171	0.142813	0.8867
Democracy	0.012134	0.019941	0.608497	0.5443
Law Enforcement	0.003182	0.002598	1.224677	0.2236
Budget Realization	-7.78E-05	4.00E-05	-1.946654	0.0544

Source: Data processed by the author with Eviews 13, 2025

As all probability values for the independent variables exceeded 0.05, the null hypothesis was accepted, indicating that heteroscedasticity was not present.

Panel Data Regression Results

The regression results presented in Table 6 show the estimated relationship of corruption, democracy, law enforcement, and budget realization with sustainable development.

Table 6 Partial Test Results

Variable	Coefficient	Std Error	t-Statistic	Prob.
Corruption	0.064375	0.018826	3.419542	0,0009
Democracy	0.071956	0.040934	1.757835	0,0819
Law Enforcement	-0.019584	0.005333	-3.672302	0,0004
Realization of Regional Expenditure	-0.000187	8.20E-05	-2.279338	0,0248

The probability value of the number of corruption cases variable is 0.0009, which is below the 0.05 significance threshold, indicating that this variable has a statistically significant effect on the Sustainable Development Index (SDI). Furthermore, the beta

coefficient for the number of corruption cases is 0.064375, meaning that this variable can explain 6.4% of the variation in the SDI. This can be interpreted as follows: for every additional corruption case recorded, the SDI increases by approximately 6,4.

The probability value of the Democracy Index variable is 0.0819, which exceeds the 0.05 significance threshold, indicating that this variable has no statistically significant effect on the Sustainable Development Index (SDI). The beta coefficient for the Democracy Index is 0.071956, suggesting that this variable accounts for 7,1% of the variation in the SDI. This can be interpreted as follows: for every additional unit increase in the Democracy Index, the SDI is expected to rise by approximately 7,1.

The probability value of the crime settlement variable is 0.0004, which is below the 0.05 significance level, indicating that the law enforcement variable has a statistically significant effect on the SDI. The beta coefficient for the crime settlement variable is -0.019584 , meaning that it explains 1.9% of the variation in the SDI. This implies that every one percent increase in crime settlement is associated with a 1,9 decrease in the SDI.

The probability value of the budget realization variable is 0.0235, which falls below the 0.05 significance threshold, signifying a statistically significant relationship with the SDI. The beta coefficient for the regional expenditure realization variable is -0.000187 , indicating that it explains 0.02% of the variation in the SDI. This can be interpreted as each additional one billion rupiah in realized regional expenditure is linked to a 0,02 decrease in the SDI.

Table 7 Simultaneous Test Results

R-squared	0.982503	Mean dependent var	61.83187
Adjusted R-squared	0.975896	S.D. dependent var	8.610459
S.E. of regression	1.336802	Akaike info criterion	3.649574
Sum squared resid	175.1300	Schwarz criterion	4.463404
Log likelihood	-210.1710	Hannan-Quinn crister.	3.980294
F-statistic	148.7250	Durbin-Watson stat	1.440842
Prob(F-statistic)	0.000000		

Source: Data processed by the author with Eviews 13, 2025

The R-squared value of 0.982503 indicates that the set of good governance variables included in the model collectively explains 98.25% of the variation in the Sustainable Development Index (SDI), with the remaining variation attributable to factors outside the model. The probability value of the F-statistic is 0.000000, which is well below the 0.05 significance threshold, leading to the acceptance of H1. Acceptance of H1 in the simultaneous test implies that the good governance variables simultaneously have a statistically significant effect on the SDI.

An R^2 value of 98% indicates that the model explains almost all of the variation in sustainable development. However, this high R^2 value may be influenced by the characteristics of panel data with similar trends between variables or the complexity of the model that absorbs data variation (Frost, 2025). Therefore, caution is needed in interpretation so as not to rely only on statistical correlations.

Discussion

The Effect of Corruption on Sustainable Development

Corruption is generally associated with adverse effects on both economic performance and sustainable development, particularly in high-income countries. However, in low-income contexts, some empirical evidence suggests potential short-term positive effects, although corruption remains widely regarded as a structurally harmful phenomenon (Hoinaru et al., 2020). In line with research showing that in developing countries with low governance quality, corruption can be positively related to sustainable development according to the "grease the wheels" hypothesis (Fhima et al., 2023). Findings from Zaitun (2024) indicate partial support for the "greasing the wheels" hypothesis, which posits that corruption can "grease the rigid bureaucratic wheels," thereby facilitating economic processes and enhancing efficiency. This perspective is reinforced in other studies, such as Malkina & Ovchinnikov (2020), which show that certain forms of corruption may accelerate growth by "greasing" the slow bureaucracy and enabling actors to avoid excessive administrative barriers.

However, in Indonesia, the results are contradictory. Corruption actually weakens growth and investment, reduces productivity, damages the quality of goods and services, reduces tax revenues, and increases national debt. Thus, although there is empirical evidence to support the "Greasing the Wheels" hypothesis, in Indonesia, corruption slows down sustainable development and exacerbates weaknesses in governance (Rachmawati, 2022). The findings indicate that corruption has a positive and significant effect on sustainable development, particularly in contexts with low governance quality. This supports the "grease the wheels" hypothesis, suggesting that in certain settings, corruption can bypass rigid bureaucratic processes, reduce excessive administrative barriers, and facilitate economic activities, thereby contributing to sustainability outcomes, although as a short-term and context-dependent phenomenon.

The Effect of Democracy on Sustainable Development

Empirical results on the relationship between democracy and the environment are inconsistent, depending on measurement methods and regional contexts, so their influence is not always significant in all situations (Acheampong et al., 2022). Based on the findings of Hasan et al. (2025), democracy encourages socially responsible work practices that contribute to sustainable development, particularly through CO₂ control, which acts as a key driver of environmental sustainability. However, this relationship does not apply universally and appears to be influenced by a country's level of economic development. In line with these findings, Carayannis et al., (2021) report that democracy, especially when it promotes political freedom, has a positive correlation with environmental performance in achieving sustainable development goals. Similarly, Uzar (2024) observes that during the transition phase toward sustainable development, democratic governance helps reduce the ecological footprint, thereby mitigating the environmental impact of human activities. Subekti et al.,(2024) highlight that the balance between economic and environmental dimensions in Indonesia remains weak, indicating that democracy has not yet been able to integrate sustainability principles into economic governance. It can be concluded that the findings of this study suggest a positive but statistically insignificant relationship between democracy and sustainable development. Its impact varies depending on measurement methods, regional context, and a country's economic development level, mainly through enhancing environmental performance, regulating CO₂ emissions, and reducing ecological footprints.

The Effect of Law Enforcement on Sustainable Development

Developing countries seeking to balance economic growth with ecological sustainability must strengthen their legal frameworks for environmental governance. As noted by Li et al. (2025), enforcement may initially put pressure on the environment, but in the long term, it can contribute positively to sustainability outcomes. However, findings from Y. Liu & Tang (2024) show that while increased environmental sanctions have a statistically significant effect in promoting green innovation, this impact is generally temporary. In regions where fines are frequently imposed, companies tend to be less willing to implement structural changes, indicating that criminal case resolutions alone are insufficient to drive sustainable and lasting transformation. The negative impact of law enforcement on sustainability can be explained by the fact that law enforcement is still weak, even though legal instruments have been strengthened normatively, and therefore have not been able to contribute to the achievement of sustainable development goals (Najjicha et al., 2023). This is confirmed by research conducted by Yustitiani et al. (2025), which found that the effectiveness of law enforcement is constrained by weak law enforcement, low public awareness, and conflicts between economic development and environmental conservation. The findings indicate that law enforcement has a negative and significant effect on sustainable development, mainly due to weak implementation, low public awareness, and conflicts between economic growth and environmental preservation, limiting its effectiveness in driving sustainable transformation in Indonesia.

The Effect of Regional Expenditure Realization on Sustainable Development

In a study by Guerrero & Castañeda (2022), it was found that there is a non-linear response between increases in government spending on development. There is a limit to the amount of increase in public spending that can reduce development gaps. Therefore, budget increases alone are not enough; new policies targeting behavior, technology, and organizational governance are needed. Another study shows that decentralization of spending has a U-shaped non-linear relationship with green development efficiency, indicating that fiscal decentralization is disadvantageous to green development if local governments still have limited environmental incentives at the local level (R. Liu et al., 2022). The existence of public debt and budget deficits has negatively affected sustainable development (Van et al., 2020). Targeted budget implementation contributes directly to sustainable development. The transition to environmentally friendly public spending is considered crucial in supporting the green economy. Therefore, budget effectiveness is not only measured by absorption but also by its impact on sustainability (Gonon et al., 2025). The findings indicate that budget realization has a negative and significant effect on sustainable development. This outcome suggests that increasing public spending or fiscal decentralization does not necessarily improve efficiency or sustainability, particularly when not supported by environmental incentives, effective governance, and policies that promote sustainable behaviors and technologies. Budget effectiveness depends not only on fund absorption but also on its capacity to generate positive sustainability impacts.

The Effect of Good Governance Indicators on Sustainable Development

Governments play a critical role in shaping sustainable development and environmental capacity. However, their influence is asymmetrical, varying across different levels of sustainable development performance. The positive impact of government is most evident and consistent in countries with high levels of sustainable development, while in countries with low levels of sustainable development, the effect tends to be weaker and

less consistent (Akadiri et al., 2025). In line with Hasan's (2025) findings, governance has a positive and significant influence on the Load Capacity Factor (LCF), helping to maintain a balance between a region's environmental capacity and the pressure generated by human activities. Supporting this view, Nwafor (2023) notes that many sustainable development policies fail to achieve effective implementation, largely due to governance issues such as corruption, low bureaucratic efficiency, and weak institutional capacity. Weak governance, especially in authoritarian contexts, remains a major obstacle to achieving long-term sustainability goals (Knox & Orazgaliyev, 2024). The governance of government influences sustainable development, which is determined by regional integration and the size of government, which have varying degrees of influence (Ullah et al., 2021). These findings emphasize that the quality of governance is a determining factor in the success of development strategies aimed at sustainability. Governments play a crucial role in promoting sustainable development, though their influence varies across countries. The positive impact is stronger in nations with high sustainability performance, while in those with lower performance, the effect is weaker and less consistent. Good governance has a significant positive impact on environmental capacity, whereas weak governance—characterized by corruption, low bureaucratic efficiency, and limited institutional capacity—remains a major barrier. Additionally, regional integration and government size emerge as important determinants of the effectiveness of sustainable development strategies.

Conclusions and Suggestions

The findings of this study indicate that good governance indicators collectively have a significant impact on sustainable development in Indonesia. However, partial analysis shows mixed effects: corruption shows a significant positive influence, while democracy shows a positive effect but is not statistically significant. Conversely, law enforcement and budget realization are associated with significant negative impacts. This finding enriches the literature on governance and sustainable development by revealing a development paradox, where theoretically governance should promote sustainability but instead produces contradictory results.

From a policy perspective, this finding provides empirical evidence that governance improvements must be more targeted and specific. The government should relate budget realization to green indicators through green budgeting so that public spending contributes directly to the achievement of sustainable development. In addition, it is necessary to strengthen democracy that integrates environmental and economic dimensions, followed by increased public transparency, such as openness of environmental and fiscal data. It is also necessary to prioritize law enforcement in strategic sectors such as the environment, energy, and natural resources to ensure sustainability.

This study has several limitations that need to be considered. The relatively short observation period (2020–2023) means that long-term patterns and the delayed effects of the variables studied have not been optimally captured. The secondary data used has the potential to contain recording biases and differences in standards between regions. The variables used in this study are still limited in terms of both dependent and independent variables, so they are not able to fully capture the political, social, and cultural dimensions that influence sustainable development. In addition, a purely quantitative approach does not provide a contextual picture of the social, political, and cultural dynamics that can influence the relationship between governance and sustainable development. Therefore,

further research could extend the observation period, enrich the variables, and combine research methods.

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