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Reformulating Indonesia's Development Paradigm toward Sustainable Prosperity

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Abstract

This study reexamines Indonesia's development paradigm with a focus on achieving sustainable welfare. Employing a dynamic panel data approach, the analysis investigates the effects of social, economic, and environmental dimensions on sustainable welfare proxied by the Gini ratio across 34 provinces over the 2019–2024 period. To address endogeneity concerns and capture dynamic relationships, the Generalized Method of Moments (GMM) is applied. The estimation results from the FDGMM, SYSGMM, and DPGMM models satisfy the criteria of validity, consistency, and unbiasedness. Overall, the findings indicate that the explanatory variables in all three models exert a strong, negative, and statistically significant effect on inequality reduction, thereby enhancing sustainable welfare. However, per capita income exhibits a positive yet statistically insignificant impact on welfare in both the short and long run. Based on these findings, the study recommends a reformulation of Indonesia's development paradigm toward sustainable welfare by positioning the Human Development Index (HDI) as the core foundation of development and structural reform. The results underscore the need for policy innovation that prioritizes HDI-based development, accelerates structural transformation, and promotes green job creation. Ultimately, progressive, inclusive, and consistent policy design is essential for achieving sustainable wellbeing, with a strong emphasis on equity and long-term sustainability.

Keywords: Wellbeing Sustainability, Economic Inequality, Dynamic Panel Model

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INTRODUCTION

For decades development has been rooted in increasing Gross Domestic Product Growth as one measure of success. Excessive focus on the rate of economic growth tends to ignore negative externalities, such as social, economic, and environmental dimensions.

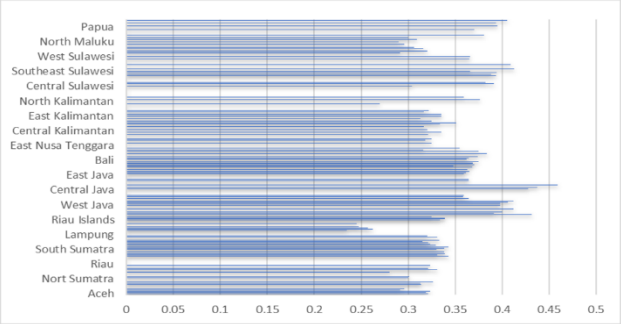

Figure 1. Graph of Gini Ratio
Source: BPS, 2024

Growth without balance leads to the intersection of sustainability, equity, and inequality. Developers have shown significant interest in the correlation between economic performance, as indicated by Gross Domestic Product growth (Butkus et al., 2024) and the concept of sustainable development. Indonesia is at a pivotal point of transformation, revisiting the development paradigm towards sustainability in an era of rapid technological transformation.

Indonesia's change of consciousness began to appear in increasingly prominent global forums, such as as part of the G20, with the agenda of net-zero transition and regenerative economy with the aim of creating an economic system that ennobles life. Indonesia's new transformation applies three pillars of change, namely inclusive socio-economic transformation and sustainable environment. The transformation of Indonesia's development paradigm has shifted since the adoption of sustainable development goals (SDGs) in 2015 by emphasizing that development is no longer measured by economic growth but by the extent to which development is sustainable, inclusive, and equitable.

According to BI (2022). Indonesia's gross domestic product growth in 2022 experienced a significant increase, with economic growth projected to be at the upper limit of Bank Indonesia's estimate of between 4.5% and 5.3%. According to CORE INDONESIA (2023) the Indonesian economy is predicted to grow by 4.5% to 5.0% in 2023. Non-inclusive economic growth leads to a high Gini ratio, as shown in figure 1.

Based on this graph, inequality in the provinces of DKI Jakarta, DI Yogyakarta, Papua, North Sulawesi, Bali, and Riau Islands is relatively high, approaching or exceeding 0.40%, although several other provinces are in the moderate category with a range of 0.30%. The high Gini ratio is caused by a highly centralized economic structure and the unequal utilization of economic growth among the population as well as structural and economic factors.

Overall, the pattern of inequality between provinces indicates a major challenge in equitable development. Since Indonesia has embarked on achieving the SDGs, Indonesia's development requires expanding welfare indicators to include indicators of social, economic, and environmental dimensions (Costanza et al., 2014).

Efforts to accelerate economic growth often lead to unsustainable exploitation of natural resources and the environment (Guo & Shahbaz, 2024). Achieving prosperity sustainably There has been little research addressing development (Sahle et al., 2025), plus the

indicators to measure it are still debated (Cole et al., 2014; Stiglitz et al., 2009; Li et al., 2025). Inequality and inequalities are rooted in structural inequalities, where growth-driven economies tend to widen the gap in per capita income and wealth, as reflected in Gini coefficients that remain high (Lee & Suh, 2025).

Yet sustainable development is about balancing economic performance against social welfare (Yeboah et al., 2024. Social welfare can be achieved by involving addressing social disparities and ensuring equal access to increase participation of marginalized groups and emphasizing equity (Barron et al., 2025; Zhuo et al., 2021; Medina-Moral & Montes-Gan, 2018; Li et al., 2025). According Killen (2021) the social dimension can increase social injustice that threatens welfare so that the majority of the population does not experience a proportional increase in welfare.

This inequality is exacerbated by the low quality of the human development index in remote areas, which inhibits the development of human resource potential. An increase in welfare inequality also occurs when the expansion of employment opportunities and the provision of basic social services (such as education and health) do not develop proportionally to the rate of population growth, which is also the demographic bonus (Barron et al., 2025). According Muthu (2020) there is ecological degradation that threatens the principle of sustainability.

The fundamental problem lies in the failure of long-term economic models to internalize environmental health, which impacts social and resource inequalities (Voulvoulis et al., 2022). According Mamman (2023) climate change significantly impedes inclusive growth; there is evidence of long-term negative effects of climate change on long-term sustainable welfare (Li et al., 2025) and long-term positive effects of climate change on welfare (Ullah et al., 2024; Barron et al., 2025).

Sustainable economic development, which includes an economic pillar measured by per capita income, a social pillar measured by urbanization and the Human Development Index (HDI), and an environmental pillar measured by the Environmental Quality Index (EQI) (Mindawati et al., 2025) (Mindawati et al., 2025). Sustainable welfare is a development concept that combines meeting needs with preservation. Sustainable development must meet the needs of the current generation without sacrificing future generations. Welfare is not only current utility but also the ability to maintain long-term quality (Biggeri et al., 2025).

Welfare is measured based on capabilities, which are reflected in the quality of human development, not just income (Zhang & Wu, 2022). According to the UN (2025), there are 17 Sustainable Development Goals (SDGs) in the national development plan (RPJM) to improve overall welfare not only economically but also socially and environmentally.

According to Easterlin (2010), increasing income does not always improve welfare in the long term. In this context, the Gini ratio is one of the sustainability indicators because it is a measure of income distribution and a reflection of equitable development outcomes across all levels of society. The lower the Gini ratio, the greater the chance of achieving welfare, and conversely, the higher the Gini ratio, the lower the chance of achieving welfare.

Achieving well-being sustainably has been at the center of scientific and political discussions over the past few years (Sahle et al., 2025). Despite the frequent use of the terms

"well-being" and "sustainability," the indicators to measure them are unclear and debatable (Cole et al., 2014). One alternative indicator that measures well-being is the social dimension of outcomes (Stiglitz et al., 2009; Li et al., 2025). Sustainable economic development, which includes a social pillar measured by urbanization and the Human Development Index (Mindawati et al., 2025).

According to Malthus' theory, an increase in population leads to an increase in inequality (Unat, 2020). The dimension of economic performance is one of the main pillars in the transformation of sustainable development to achieve a better quality of life. Both of these relationships are heavily influenced by income distribution for meeting basic human needs. Many studies show that per capita income plays a significant role in widening inequality, especially during the early stages of growth (Kuznet effect).

However, this effect can weaken if the quality of human resources also weakens. Sustainable development is about balancing economic performance against well-being (Yeboah et al., 2024). Inclusive growth involves addressing social disparities and access to employment opportunities (Barron et al., 2025). Absorbed labor increases social stability and strengthens social cohesion (Zhuo et al., 2021), but if the job market is dominated by the informal sector with low wages, it worsens inequality (Medina-Moral & Montes-Gan, 2018; Li et al., 2025).

The most fundamental dimension of the concept of sustainability is a healthy environment. A healthy environment affects well-being through the quality of air, water, and soil, which impacts decreased productivity and the economic vulnerability of villages. According to Mamman et al. (2023), climate change positively and significantly increases inequality.

Additionally, there is evidence of the negative effects of climate change on well-being (Muthu, 2020) and the long-term positive impact of climate change on economic progress (Ullah et al., 2024). For environmental sustainability, this study refers to the environmental health index (Barron et al., 2025; Li et al., 2025).

Indonesia has shown substantial acceleration in development, reflected in indicators such as the Human Development Index, per capita income, labor market structure, and environmental quality that pose a complex set of challenges. These regional disparities demand the formulation of integrated and adaptable development policies. Indonesia is currently at a crucial juncture in its sustainable development trajectory, reflecting the contradiction between achievement and inequality.

As such, the country faces a strategic dilemma, trapped in the middle-income trap, which demands a re-evaluation to achieve truly sustainable development. Therefore, this study aims to review Indonesia's development paradigm towards sustainable prosperity with a dynamic panel approach to prove the social, economic performance and environmental dimensions of sustainable prosperity.

RESEARCH METHODS

The data source in this study uses quantitative panel data, which includes the number of observations of 34 provinces in Indonesia, obtained from the publication of the Central Statistics Agency (BPS, 2024) with a vulnerable data time of 2019-2024. This study analyzes two groups of variables, namely the

dependent variable, namely the Gini ratio as an indicator of sustainable welfare, and the independent variables of HDI, population as an indicator of the social dimension, per capita income and working population as part of the economic performance dimension, and the environmental quality index (water, air, and waste) as an indicator of the environmental dimension. Data processing is carried out using econometric applications, namely Stata 17 software.

This research studies the dynamics of change with long time series, controlling for time-invariant heterogeneity of observations (Arellano & Honoré, 2001). The main reason for using Generalized Method of Moments (GMM) is the model's ability to handle endogeneity issues in dynamic panel regression models (Hendayanti & Nurhidayati, 2023). In this study, it is possible that the independent variables are correlated with the error terms, especially since the delayed dependent variable is included as a predictor.

This method can capture temporal dynamics, such as how current economic growth is affected by previous economic growth (delayed effect). This capability provides an advantage over static models, such as fixed effects or random effects, which cannot capture temporal dynamics effectively.

The steps of the data analysis strategy in this study are as follows, according to A0 (2007) The stationarity test observes the stochastic process for each panel data, and each individual time series observation is stationary or not by using the unit root test with the Phillips-Perron root test. Phillips and Perron use a nonparametric statistical method to handle serial correlation in the error terms without adding lagged difference terms. GMM dynamic panel model test, the first dynamic panel data model evaluation is done with First Difference GMM (FDGMM) estimation with the requirements of Arellano-Bond test parameter consistency test and valid instrument test using Sargan test.

The second estimation with Sytem Generalized Method of Moments (SYSGMM) estimation with the requirement of conducting Arellano-Bond test model parameter consistency test, valid instrument test using Sargan test.

The third is Dynamic Panel Generalized Method of Moments (DPGMM) estimation with Arellano-Bond test and valid instrument test using Sargan test and estat abond test for consistency test. Conducting unbiased tests by calculating the parameters of the pooled least square (CEM) and fixed effect (FEM) models. Determine the best panel model between CEM, FEM, FDGMM, SYSGMM and DPGMM based on the criteria of parameter consistency, valid instruments, and unbiased parameters.

Conduct parameter significance testing and interpretation of the best model. Draw conclusions based on the best model obtained. Dynamic panel data regression is a regression method that adds lags to the dependent variable and makes the independent variable (Chernozhukov et al., 2024).

The model equation can be written as in equation 1 as shown in appendix 1. (All the equation the authors presented in this article are With i values 1, 1,2,…. n and t values 1, 1,2,….,T. The index i indicates the cross-section dimension, while t indicates the time series dimension. If $y_{i,t}\}$ is a function of $u_{i,t}$.

Then $y_{i,-t}$ is also a function of $u_{i,t}$, because $y_{i,-t}$ is an explanatory endogenous. First Difference (FD-GMM) can overcome the correlation problem between the lag of the

dependent variable and the error component. This aims to eliminate individual effects in the model. It can be written written as in equation 2. With i values 1,2,.....n and t values 1,2,....,T.

Furthermore, estimating the Generalized Method of Moments system from the Blundell-Bond estimator using a combination of first difference and level condition moment can be written as in equation 3. If there are N observations, T periods and K exogenous variables, equations 3 and 4 can be written as equation 4. The error value of equation 4 is written as equation 5.

Next, determine the moment of condition of the sample equation 6. The GMM estimation function for the squared function of the sample moments can be written as in equation 7. To estimate the GMM by minimizing $J(\gamma)$ as shown in equation 8. Equation 5 can be rewritten for equation 9 to obtain the Arellano-Bond GMM two-step efficiency estimate. Then the econometric equation of the research variables can be written based on equation 2 for equation 10.

RESULTS AND DISCUSSION

This section presents the results of our analysis using the GMM model, starting with the test the Fisher-type unit root test that combines the results of the Phillips-Perron (PP) test in each province (34 panels), shown in table 1.

Based on table 1, all research variables are free from unit root with a p-value of 0.000 at the 5% level. This indicates that the variables do not contain stochasticity and do not need further differentiation.

Table 1. Phillips-Perron Stationary Test

Test		Lgr	Lhdi	Lp	Lip	Lwp	lehi
Inverse chi-squared	P	284.8436	78.7471	302.2141	28.3683	157.1311	276.9617
		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Inverse normal	Z	6.7678	8.0682	-8.5696	7.0526	-4.1750	-6.9560
		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Inverse logit t	L*	-11.4581	6.6232	-13.1458	7.2724	-5.0184	-11.1069
		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Modified inv. chi-squared	Pm	18.5942	0.9216	20.0837	-3.398	7.6429	17.9183
		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Data processed, 2025

Based on table 2, the short-term GMM estimation shows that the CEM, FEM, and FDGMM models are significant at the 5% level, which means that Lag GR does not consistently affect the next period. In contrast, LHDI has a significant negative effect on all three GMM models, indicating that an increase in HDI reduces inequality, which has an impact on improving welfare. Similarly, the LP variable has a negative and significant effect, indicating that population growth worsens inequality and depresses welfare. However, the LIP variable has a negative and insignificant effect on the FDGMM and SYSGMM models and a positive effect on the DPGMM model.

This suggests that per capita income does not have a direct and destabilizing impact on inequality. This proves that economic growth is

not automatically inclusive of welfare. The LWP variable has a negative and significant effect and is consistent across the three GMM models, indicating that an increase in the number of working pxeople will reduce inequality, which has an impact on improving welfare.

Table 2. Comparison of the Best Models

Variable	CEM	FEM	FDGMM	SYSGMM	DPGMM
Lgr L1.	.16897511**	.15833548**	-.08348863*	-.04168073	.01240164
	0.006	0.009	0.047	0.208	0.480
Lhdi	-.02460029	-.02079966	-.1924955***	-.18034345***	-.14893629***
	0.688	0.737	0.000	0.000	0.000
Lp	.06526281	.055915	-.18948272***	-.16569548***	-.2156974***
	0.301	0.375	0.000	0.000	0.000
Lip	-.25626257	-.25363944	-.65777303	-.44742247	.17711885
	0.422	0.435	0.166	0.241	0.396
Lwp	-.06144757	-.06297915	-.23423262***	-.24609663***	-.15014718***
	0.501	0.492	0.000	0.000	0.000
Lehi	-.12424188***	-.12549868***	-.15013768***	-.14859482***	-.16198905***
	0.000	0.000	0.000	0.000	0.000
_Cons	8.7545794	8.821171	20.27419**	17.059239**	
	0.063	0.064	0.003	0.002	
Sargan	Chi2		17.47711	20.03382	29.28698
	Prob >Chi		0.0645	0.1291	0.6979
Abond	1		-2.9131	-2.6591	-2.5543
			(0.0036)	(0.0078)	(0.0106)
	2		(.1445)	.29743	.8242
			0.8851	(0.7661)	(0.4098)
R	.54136792				
R2_a	.52448576				

Legend: * p<0.05; ** p<0.01; *** p<0.001

Source: Data processed, 2025

Improved environmental performance reduces inequality, which can encourage sustainable welfare, as evidenced by the results of the GMM model, which consistently has a negative and significant effect. This finding is in line with the concept of green growth for equity.

All GMM models in Table 2 fulfill the valid instrument and are free from second-order autocorrelation so that the instrument is valid to use and the GMM model of this study can be trusted. Determining the best GMM model based on instrument validity, consistent and unbiased, the Dynamic Panel Generalized Method of Moments (DPGMM) model was chosen. One of the advantages of the GMM model is that it displays long-term estimates as shown in table 3. Based on the estimation results that HDI reduces inequality strongly as

evidenced by the large convergent value, this suggests that quality human development is the foundation of sustainable prosperity.

This result is in line with the findings of Stiglitz (2009) and Li (2025). Human development has a much stronger structural equalization effect than short-term economic policies. Population growth also reduces inequality.

Table 3. Long-run Estimation and Convergence

Variables	Estimation	Convergence
Lhdi	-.1508065	1.8917577
	0.000	
Lp	-.218406	1.5213996
	0.000	
Lip	.179343	1.7184551
	0.402	
Lwp	-.1520326	1.8836603
	0.000	
Lehi	-.16198905***	1.8077474
	0.000	

Source: Data processed, 2025

The larger the population, the greater the pressure on public services, infrastructure, and labor markets. This finding is in line with Unat (2020) meaning that policies controlling the quality of urbanization and demographic burden reduce inequality. Similarly, the short-term estimation of per capita income has a positive but insignificant effect on welfare sustainability. These results are in line with (Lee & Suh, 2025; Zhuo et al., 2021) inequality and inequality are rooted in economic growth driven by per capita income and wealth gaps.

Economic growth is not inclusive enough, income distribution, the quality of equitable growth is needed more than just economic growth. The number of people working reduces inequality, and increases welfare, this is because the more the population works the greater the more equitable the distribution of income. In the framework of sustainable development, labor absorption is an indicator that economic activity is healthy, boosting regional productivity and strengthening socioeconomic resilience.

The long-term estimation results prove the largest effect on reducing inequality. This is in line with the findings of (Muthu, 2020; Ullah et al., 2024) environmental sustainability refers to the environmental health index that leads to a decrease in inequality (Barron et al., 2025; Li et al., 2025) evidence of the long-term negative effects of climate change on long-term sustainable welfare.

Sustainable prosperity can be realized with better environmental performance. Every economic actor must implement green economy decisions, energy efficiency to optimize the negative impact of carbon emissions. The green development paradigm strategy is a long-term investment for sustainability.

CONCLUSION

Based on the research results, it is concluded that the estimation of model parameters with the Difference Generalized Method of Moments, System Generalized Method of Moments, and Dynamic Panel Generalized Method of Moments approaches meets the criteria of validity, consistency, and unbiased models.

Then, all variables in the FDGMM, SYSGMM, and DPGMM models dominantly have a strong negative and significant influence on reducing inequality to improve sustainable welfare. However, there is a difference with the per capita income variable in the short and long term, which has a positive and insignificant

effect on welfare. Based on this study, it is recommended to redesign Indonesia's development paradigm towards sustainable welfare by considering the HDI variable as the main foundation of development and improving structural aspects.

Broad labor absorption plays a role in reducing income inequality. The government must design real sector policies oriented towards economic diversification, development of green jobs. Overall, the long-term policy implications show that transformation towards sustainable prosperity requires progressive, inclusive and consistent policy design. Economic development is not just growth but sustainable and equitable.

To improve sustainable welfare and reduce inequality, the government needs to strengthen the social dimension by improving the Human Development Index (HDI) and better managing population growth. Increasing access to quality education and equitable health services and improving living standards are important steps that can encourage equitable distribution of human quality between regions.

Similarly, policies to control population growth through family empowerment and the spread of new economic centers are needed to reduce demographic pressure and avoid the concentration of development only in certain regions. At the same time, the performance dimension of the economy must be improved through strengthening local productive sectors, encouraging green industries, and providing vocational training that meets industry needs to increase worker productivity.

Inclusive job creation-especially in the modern agriculture, creative economy, and renewable energy sectors-is an important strategy to expand employment opportunities and increase people's real income. To reduce inequality reflected in the Gini ratio, the government also needs to strengthen redistribution policies through a progressive tax system, expansion of well-targeted social protection, and an increase in the Village Fund and development programs in disadvantaged areas.

In addition, efforts to preserve the environment must be a major component of sustainable development through the implementation of green budgeting, sustainable management of natural resources, improving air and water quality, and developing renewable energy based on local potential to maintain a balance between economic growth and ecological resilience.

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APPENDIX

Appendix 1. Equation Table

Number	Equation
1	$y_{i,t} = \delta y_{i,t-1} + x'_{i,t}$
2	$y_{i,t} - y_{i,t-1} = (y_{i,t-1} - y_{i,t-2})\delta + (x_{i,t} - x_{i,t-1})\beta + (v_{i,t} - v_{i,t-1})$
3	$\Delta y_{i,t} = \Delta y_{i,t-1}\delta + \Delta x'_{i,t}\beta + \Delta v_{i,t}$
4	$\Delta y_{i,t} = \Delta y_{i,t-1}\delta + \Delta x'_{i,K}\beta + \Delta v_i$
5	$\Delta v_i = \Delta y_{i-}\Delta y_{i,t-1}\delta + \Delta x'_{i,K}\beta$
6	$\tilde{g}(\gamma) = N^{-1}\sum_{i=1}^{N}(z'_i(\Delta y_i - Q(\gamma)$
7	$J(\gamma) = \tilde{g}(\gamma)'\,\hat{w}\tilde{g}(\gamma)$
8	$\frac{\partial J(\gamma)}{\partial(\widehat{Y})} = 0$
9	$\begin{pmatrix}\hat{\delta}\\ \hat{\beta}\end{pmatrix}[(N^{-1}\sum_{i=1}^{N}(\Delta y_{i,t-1}, \Delta x_i)\hat{\Lambda}^{-1}$ $(N^{-1}\sum_{i=1}^{N}(Z'_i(\Delta y_{i,t-1}, \Delta x_i)]^{-1}$
10	$GR_{i,t} = \delta + \beta_1 GR_{i,t-1} + \beta_2 HDI_i + \beta_3 P_i + \beta_4 IP_i + \beta_5 WP_i + \beta_6 WP_i$