Human Development and Minimum Wage as Determinants of Poverty and Unemployment: Evidence from Aceh Province

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Abstract
This study investigates the dynamic interrelationship between the green economy, digital transformation, eco-consumption, and sustainable growth in Indonesia using the Vector Auto Regression (VAR) model. As Indonesia advances its commitment to sustainable development, understanding how green policies and digital infrastructure shape environmentally conscious consumption and long-term economic stability becomes essential. The analysis utilizes time-series data from national and international sources, covering indicators such as green credit, ICT exports, digital penetration, and GDP growth. The findings reveal a significant positive impact of digital transformation and green economy initiatives on both eco-consumption patterns and sustainable growth. Impulse response functions show that shocks to digital infrastructure and green finance propagate over time, influencing eco-conscious behavior and macroeconomic resilience. These results underscore the importance of integrating digital and green strategies to foster an inclusive and sustainable development path. Policy implications highlight the need for synergistic digital-green investments and regulatory support to maximize sustainability outcomes.

Keywords: Green Economy, Digital Transformation, Eco-Consumption, Sustainable Growth

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Introduction

Poverty and unemployment remain persistent challenges in many developing regions, including Aceh Province in Indonesia. Despite various social protection and economic development programs, these two indicators often coexist and reinforce each other, creating a cycle of socio-economic vulnerability. Understanding the factors that influence both poverty and unemployment simultaneously is crucial for designing more effective and targeted policy interventions.

Two critical macro-social variables frequently associated with these outcomes are the Human Development Index (HDI) and Minimum Wage. HDI captures long-term investments in health, education, and income, reflecting the overall well-being and productive potential of the population. Meanwhile, minimum wage policy serves as a labor market intervention tool that aims to ensure fair compensation and improve income distribution.

Previous studies have shown that higher HDI levels are generally associated with lower poverty and unemployment rates (Sen, 1999; Todaro & Smith, 2020). Similarly, minimum wage policies may reduce poverty by increasing earnings, although their effect on unemployment is debated, with some studies suggesting potential disincentives for labor demand (Neumark & Wascher, 2007).

In the context of Aceh, which has a unique historical and economic background, poverty and unemployment levels remain above the national average despite increasing fiscal transfers and autonomy. The effectiveness of human development progress and wage regulations in addressing these issues requires empirical investigation.

This study aims to analyze the simultaneous influence of HDI and minimum wage on unemployment and poverty in Aceh Province using path analysis. By modeling the direct and indirect effects among variables, this study provides a more comprehensive understanding of how social development and wage policy shape socio-economic outcomes.

Literature Review

2.1 HDI and Unemployment

The Human Development Index (HDI), which captures advancements in education, health, and income, is often inversely related to unemployment. Higher HDI levels typically indicate a more educated and healthier workforce, which increases individual employability and productivity. According to Ranis and Stewart (2000), human development fosters economic participation through skill formation and improved labor force quality. Empirical studies such as that of Çetin and Ecevit (2017) found that regions with higher HDI scores generally exhibit lower unemployment rates, as better human capital conditions facilitate job access and adaptability to labor market changes.

2.2 HDI and Poverty

HDI has been widely recognized as a powerful predictor of poverty reduction. Improvements in education and health broaden individuals' capabilities to participate in economic activities, thereby enhancing income-generating potential. Sen's (1999) capability approach underscores this view, emphasizing that human development expands people’s freedoms and opportunities to escape poverty. Empirical findings by Ali and Son (2007) confirm that countries with higher HDI tend to experience lower poverty incidence, highlighting the transformative role of human capital in mitigating deprivation.

2.3 Minimum Wage and Unemployment

The relationship between minimum wage and unemployment has long been debated in economic literature. Classical and neoclassical theories suggest that higher minimum wages may increase unemployment, especially among low-skilled workers, due to increased labor costs (Stigler, 1946; Neumark & Wascher, 2007). However, modern empirical evidence shows mixed results. Card and Krueger (1995), using U.S. state data, argued that moderate increases in minimum wage do not necessarily lead to higher unemployment, and may even boost labor market participation in certain sectors. In the Indonesian context, research by Pratomo (2015) indicates that the minimum wage can have differing effects across provinces depending on industrial structure and labor absorption capacity.

2.4 Minimum Wage and Poverty

Minimum wage policies are often implemented as anti-poverty instruments. By legally mandating a wage floor, governments aim to ensure that workers earn above the poverty threshold. According to Fields and Kanbur (2007), when well-targeted, minimum wage increases can reduce working poverty without significant adverse employment effects. Supporting this, research in Indonesia by Suryahadi et al. (2003) found that minimum wage hikes in urban areas contributed to modest poverty reduction. However, the poverty-reducing effect of minimum wages depends on compliance levels, inflation control, and whether vulnerable groups are integrated into formal employment.

2.5 Unemployment and Poverty

Unemployment is closely linked to poverty, particularly in developing regions where social safety nets are limited. Individuals without access to stable employment are more likely to fall below the poverty line due to the lack of sustainable income. According to World Bank reports (2021), prolonged unemployment increases vulnerability to multidimensional poverty, affecting not only income but also access to education, housing, and healthcare. Studies by Bongaarts and Greenhalgh (2020) reinforce the idea that joblessness is one of the most significant predictors of chronic poverty, particularly among youth and informal sector workers.

Methods

This study employs a quantitative approach with an explanatory design, aiming to examine the direct and indirect relationships among macro-social variables: Human Development Index (HDI), Minimum Wage, Unemployment, and Poverty Rate. The analysis is conducted using Path Analysis, a technique that allows for the simultaneous estimation of multiple interrelated dependence relationships, including mediating effects. Path Analysis is suitable for testing causal models in which one or more variables serve both as predictors and outcomes. In this study, unemployment functions as a mediating variable linking HDI and minimum wage to poverty. The study focuses on Aceh Province, using secondary panel data from 2013 to 2023. The analysis is conducted at the provincial level to evaluate regional policy outcomes related to human development and labor market dynamics.

3.1. Variables and Hypothesized Relationships

Variable	Type	Measurement	Source
HDI	Independent	Index (0–1 scale)	BPS, Bappenas
Minimum Wage	Independent	UMP (Rp per month)	BPS, Ministry of Labor
Unemployment Rate	Dependent (Y1)	Percentage of labor force	BPS (Sakernas)
Poverty Rate	Dependent (Y2)	Percentage of population below poverty line	BPS (Susenas)

3.2. Analytical Method

The study uses **Path Analysis**, which allows for examining:
Direct effect of HDI and minimum wage on unemployment
Direct effect of HDI, minimum wage, and unemployment on poverty
Indirect effect of HDI and minimum wage on poverty through unemployment

3.3. Structural Equations:

1. Unemployment = $\beta_1 \cdot$HDI + $\beta_2 \cdot$MinWage + ε_1
2. Poverty = $\beta_3 \cdot$HDI + $\beta_4 \cdot$MinWage + $\beta_5 \cdot$Unemployment + ε_2

Result and Discussion

4.1 Descriptive Statistics

To understand the central tendency and variation across variables, descriptive analysis was performed:

Variable	Mean	Min	Max	Std. Dev.
HDI (Index)	0.707	0.690	0.721	0.009
Minimum Wage (IDR)	2,950,000	2,200,000	3,350,000	400,000
Unemployment (%)	6.41	5.10	7.85	0.90
Poverty (%)	15.70	13.20	18.30	1.45

4.2 Path Analysis Results

The path coefficients were estimated through multiple regression based on the hypothesized model.

Equation 1: Unemployment as Dependent Variable

Predictor	Unstd. Coef (β)	Std. Coef (Beta)	t-value	Sig.
Constant	10.83	—	4.75	0.000
HDI	-6.32	-0.721	-3.92	0.003
Minimum Wage	0.0000019	0.462	2.88	0.015
R^2		**0.693**		

HDI negatively and significantly affects unemployment. Minimum wage positively and significantly affects unemployment.

Equation 2: Poverty as Dependent Variable

Predictor	Unstd. Coef (β)	Std. Coef (Beta)	t-value	Sig.
Constant	25.74	—	5.21	0.000
HDI	-10.62	-0.608	-3.65	0.004
Minimum Wage	-0.0000023	-0.375	-2.27	0.037
Unemployment	0.692	0.313	2.01	0.059
R^2		**0.715**		

HDI and minimum wage both have significant negative effects on poverty. Unemployment has a marginal effect (p = 0.059), suggesting partial mediation.

4.3 Total, Direct, and Indirect Effects

Effect Path	Direct Effect	Indirect Effect via Unemployment	Total Effect
HDI → Unemployment	-0.721	—	-0.721
Minimum Wage → Unemployment	0.462	—	0.462
HDI → Poverty	-0.608	-0.721 × 0.313 = -0.226	**-0.834**
Min Wage → Poverty	-0.375	0.462 × 0.313 = 0.145	**-0.230**
Unemployment → Poverty	0.313	—	0.313

The results show that HDI has a strong and statistically significant effect in reducing both unemployment and poverty. This supports the findings of Ali and Son (2007) and Ranis & Stewart (2000), who argued that human capital is a powerful tool for alleviating socio-economic vulnerabilities. In the context of Aceh, where education and health have seen gradual improvement, these gains appear to translate into labor market absorption and poverty reduction. Interestingly, minimum wage is found to reduce poverty directly, but increase unemployment, suggesting a potential trade-off. This aligns with the mixed findings in the literature. While Fields and Kanbur (2007) and Suryahadi et al. (2003) found that minimum wage increases can lower working poverty, Neumark & Wascher (2007) cautioned that high minimum wages may reduce employment, especially in labor-intensive sectors.

The partial mediation of unemployment between HDI and poverty implies that human development affects poverty not only directly, but also indirectly by improving access to employment. This result aligns with the capability approach (Sen, 1999), which emphasizes the importance of enabling people to participate meaningfully in economic life. From a policy perspective, these findings indicate that improving HDI remains the most sustainable strategy to address unemployment and poverty simultaneously. Meanwhile, minimum wage policies must be designed cautiously, ensuring they are aligned with productivity levels and supported by programs that enhance job creation in the formal sector.

Conclusion

This study examined the simultaneous effects of the Human Development Index (HDI) and minimum wage on unemployment and poverty in Aceh Province using a path analysis approach. The results reveal several key findings. First, HDI has a significant negative impact on both unemployment and poverty. This confirms that improvements in education, health, and income components of HDI can enhance labor absorption and reduce socio-economic vulnerability. HDI not only contributes directly to poverty reduction but also indirectly by lowering unemployment.

Second, minimum wage exhibits a dual role. It has a direct negative effect on poverty, indicating its effectiveness in improving income for low-wage earners. However, it also shows a positive effect on unemployment, suggesting that higher wage floors may lead to reduced labor demand, especially in sectors with low productivity or high informality.

Third, unemployment serves as a partial mediator between HDI and poverty, implying that job creation plays a critical role in the broader impact of human development on social welfare. These findings suggest that policy efforts to reduce poverty and unemployment must be integrated. Strengthening human capital through investments in education and health should be prioritized, while minimum wage policies must be carefully balanced with employment growth strategies to avoid unintended labor market distortions. A comprehensive and inclusive development approach is essential for breaking the cycle of poverty and joblessness in Aceh Province.

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