

DETERMINANTS OF HUMAN DEVELOPMENT IN INDONESIA: A COMPARATIVE ANALYSIS OF THE WESTERN AND EASTERN REGIONS

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Abstract

This study examines the effects of health, education, economic, and infrastructure expenditures, economic growth, investment, and the Labor Force Participation Rate (LFPR) on the Human Development Index (HDI) in Indonesia. It also compares the determinants of HDI between Western and Eastern Indonesia. Using a quantitative approach, the study applies panel data regression with the Common Effect Model and Ordinary Least Squares method. Secondary data from 2012–2021 were obtained from Statistics Indonesia, the Ministry of Finance, and other official institutions. The results show that all independent variables simultaneously have a significant effect on HDI. Partially, education expenditure, infrastructure expenditure, and investment have positive and significant effects, while health expenditure, economic expenditure, economic growth, and LFPR are statistically insignificant. Regional analysis reveals different determinants of HDI. In Western Indonesia, education expenditure, infrastructure expenditure, economic growth, and LFPR significantly affect HDI. In Eastern Indonesia, infrastructure expenditure, investment, and LFPR are significant determinants. These findings demonstrate that regional disparities in human development are associated with differences in economic capacity, infrastructure quality, investment distribution, connectivity, and development governance. Therefore, place-based development policies are required to improve the effectiveness and equity of human development, particularly in Eastern Indonesia.

Keywords: Social Welfare, Regional Disparity, Public Expenditure, Economic Growth, Human Development Index, Common Effect Model, Indonesia

1. INTRODUCTION

Interregional welfare inequality remains one of the most persistent development challenges in Indonesia despite the implementation of fiscal decentralization over several decades and the continued expansion of economic growth. Although the national Human Development Index (HDI) has demonstrated a positive trajectory over the last decade, substantial disparities continue to characterize development conditions between Western and Eastern Indonesia. Provinces located in Java and Sumatra generally exhibit higher levels of human development achievement, stronger infrastructure capacity, and more diversified economic structures than provinces in Papua, Maluku, and several other eastern regions.

Such disparities raise a fundamental question concerning the extent to which public expenditure and macroeconomic policies are effective in promoting inclusive welfare improvement across heterogeneous regional contexts characterized by differing socioeconomic and institutional conditions (Todaro & Smith, 2011; UNDP, 2020).

From the perspective of development economics, welfare is no longer narrowly conceptualized solely through income-based indicators. Contemporary approaches increasingly emphasize the multidimensional nature of welfare, encompassing education, health, employment opportunities, and access to public services. The Capability Approach developed by Sen argues that development should be understood as a process of expanding substantive freedoms that enable individuals to achieve valued functionings (Sen, 1999). Within this framework, human development reflects individuals' capacity to attain education, maintain good health conditions, and participate productively in economic activities. Consequently, welfare inequality not only represents differences in income levels but also signifies disparities in access to capabilities necessary for improving quality of life. Recent empirical studies increasingly confirm that multidimensional welfare indicators provide a more comprehensive explanation of development inequality in developing and emerging economies (Alkire & Foster, 2021; Gupta & Vegelin, 2016).

The Indonesian context provides a highly relevant foundation for examining this issue. Since the implementation of fiscal decentralization reforms, local governments have obtained broader authority to allocate expenditure across health, education, infrastructure, and economic sectors. Nevertheless, the effectiveness of such expenditures continues to demonstrate substantial regional variation. Several provinces in Eastern Indonesia still face limited infrastructure accessibility, low investment inflows, relatively weak labor productivity, and high logistics costs. These structural constraints potentially reduce the effectiveness of government expenditure transmission mechanisms in improving societal welfare. By contrast, regions in Western Indonesia benefit from more advanced infrastructure networks, stronger industrial concentration, and relatively better institutional capacity (World Bank, 2018; Nasution, 2016).

Existing empirical literature demonstrates mixed findings regarding the relationship between fiscal variables and welfare outcomes. Numerous studies on government expenditure generally conclude that education and health spending positively affect human development indicators, particularly in developing countries still constrained by limited human capital accumulation (Bose et al., 2007; Rahman et al., 2020). However, other studies report insignificant or inconsistent effects due to inefficiencies in public expenditure allocation, variations in governance quality, and persistent regional disparities (Kim & Lane, 2013; Nguyen et al., 2021). Similarly, economic growth has traditionally been associated with welfare improvement. Nevertheless, economic growth does not necessarily guarantee equitable human development outcomes. In many developing economies, rapid economic growth often coexists with high inequality, limited labor absorption, and unequal access to public services, thereby constraining the inclusiveness of development outcomes (Stiglitz et al., 2018).

Human Capital Theory provides an important analytical foundation for understanding this relationship. Becker (1993) argues that investment in education and health enhances labor productivity and improves welfare in the long term. Regions characterized by higher educational attainment and healthier labor forces generally possess

greater capacity to generate sustainable economic growth. Recent empirical findings from developing countries further indicate that public investment in education and health significantly improves labor productivity and social mobility when supported by effective institutional arrangements and adequate infrastructure (Hanushek & Woessmann, 2020; Psacharopoulos & Patrinos, 2018). In a similar vein, Endogenous Growth Theory emphasizes the importance of public investment, infrastructure development, and knowledge accumulation as internal drivers of long-term economic growth (Romer, 1986; Lucas, 1988). Contemporary empirical studies suggest that transportation infrastructure, digital connectivity, and public capital investment exert positive effects on regional productivity and welfare distribution, particularly in countries with fragmented geographical conditions such as Indonesia (Calderón & Servén, 2014; Prasetyo & Firdaus, 2020).

Despite a growing body of literature examining the determinants of welfare in Indonesia, at least three important research gaps remain. First, the majority of previous studies have analyzed welfare determinants using an aggregated national approach without adequately accounting for regional heterogeneity between Western and Eastern Indonesia. Such an aggregated perspective risks overlooking structural differences that may influence the effectiveness of fiscal and economic variables. Second, prior studies have generally focused on a single dimension of public expenditure, particularly education or health spending, while limited attention has been given to the simultaneous interaction among social expenditure, infrastructure spending, investment, labor force participation, and economic growth. Third, relatively few studies have integrated multidimensional welfare theory with comparative interregional econometric analysis.

This study seeks to address these limitations by developing a more comprehensive analytical framework through the integration of the Capability Approach, Human Capital Theory, and Endogenous Growth Theory within a panel data model. In contrast to approaches that conceptualize welfare solely as an economic outcome, this study defines welfare as a multidimensional process shaped by the interaction between fiscal policy, labor market dynamics, economic performance, and regional development structures. Specifically, the analysis compares Eastern and Western Indonesia to identify whether the determinants of welfare operate differently across distinct regional contexts.

This study contributes theoretically by extending the application of the multidimensional welfare framework into comparative regional analysis within the context of developing countries. Empirically, the study provides evidence regarding the differential effects of government expenditure and macroeconomic variables on human development across regions in Indonesia. Methodologically, it contributes through the application of panel data regression integrated with comparative regional analysis, thereby enabling a deeper understanding of structural disparities across regions. From a policy perspective, the findings offer empirical evidence that may serve as a basis for designing region-specific development strategies aimed at reducing welfare inequality and enhancing the effectiveness of fiscal interventions.

2. RESEARCH METHOD

This study employs a quantitative approach using an explanatory research design aimed at analyzing the causal relationship between fiscal, economic, and labor-related

factors and the Human Development Index (HDI) in Indonesia, while simultaneously comparing the patterns of influence between Western and Eastern Indonesia. Conceptually, the research model is grounded in Human Development Theory, Human Capital Theory, and Endogenous Growth Theory, which position the quality of human development as the outcome of interactions among fiscal policy, economic growth, investment, and labor force participation. The study utilizes panel data with 34 provinces in Indonesia as the units of analysis over the period 2012–2021, thereby enabling the simultaneous observation of cross-sectional regional variation and time-series dynamics.

The data employed in this study consist of secondary data collected through documentation techniques and literature review from official government publications. Data on the Human Development Index (HDI), real Gross Regional Domestic Product (GRDP) per capita, and the Labor Force Participation Rate (LFPR) are obtained from the Central Bureau of Statistics. Data on health, education, economic, and infrastructure expenditure are sourced from the Directorate General of Fiscal Balance, while investment data represented by realized Domestic Direct Investment (DDI) and Foreign Direct Investment (FDI) are obtained from the Investment Coordinating Board. The study comprises one dependent variable, namely HDI, and seven independent variables, including health expenditure, educational expenditure, economic expenditure, infrastructure expenditure, economic growth proxied by real GRDP per capita, investment, and LFPR.

Data analysis is conducted using panel data regression with the Common Effect Model (CEM), also referred to as the Pooled Least Squares approach, which is employed to estimate the general effects of independent variables on HDI at the provincial level. Prior to model estimation, descriptive statistical analysis and classical assumption tests—including normality, multicollinearity, heteroskedasticity, and autocorrelation tests—are performed to ensure model validity and estimation reliability. Subsequently, hypothesis testing is conducted using simultaneous significance tests (F-test), partial significance tests (t-test), and the coefficient of determination (R^2). To obtain a comparative understanding of regional development disparities, regression analyses are also estimated separately for Western and Eastern Indonesia, thereby enabling the identification of differences in the direction, magnitude, and statistical significance of the effects of each independent variable on HDI. All data processing procedures are conducted using the econometric software EViews.

3. RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistical analysis was conducted on 340 panel observations comprising 34 provinces over the period 2012–2021. The descriptive results reveal substantial variation across provinces in both human development indicators and fiscal and macroeconomic variables.

Table 1. Descriptive Statistics

Variable	Mean	Minimum	Maximum	Std. Deviation
HDI	69,164	0,000	81,110	5,719
Health Expenditure	1.191.469	0,000	18.098.009	2.111.439
Educational Expenditure	1.990.606	0,000	21.778.833	3.210.025
Economic Expenditure	807.397	0,000	7.014.328	966.130
Infrastructure Expenditure	1.145.723	0,000	15.436.749	1.702.558

Economic Growth	4,712	-15,740	21,760	3,429
Investment	7.677	0,000	62.094	11.724
Labor Force Participation Rate (LFPR)	68,052	0,000	79,610	7,275

Source: Processed research data using EView, 2026

In general, the average Human Development Index (HDI) in Indonesia during the study period reached 69.16 points, indicating a moderate-to-high level of human development. Nevertheless, the standard deviation of 5.72 suggests the persistence of interprovincial disparities in human development outcomes. Among the expenditure variables, educational expenditure recorded the highest average allocation at approximately IDR 1.99 trillion, while economic expenditure represented the relatively smallest expenditure component, with an average of approximately IDR 807 billion.

The relatively high standard deviations observed in government expenditure and investment variables indicate substantial heterogeneity in fiscal capacity and economic activity across provinces. This condition reflects considerable regional development disparities, particularly between Western and Eastern Indonesia, thereby suggesting unequal development capacities and variations in welfare outcomes across regions.

4.2 National Regression Results

Table 2. Common Effect Model (CEM) Regression Results

Variable	Coefficient	Prob.	Description
Health Expenditure (BKES)	-2,25E-07	0,1352	Not significant
Educational Expenditure (BPEND)	2,94E-07	0,0067	Positive and significant
Economic Expenditure (BEKO)	3,07E-07	0,3187	Not significant
Infrastructure Expenditure (BINF)	4,71E-07	0,0004	Positive and significant
Economic Growth (GRDP)	-0,097493	0,0703	Significant at the 10%
Investment (INV)	6,27E-05	0,0021	Positive and significant
Labor Force Participation Rate (LFPR)	0,042507	0,1417	Not significant

Source: Processed research data using EViews, 2026

$R^2 = 0.3051$; F-statistic = 19.69797 ($p < 0.01$)

The results of the simultaneous significance test indicate that all independent variables collectively exert a statistically significant effect on the Human Development Index (HDI). The coefficient of determination (R^2) of 30.51% suggests that variations in HDI are explained by the model at a magnitude of 30.51%, while the remaining proportion is influenced by other factors beyond the scope of the model.

At the partial level, several variables demonstrate differing effects on human development outcomes.

1. Educational expenditure (BPEND) exerts a positive and statistically significant effect on HDI ($\beta = 2.94E-07$; $p = 0.0067 < \alpha = 0.05$). Therefore, Hypothesis 1 concerning educational expenditure is accepted. This finding confirms that increased educational spending contributes to improvements in human resource quality and human

- development outcomes. Economically, an increase of IDR 1 trillion in educational expenditure is estimated to increase HDI by approximately 0.294 points.
2. Infrastructure expenditure (BINF) demonstrates a positive and statistically significant effect on HDI ($\beta = 4.71\text{E-}07$; $p = 0.0004 < \alpha = 0.05$). Accordingly, Hypothesis 1 regarding infrastructure expenditure is accepted. Infrastructure serves as an important instrument for expanding public access to education, healthcare, and economic activities. The estimation results suggest that an increase of IDR 1 billion in infrastructure expenditure raises HDI by approximately 0.000471 points.
 3. Investment (INV) has a positive and statistically significant influence on HDI ($\beta = 6.27\text{E-}05$; $p = 0.0021 < \alpha = 0.05$). Thus, Hypothesis 1 concerning investment is accepted. Investment emerges as one of the most effective economic drivers of HDI improvement through employment generation and household income enhancement. Empirically, an increase of IDR 1 billion in investment is estimated to raise HDI by approximately 0.0627 points.
 4. Economic growth proxied by real Gross Regional Domestic Product (GRDP) per capita exhibits a negative coefficient and is statistically significant at the 10% level ($\beta = -0.097$; $p = 0.0703$). This finding indicates that economic growth during the study period has not been entirely inclusive, implying that increases in regional economic performance were not necessarily accompanied by equitable improvements in human development outcomes.
 5. Health expenditure, economic expenditure, and the Labor Force Participation Rate (LFPR) do not demonstrate statistically significant effects on HDI at the national level. This finding suggests that the influence of these variables on human development may depend on contextual factors such as institutional effectiveness, regional development disparities, and the quality of public service delivery.

4.3 Regression Results for Western and Eastern Indonesia

Table 3. Regression Results for Western and Eastern Indonesia

Variable	Region	Coefficient	Prob.	Interpretation
Health Expenditure (BKES)	Western	-1,61E-07	0,2036	Negative, not significant
	Eastern	-3,83E-07	0,4511	Negative, not significant
Educational Expenditure (BPEND)	Western	3,30E-07	0,0004	Positive and significant
	Eastern	5,14E-07	0,1535	Positive, not significant
Economic Expenditure (BEKO)	Western	1,71E-07	0,5241	Positive, not significant
	Eastern	1,33E-06	0,0703	Positive, significant 10%
Infrastructure Expenditure (BINF)	Western	6,06E-07	0,0000	Positive and significant

	Eastern	-7,88E-07	0,0175	Negative and significant
Economic Growth (GRDP)	Western	-0,172666	0,0239	Negative and significant
	Eastern	-0,013091	0,8277	Negative, not significant
Investment (INV)	Western	-8,28E-06	0,6630	Negative, not significant
	Eastern	0,000390	0,0000	Positive and significant
Labor Force Participation Rate (LFPR)	Western	0,196364	0,0039	Positive and significant
	Eastern	-0,062669	0,0335	Negative and significant

Source: Processed research data using EViews, 2026

1. Regression Results for Western Indonesia

Based on the estimation results, the model produced an F-statistic value of 16.72863 with a probability value of 0.000000 ($\alpha = 0.05$). Therefore, health expenditure, educational expenditure, economic expenditure, infrastructure expenditure, economic growth, investment, and the Labor Force Participation Rate (LFPR) collectively exert a statistically significant influence on the Human Development Index (HDI) in Western Indonesia.

Educational expenditure demonstrates a positive and statistically significant effect on HDI ($\beta = 3.30\text{E-}07$; $p = 0.0004 < \alpha = 0.05$). Economically, an increase of IDR 1 trillion in educational expenditure is estimated to raise HDI by approximately 0.330 points. This finding suggests that Western Indonesia possesses a greater capacity to transform educational investment into improvements in human resource quality and broader human development outcomes.

Infrastructure expenditure also exerts a positive and statistically significant influence ($\beta = 6.06\text{E-}07$; $p = 0.0000 < \alpha = 0.05$) and represents the fiscal variable with the strongest estimated effect. An increase of IDR 1 billion in infrastructure expenditure is estimated to increase HDI by approximately 0.000606 points. Adequate infrastructure strengthens access to essential public services and improves economic connectivity, thereby facilitating welfare enhancement.

Economic growth proxied by real GRDP per capita exhibits a negative and statistically significant effect on HDI ($\beta = -0.172666$; $p = 0.0239 < \alpha = 0.05$). Empirically, an increase of IDR 1 million in GRDP per capita is estimated to reduce HDI by approximately 0.173 points. This finding indicates that economic growth in Western Indonesia remains concentrated in particular sectors and geographic areas, such that its benefits have not yet been distributed equitably across society.

The Labor Force Participation Rate (LFPR) demonstrates a positive and statistically significant influence on HDI ($\beta = 0.196364$; $p = 0.0039 < \alpha = 0.05$). An increase of 1% in LFPR is estimated to increase HDI by approximately 0.196 points. The relatively advanced economic structure of Western Indonesia enables labor market participation to contribute more effectively to welfare improvement and human development.

Meanwhile, health expenditure, economic expenditure, and investment do not exhibit statistically significant effects on HDI in Western Indonesia. The Western Indonesia model yields an R^2 value of 42.72%, indicating greater explanatory power compared with the national model.

2. Regression Results for Eastern Indonesia

Based on the estimation results, the model generated an F-statistic value of 16.05767 with a probability value of 0.000000 ($< \alpha = 0.05$). Thus, health expenditure, educational expenditure, economic expenditure, infrastructure expenditure, economic growth, investment, and the Labor Force Participation Rate (LFPR) simultaneously exert statistically significant effects on HDI in Eastern Indonesia.

Economic expenditure demonstrates a positive and statistically significant effect at the 10% significance level ($\beta = 1.33\text{E-}06$; $p = 0.0703 < \alpha = 0.10$). An increase of IDR 1 billion in economic expenditure is estimated to increase HDI by approximately 0.00133 points. This finding suggests that government expenditure supporting productive economic activities contributes to improvements in human development in Eastern Indonesia.

In contrast, infrastructure expenditure exhibits a negative and statistically significant effect ($\beta = -7.88\text{E-}07$; $p = 0.0175 < \alpha = 0.05$). This finding indicates that infrastructure development in Eastern Indonesia has not yet directly translated into improvements in societal quality of life and may still be constrained by issues related to implementation effectiveness, unequal distribution, and the time lag associated with infrastructure benefits.

Investment emerges as the most dominant variable, exhibiting the largest positive coefficient and statistical significance at the 1% level ($\beta = 0.000390$; $p = 0.0000 < \alpha = 0.05$). An increase of IDR 1 billion in investment is estimated to raise HDI by approximately 0.39 points. This result indicates that investment serves as the principal driver of HDI improvement in Eastern Indonesia through productive economic expansion and employment opportunities.

The Labor Force Participation Rate (LFPR) exerts a negative and statistically significant effect on HDI ($\beta = -0.062669$; $p = 0.0335 < \alpha = 0.05$). This result suggests that higher labor force participation in Eastern Indonesia has not necessarily been accompanied by improvements in job quality, as a substantial proportion of workers remain concentrated in informal and low-productivity sectors.

Meanwhile, health expenditure, educational expenditure, and economic growth do not demonstrate statistically significant effects on HDI in Eastern Indonesia. The Eastern Indonesia model produces an R^2 value of 43.00%, which is slightly higher than that of the Western Indonesia model, indicating marginally stronger explanatory performance.

4.4 Comparative Analysis of Western and Eastern Indonesia

Table 4. Comparative Regression Results between Western and Eastern Indonesia

Variable	Western	Eastern	Conclusion
Health Expenditure (BKES)	Not significant (-)	Not significant (-)	No effect in both regions
Educational Expenditure (BPEND)	Significant (+)	Not significant (+)	Significant only in Western

Economic Expenditure (BEKO)	Not significant (+)	Significant (+)	Significant only in Eastern
Infrastructure Expenditure (BINF)	Significant (+)	Significant (-)	Significant in both regions with opposite directions
Economic Growth (GRDP)	Significant (-)	Not significant (-)	Significant only in Western
Investment (INV)	Not significant (-)	Significant (+)	Significant only in Eastern
Labor Force Participation Rate (LFPR)	Significant (+)	Significant (-)	Significant in both regions with opposite directions

Source: Processed research data using EViews, 2026

Variables Significant in Both Regions

1. Infrastructure Expenditure

Infrastructure expenditure demonstrates statistically significant effects in both regions; however, the direction of influence differs substantially. In Western Indonesia, infrastructure expenditure exerts a positive and significant effect on the Human Development Index (HDI), indicating that infrastructure development has been effectively integrated with economic activities and public service provision. Improved connectivity and access to education, healthcare, and productive economic opportunities contribute positively to welfare enhancement and human development outcomes.

In contrast, infrastructure expenditure in Eastern Indonesia demonstrates a negative and statistically significant effect on HDI. This finding suggests that infrastructure development in the eastern region has not yet fully translated into direct welfare improvements for local communities. The limited effectiveness of infrastructure spending may be associated with implementation constraints, unequal distribution of infrastructure benefits, and the existence of time lags between infrastructure investment and socioeconomic outcomes.

2. Labor Force Participation Rate (LFPR)

The Labor Force Participation Rate (LFPR) also exhibits statistically significant effects in both regions, although with opposite directions. In Western Indonesia, LFPR exerts a positive and significant effect, implying that greater labor force participation contributes directly to welfare improvement and human development. This pattern reflects a relatively more advanced economic structure characterized by higher labor productivity and stronger integration between labor participation and income generation.

Conversely, LFPR demonstrates a negative and statistically significant effect in Eastern Indonesia. This finding indicates that increased labor force participation does not necessarily lead to improved welfare outcomes, largely because a considerable proportion of workers remain concentrated in informal, low-skilled, and low-productivity sectors. Consequently, the quality of employment emerges as a key differentiating factor between the two regions.

Variables Significant Only in Western Indonesia

Educational expenditure and economic growth are statistically significant only in Western Indonesia. Educational expenditure exhibits a positive influence on HDI,

suggesting that improvements in human capital investment are more effectively translated into enhanced human development outcomes in regions characterized by stronger institutional capacity and better educational infrastructure. Meanwhile, economic growth demonstrates a negative effect, indicating that growth dynamics in Western Indonesia may remain spatially concentrated and insufficiently inclusive, thereby limiting their contribution to broad-based welfare improvement.

These findings imply that human development in Western Indonesia is more strongly influenced by improvements in human capital quality and regional economic dynamics.

Variables Significant Only in Eastern Indonesia

Economic expenditure and investment are statistically significant only in Eastern Indonesia. Economic expenditure exerts a positive effect, suggesting that government spending supporting productive economic activities contributes to welfare improvement through enhanced employment opportunities and local economic participation.

Investment emerges as a particularly influential determinant, demonstrating a strong positive effect on HDI. This finding indicates that human development in Eastern Indonesia is highly sensitive to productive investment flows capable of generating employment, stimulating regional economic activity, and increasing household income. In structurally disadvantaged regions, investment appears to play a crucial role in compensating for limitations in infrastructure and institutional capacity.

Differences in the Magnitude of Effects

Differences in coefficient magnitudes further illustrate the contrasting determinants of human development between the two regions.

In Western Indonesia, the dominant variables include the Labor Force Participation Rate ($\beta = 0.196364$), infrastructure expenditure ($\beta = 6.06E-07$), and educational expenditure ($\beta = 3.30E-07$). These findings indicate that human development in the western region is primarily driven by labor market participation, infrastructure quality, and investments in human capital.

By contrast, in Eastern Indonesia, the dominant variables comprise investment ($\beta = 0.000390$), economic expenditure ($\beta = 1.33E-06$), and infrastructure expenditure ($\beta = -7.88E-07$). These results suggest that human development in the eastern region is more dependent upon productive investment flows and government support for economic activities, while infrastructure effectiveness remains constrained.

Overall, the findings confirm the existence of heterogeneity in the determinants of human development between Western and Eastern Indonesia. Consequently, human development policies should not be designed using a uniform national approach but rather tailored to the structural characteristics and developmental needs of each region in order to promote more equitable, inclusive, and sustainable welfare outcomes.

Discussion

The findings of this study indicate that human development in Indonesia during the 2012–2021 period was shaped by a combination of fiscal and macroeconomic factors operating differently across regions. At the national level, educational expenditure, infrastructure expenditure, and investment were found to exert positive and statistically significant effects on the Human Development Index (HDI), whereas health expenditure, economic expenditure, economic growth, and the Labor Force Participation Rate (LFPR) demonstrated statistically insignificant or inconsistent effects. When the analysis was disaggregated between Western and Eastern Indonesia, a more complex pattern emerged. Western Indonesia exhibited stronger statistical significance for educational expenditure, infrastructure expenditure, and LFPR, whereas Eastern Indonesia was more strongly influenced by investment and economic expenditure, with infrastructure expenditure displaying a negative effect. These findings suggest that human development in Indonesia does not occur homogeneously but is strongly conditioned by variations in economic structure, institutional quality, fiscal capacity, and regional spatial characteristics (Sen, 1999; Todaro & Smith, 2021). Empirical evidence from recent studies further demonstrates that the effectiveness of government expenditure in improving human development is highly dependent upon policy implementation capacity, fiscal governance quality, and local socioeconomic conditions, thereby producing differentiated impacts on HDI across provinces and development regions.

From the perspective of the Capability Approach, human development is understood as a process of expanding individuals' capabilities to lead healthy, educated, productive, and dignified lives. According to Amartya Sen, welfare enhancement is not solely determined by income levels or economic growth but by society's ability to access essential services and transform available resources into meaningful welfare outcomes (Sen, 1999). Accordingly, the effects of fiscal variables on HDI observed in this study may be interpreted as reflections of the state's effectiveness in expanding societal opportunities and substantive freedoms. When government expenditure succeeds in improving access to education, strengthening regional connectivity, and expanding economic opportunities, its contribution to human development becomes more evident. Conversely, when expenditure is not accompanied by effective implementation mechanisms and equitable access, its developmental impact tends to weaken or become statistically insignificant.

Health expenditure demonstrates a negative yet statistically insignificant effect at both the national and regional levels. Theoretically, this finding appears paradoxical, given that health constitutes one of the fundamental dimensions of human development. From the perspective of Human Capital Theory, Gary Becker conceptualizes health as a form of human capital investment that enhances productivity, learning capacity, and long-term income generation (Becker, 1993). However, the statistical insignificance of health expenditure in this study suggests that increases in fiscal allocation have not been fully translated into improvements in healthcare quality capable of directly influencing HDI indicators. In the Indonesian context, this condition may be explained by disparities in regional healthcare governance quality, the predominance of routine expenditure, and the limited effectiveness of medical personnel and healthcare facility distribution, particularly

in remote areas. In Western Indonesia, the relatively limited effect of health expenditure may reflect the fact that basic healthcare needs have been more adequately fulfilled, implying diminishing marginal returns from additional spending. By contrast, in Eastern Indonesia, geographical constraints, high logistics costs, and weaker institutional capacity hinder the effective conversion of increased fiscal allocation into accessible and quality healthcare services. These findings reinforce the argument that increases in health expenditure do not automatically expand human capabilities in the absence of strong institutional support and effective policy implementation (Todaro & Smith, 2021; Sen, 1999).

In contrast to health expenditure, educational expenditure demonstrates a positive and statistically significant effect, particularly at the national level and in Western Indonesia. This finding is consistent with the logic of Human Capital Theory, which conceptualizes education as a productive investment capable of enhancing labor quality, productivity, and social mobility (Becker, 1993). Education increases individuals' ability to secure better employment opportunities, raise income levels, and expand life choices, thereby establishing a direct relationship with the dimensions of the Human Development Index (HDI). From the perspective of the Capability Approach, education also broadens individuals' substantive freedoms to participate meaningfully in socioeconomic life (Sen, 1999; Nussbaum, 2011). The stronger statistical significance observed in Western Indonesia indicates that educational investment operates more effectively in regions characterized by more mature economic ecosystems, more adequate infrastructure, and broader labor market access. This finding is further supported by recent empirical studies demonstrating that government expenditure on education significantly improves HDI when accompanied by strong institutional quality, effective educational governance, and higher levels of regional economic development (Sarker et al., 2021; Kwon & Kim, 2021). By contrast, the statistical insignificance of educational expenditure in Eastern Indonesia suggests that increases in educational spending alone remain insufficient in the absence of equitable teacher quality distribution, adequate educational facilities, regional accessibility, and post-education economic opportunities. Therefore, the contribution of education to human development is determined not merely by the magnitude of expenditure but also by the regional capacity to absorb and utilize the human capital generated. Consequently, increases in educational expenditure should be accompanied by affirmative policies emphasizing equitable access to quality educational services, teacher capacity enhancement, and stronger integration between education systems and local labor market needs to ensure that educational investment produces broader and more inclusive human development outcomes (UNDP, 2024).

Economic expenditure and infrastructure expenditure exhibit an especially interesting pattern of association because both represent government spending directed toward productive sectors. At the national level and in Western Indonesia, infrastructure expenditure demonstrates a positive and statistically significant effect on HDI, whereas in Eastern Indonesia it exhibits a negative and statistically significant relationship. This finding indicates that the developmental impact of infrastructure is highly contextual and region-specific. From the perspective of Endogenous Growth Theory, as developed by Paul Romer, infrastructure constitutes a form of public capital that enhances productivity, strengthens economic connectivity, and generates spillover effects for education, healthcare, and labor markets (Romer, 1990; Barro, 1990). In Western Indonesia, more mature infrastructure

systems enable additional government investment to directly expand access to education and healthcare services while simultaneously improving economic efficiency, thereby contributing positively to HDI. However, in Eastern Indonesia, the negative relationship suggests that infrastructure development may still be constrained by issues related to targeting inefficiency, limited economic utilization, or a long-term project orientation whose social benefits have not yet materialized during the observation period. Geographical fragmentation associated with archipelagic conditions and limited market integration may further delay the realization of infrastructure benefits at the community level. Meanwhile, the relatively insignificant effect of economic expenditure suggests that expansion in productive-sector spending does not necessarily improve welfare when economic activities remain extractive, spatially concentrated, and weakly connected to broad-based improvements in societal quality of life. Previous studies similarly indicate that infrastructure development in less-developed regions does not automatically generate welfare improvement unless accompanied by equitable access, strong local institutional capacity, and adequate regional economic integration (World Bank, 2024; Azzoni & Servo, 2022; Faguet et al., 2020).

Economic growth demonstrates relatively contradictory results, as several model estimations indicate a negative relationship with the Human Development Index (HDI), particularly in Western Indonesia, while the effect remains statistically insignificant in Eastern Indonesia. These findings suggest that increases in economic output are not necessarily synonymous with improvements in human development outcomes. Within contemporary development literature, the relationship between economic growth and human development is understood as a non-automatic linkage, in which the effectiveness of growth depends heavily upon economic structure, income distribution, institutional capacity, and the quality of public policies that connect economic expansion with broader societal welfare enhancement (Todaro & Smith, 2021). From the perspective of the Capability Approach, economic growth constitutes merely a means rather than the ultimate objective of development (Sen, 1999). When the benefits of growth remain concentrated among specific socioeconomic groups or modern urban regions, increases in Gross Regional Domestic Product (GRDP) do not automatically expand public access to education, healthcare, or broader welfare opportunities.

In the context of Western Indonesia, relatively high economic growth tends to be concentrated within industrial sectors, modern services, and metropolitan regions, such that its benefits are not always distributed equitably across all social groups. Under these circumstances, economic growth may contribute to spatial and social inequality when the benefits of expansion are disproportionately captured by high-income groups, specific formal sectors, or advanced urban centers, while marginalized communities continue to face restricted access to development outcomes. This phenomenon aligns with the concept of unequal growth, referring to conditions in which economic expansion occurs rapidly but fails to distribute socioeconomic benefits evenly, thereby limiting inclusive human development outcomes (Stiglitz et al., 2018). Empirical studies in Indonesia similarly demonstrate that high regional economic growth does not necessarily translate directly into HDI improvement

when accompanied by pronounced regional inequality, uneven educational access, and limited healthcare service quality (Sarker et al., 2021; Kwon & Kim, 2021).

By contrast, in Eastern Indonesia, economic growth remains heavily dependent upon primary sectors and natural resource extraction, resulting in a relatively weak linkage with societal welfare improvement. The regional economic structure continues to rely predominantly on extractive commodities, mining, agriculture, and natural resource exploitation, thereby producing an enclave economy characterized by high output generation but limited linkages to employment creation, local productivity enhancement, and equitable income distribution. Furthermore, inadequate infrastructure connectivity, high logistics costs, and limited institutional capacity at the regional level constrain the translation of economic growth into broader access to education, healthcare, and improved living standards. Accordingly, the findings of this study reinforce the argument that the ****quality of growth**** is more important than growth quantity alone, as human development depends fundamentally upon the extent to which economic expansion generates inclusive, productive, and socially equitable development outcomes (UNDP, 2024).

Investment demonstrates a positive and statistically significant effect at the national level and in Eastern Indonesia, while remaining statistically insignificant in Western Indonesia. Within the framework of Endogenous Growth Theory, investment is conceptualized as a primary source of capital accumulation, technology transfer, employment generation, and long-term productivity enhancement (Romer, 1990; Barro, 1990). The statistical significance of investment in Eastern Indonesia indicates that additional investment generates greater marginal effects in regions experiencing developmental capital shortages. Investment inflows are capable of expanding employment opportunities, stimulating local economic activities, and facilitating improvements in infrastructure and supporting services.

In the context of developing regions, investment contributes to expanded employment opportunities, stronger economic connectivity, increased local production capacity, and spillover effects across education, healthcare, and other essential public services. Consequently, investment functions as a developmental stimulus that accelerates both human capital accumulation and local economic development. Empirical studies further demonstrate that investment in developing regions exerts stronger effects on human development when accompanied by expanded local employment opportunities, improved supporting infrastructure, and strengthened institutional capacity at the regional government level (World Bank, 2024; Azzoni & Servo, 2022; Faguet et al., 2020).

By contrast, the statistical insignificance of investment in Western Indonesia may be explained by the characteristics of a relatively more mature economic structure, in which investment tends to be concentrated in capital-intensive sectors and geographically specific areas. Under such conditions, the benefits of investment are less likely to diffuse broadly across society and may not directly translate into improvements in human development outcomes. This finding suggests that the contribution of investment to the Human Development Index (HDI) is highly contingent upon local economic structures, patterns of investment distribution, and regional capacity to generate broader socioeconomic multiplier effects. In regions where investment is concentrated within modern industries or urban

growth centers, its developmental benefits may remain spatially uneven and socially exclusive, thereby weakening its direct contribution to inclusive human development.

The Labor Force Participation Rate (LFPR) exhibits the most contrasting pattern between Western and Eastern Indonesia. In Western Indonesia, LFPR demonstrates a positive and statistically significant effect on HDI, whereas in Eastern Indonesia it exhibits a negative and statistically significant relationship. These findings indicate that labor force participation contributes to human development only when supported by productive and high-quality employment. In other words, labor market participation enhances welfare outcomes only if accompanied by employment opportunities that are productive, adequately remunerated, and capable of sustainably improving societal living standards (Todaro & Smith, 2021). From the perspective of Human Capital Theory, productive labor is regarded as the outcome of accumulated human capital capable of generating higher income and improved welfare (Becker, 1993). In Western Indonesia, the relatively advanced economic structure enables workers to be absorbed into more productive and formal sectors, thereby allowing increases in labor force participation to contribute positively to purchasing power and quality of life. By contrast, in Eastern Indonesia, high labor force participation does not necessarily reflect greater productivity, as a substantial share of employment remains concentrated in informal activities, subsistence agriculture, and low-wage occupations. Consequently, higher labor participation does not automatically improve quality of life and may instead reflect household economic pressures that compel individuals to engage in low-productivity employment.

Overall, this study confirms that human development in Indonesia cannot be adequately explained through a uniform development approach across regions. Variations in the direction and statistical significance of explanatory variables indicate that the effectiveness of fiscal and macroeconomic policies is highly conditioned by regional characteristics. Western Indonesia benefits from relatively stronger institutional quality, more developed infrastructure, and more mature labor markets, whereas Eastern Indonesia continues to face structural constraints related to limited connectivity, lower human capital quality, and weaker institutional capacity. Accordingly, the principal contribution of this study lies in reaffirming that human development in developing countries requires a place-based development strategy integrating human capital investment, productive infrastructure enhancement, equitable investment distribution, and improvements in the quality of economic growth. Such an approach is essential to ensuring that the expansion of societal capabilities occurs in a more inclusive, equitable, and sustainable manner

4. CONCLUSION

Concluding Remarks

This study aimed to analyze the effects of regional government fiscal factors and macroeconomic variables on human development in Indonesia, measured through the Human Development Index (HDI), both at the national level and across the regional disparities between Western and Eastern Indonesia. The findings reveal that human development in Indonesia is simultaneously influenced by health expenditure, educational

expenditure, economic expenditure, infrastructure expenditure, economic growth, investment, and the Labor Force Participation Rate (LFPR). However, at the partial level, only educational expenditure, infrastructure expenditure, and investment demonstrate positive and statistically significant effects on HDI improvement, while health expenditure, economic expenditure, economic growth, and LFPR do not exhibit statistically significant effects at the national level. These findings confirm that human development is determined not merely by the magnitude of economic growth or fiscal expansion but, more importantly, by the effectiveness of public resource allocation and the quality of developmental transformation into broader societal welfare improvements.

The study also identifies substantial spatial disparities in human development between Western and Eastern Indonesia. In Western Indonesia, human development appears to be more responsive to educational expenditure, infrastructure expenditure, and the quality of labor force participation, whereas in Eastern Indonesia structural constraints such as limited infrastructure, insufficient investment, and weaker fiscal capacity remain major obstacles to human development progress. These findings indicate that the relationship between fiscal variables, macroeconomic conditions, and human development is heterogeneous across regions. Consequently, a uniform policy approach is less effective in the Indonesian context, characterized by archipelagic geography and pronounced regional disparities.

From an academic perspective, this study contributes to the development economics literature by extending discussions on the determinants of human development through the integration of regional fiscal expenditure and macroeconomic variables within a provincial panel data framework covering the 2012–2021 period. Furthermore, the study demonstrates substantial variation in the effects of development determinants across Indonesian regions. Empirically, the findings provide evidence that the effectiveness of public expenditure, investment, and regional economic structures plays a more decisive role in improving human development than aggregate economic growth alone, thereby enriching scholarly discourse on inclusive human development and regional inequality in developing countries.

From a policy perspective, the findings underscore the need to reorient development strategies toward a more inclusive, expenditure-quality-based, and regionally sensitive approach. The government should strengthen the effectiveness of educational and infrastructure expenditure, improve the governance quality of health expenditure, expand the equitable distribution of productive investment particularly in Eastern Indonesia and promote more inclusive economic growth through regional inequality reduction, local economic strengthening, and improvements in labor quality and productivity. Accordingly, human development policies should not focus solely on economic growth targets but must also prioritize equitable access, improvements in the quality of essential public services, and the sustainable strengthening of regional development capacity.

Research Limitations

This study has several limitations that should be considered when interpreting the findings. From a methodological perspective, the application of the Common Effect Model (CEM) assumes homogeneity across provinces and, therefore, may not fully capture the substantial heterogeneity characterizing Indonesian regions in terms of economic structure, social conditions, geographical characteristics, institutional quality, and fiscal capacity. Consequently, variations in the determinants of human development across provinces may not be comprehensively reflected within the estimation framework.

From a temporal perspective, the observation period covering 2012-2021 remains relatively limited for explaining long-term human development dynamics, particularly because it includes the period of the Coronavirus Disease 2019 (COVID-19) pandemic, which may have distorted intervariable relationships due to shifts in policy priorities toward health crisis management and economic recovery. The pandemic context likely altered public expenditure patterns, labor market dynamics, investment flows, and regional economic performance, thereby affecting the stability and consistency of estimated relationships between fiscal and macroeconomic variables and human development outcomes.

Furthermore, the use of secondary data obtained from official institutions, including the Central Statistics Agency (BPS) and other related government agencies, remains subject to potential limitations associated with interregional inconsistencies in data recording, missing observations that may result in an unbalanced panel structure, and constraints related to data availability. In addition, the research variables are primarily limited to selected fiscal and macroeconomic indicators and therefore may not fully represent the multidimensional complexity of human development. Important dimensions such as poverty, income inequality, institutional quality, unemployment, technological accessibility, environmental quality, and governance effectiveness have not been comprehensively incorporated into the analysis. Likewise, the study remains limited to the provincial level and has not captured development disparities occurring at the district and municipal levels, where socioeconomic heterogeneity may be even more pronounced.

Recommendations for Future Research

Future studies are recommended to adopt more robust methodological approaches, such as the Fixed Effect Model (FEM), Random Effect Model (REM), Generalized Method of Moments (GMM), Structural Equation Modeling (SEM), or spatial econometric approaches to better capture interregional heterogeneity, causal relationships, and spatial interdependencies in development processes. The application of these methods would provide a more comprehensive understanding of the determinants of human development and their differential impacts across regions.

Moreover, extending the observation period, particularly by incorporating post-COVID-19 data, is essential to generate a more stable and reliable understanding of the long-term relationship between government expenditure, economic growth, investment, and human development. Longer-term data would also allow for a more accurate assessment of policy effectiveness and structural transformation following the pandemic period.

Future research should also complement secondary data with primary data collection through surveys, interviews, and field observations in order to obtain a deeper empirical understanding of policy implementation effectiveness, public service quality, and community perceptions regarding development in education, healthcare, and welfare sectors. Such an approach would enable research findings to become more contextualized, empirically grounded, and reflective of actual conditions experienced by local communities, thereby enhancing the explanatory power and policy relevance of future studies.

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