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Does Human Development Translate into Inclusive Welfare? Evidence from Regional Economic Dynamics in Indonesia

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Abstract

The relationship between human development and inclusive welfare remains a central issue in regional development, particularly in emerging economies where improvements in the Human Development Index (HDI) do not always translate into equitable socioeconomic outcomes. This study examines the linkage between HDI-related public investment and welfare dynamics in Jombang Regency, Indonesia. Using a quantitative approach based on time-series secondary data (2010–2024), the study employs polynomial regression and correlation analysis to evaluate the effects of education spending, health spending, wages, and demographic dynamics on poverty and household consumption. The results show that health expenditure has a strong negative association with poverty reduction, while education spending exhibits a nonlinear (U-shaped) relationship, indicating potential inefficiencies in translating educational investment into welfare outcomes. In addition, wages strongly influence household food consumption, whereas population growth demonstrates a diminishing marginal effect on consumption dynamics. These findings suggest that improvements in human development must be integrated with labor market absorption and regional economic structures to generate inclusive and sustainable welfare outcomes.

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1. Introduction

Economic development discourse has gradually shifted from a narrow focus on capital accumulation and economic output toward a more comprehensive paradigm that emphasizes human-centered development. Traditional development strategies often prioritized growth in Gross Regional Domestic Product (GRDP) as the primary indicator of economic success. However, such an approach increasingly faces criticism because economic growth alone does not necessarily guarantee improvements in social welfare or equitable distribution of development outcomes (Piketty, 2014). As a result, the global development agenda has moved toward the concept of inclusive economic growth, which emphasizes the creation of equal opportunities and equitable access to economic resources for all segments of society.

Within this evolving framework, the Human Development Index (HDI) has become a central indicator for assessing development performance. HDI reflects the quality of human capital through

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three fundamental dimensions: a long and healthy life, access to knowledge, and a decent standard of living (Fukuda-Parr, 2003). These dimensions represent not only social achievements but also essential foundations for sustainable economic participation. The improvement of human capabilities enhances productivity, encourages innovation, and strengthens the capacity of individuals to participate in economic activities.

The relationship between human development and inclusive economic growth is closely linked to individuals' ability to participate in economic processes. Improvements in health conditions and educational attainment enhance labor productivity and expand economic opportunities for the population. Conversely, economic growth that occurs without improvements in human capital may generate exclusive outcomes, where benefits are concentrated in capital-intensive sectors that provide limited employment opportunities for local communities (Anand & Sen, 2000). In this context, strengthening human development alongside expanding access to economic opportunities is essential to ensure that development contributes to poverty reduction and broader welfare improvements.

The relevance of this issue becomes evident in many regional economies, where improvements in human development indicators do not always translate into proportional improvements in welfare outcomes. This phenomenon can create a development paradox, in which regions demonstrate relatively high human development indicators while still facing persistent poverty and inequality (Acemoglu & Robinson, 2012). Such a disconnect suggests that the transmission mechanism between human development and economic welfare may not function effectively in certain contexts.

Kabupaten Jombang, located in East Java Province, represents an interesting case for examining this phenomenon. According to data from the Indonesian Central Bureau of Statistics (BPS), the Human Development Index in Jombang has consistently increased over the past five years. The HDI value rose from 73.63 in 2020 to 74.10 in 2021, 74.66 in 2022, 75.16 in 2023, and 75.67 in 2024. This steady improvement indicates sustained investments in health and education sectors and suggests progress in enhancing human capital within the region. The increasing HDI level positions Jombang among regions with relatively strong human development performance, providing a foundation for potential economic productivity gains in the future.

Despite these achievements, several socioeconomic indicators indicate that improvements in human development have not fully translated into inclusive welfare outcomes. Poverty levels in Jombang have fluctuated over the same period, declining overall but showing signs of structural persistence. The poverty rate was 9.94 percent in 2020, increased slightly to 10 percent in 2021, declined to 9.04 percent in 2022, rose to 9.15 percent in 2023, and fell again to 8.6 percent in 2024. In addition, the characteristics of poor households reveal structural vulnerabilities, including relatively large household sizes and limited educational attainment. In 2024, the average household size among the poor was 5.22 members, while 18.21 percent had not completed primary school, 61.70 percent completed elementary or junior high school, and only 20.09 percent had completed senior high school or higher. Consumption patterns among poor households also indicate significant expenditure on staple goods such as rice, cooking oil, and cigarettes, reflecting constraints in household purchasing power.

Income distribution indicators further highlight structural challenges in achieving inclusive development. The Gini Ratio in Jombang has fluctuated but generally remained within the moderate inequality category over the past five years. According to BPS data, the Gini Ratio was 0.334 in 2020, 0.332 in 2021, 0.310 in 2022, increased to 0.339 in 2023, and decreased to 0.302 in 2024. The coexistence of improving HDI performance with persistent poverty and moderate income inequality suggests that improvements in human development have not yet fully translated into broad-based welfare gains.

This condition raises a critical policy question: to what extent can improvements in human development be transformed into inclusive economic welfare? While human development indicators reflect improvements in education and health outcomes, these achievements must also be linked to

productive economic opportunities. Without effective absorption of skilled labor into the local economy, improvements in human capital may fail to generate significant welfare improvements.

Several structural challenges contribute to this disconnect. First, the absorption capacity of local labor markets remains limited, particularly in industrial and trade sectors that tend to be capital-intensive. Second, productivity in agriculture and small-scale enterprises remains relatively low, reducing the potential for income growth among rural households. Third, regional disparities across districts within Jombang continue to influence the distribution of economic opportunities. These issues indicate that current policy instruments may still be largely sectoral and technocratic, rather than integrated within a comprehensive framework of inclusive economic development.

From a theoretical perspective, addressing these challenges requires a reconstruction of the development paradigm in which human development and economic growth are no longer treated as separate policy domains. Instead, improvements in HDI should be viewed both as a prerequisite for economic participation and as an ultimate objective of inclusive development strategies. In this framework, investments in education and health must be integrated with policies that expand employment opportunities and strengthen productive sectors of the local economy.

Based on these considerations, this study aims to examine the relationship between human development achievements and welfare dynamics in Kabupaten Jombang. Specifically, the analysis focuses on several key indicators: (i) projections of regional economic growth, (ii) the relationship between education spending and poverty levels, (iii) the relationship between health spending and poverty levels, (iv) the impact of wages on household consumption, and (v) the influence of population dynamics on consumption patterns. These indicators are considered critical for understanding how improvements in human development interact with broader welfare outcomes.

By examining these relationships, this research seeks to provide a deeper understanding of the mechanisms through which human development contributes to inclusive economic welfare. The findings are expected to contribute both to the academic literature on regional development and to policy discussions regarding the design of more integrated and inclusive development strategies at the local level.

2. Literature Review

Human Development Theory

The theory of human development emerged as a critique of conventional economic development models that primarily emphasized income growth and capital accumulation as the main indicators of development success. Traditional development frameworks often measured progress through increases in per capita income or gross domestic product, overlooking broader aspects of human well-being. In contrast, the human development paradigm places individuals at the center of development processes, emphasizing the expansion of people's capabilities and opportunities as the ultimate objective of economic progress (Yusuf, 2014).

The intellectual foundation of human development theory was strongly influenced by the work of Mahbub ul Haq and Amartya Sen in the early 1990s. Their approach emphasizes that development should focus on expanding human choices and capabilities rather than merely increasing economic output. According to this perspective, economic growth is not an end in itself but rather a means to enhance the quality of human life. The objective of development, therefore, is to create conditions that enable individuals to live longer, healthier, and more productive lives while enjoying access to knowledge and decent living standards (UNDP, 1990; Todaro & Smith, 2015).

Amartya Sen's Capability Approach provides the philosophical foundation for understanding human development. Sen argues that poverty and deprivation should not only be defined in terms of low income but also as the deprivation of basic capabilities required to live a meaningful life. These capabilities include the ability to maintain good health, acquire education, and participate actively in economic and social activities. Individuals with stronger capabilities are more likely to participate productively in economic processes and contribute to broader development outcomes (UNDP, 1990; Todaro & Smith, 2015).

Human development is commonly measured through three key dimensions: health, education, and standard of living. Health conditions influence productivity and labor participation, while education enhances skills, knowledge, and adaptability in an increasingly complex labor market. Together, these components form the basis of human capital development, which plays a crucial role in supporting economic growth and improving social welfare (Sudantoko & Arfani, 2020). When combined with adequate income opportunities, these dimensions enable individuals to maintain and improve their living conditions in a sustainable manner.

From a macroeconomic perspective, investment in human development generates a multiplier effect on economic performance. Higher levels of human capital tend to increase productivity, promote technological innovation, and improve economic resilience against external shocks. As a result, investments in health and education should be viewed not merely as social expenditures but as strategic investments that contribute to long-term economic growth and development sustainability (Stiglitz et al., 2009; Ranis et al., 2000).

Inclusive Economic Development

The concept of inclusive economic development emerged as an extension of traditional economic growth theories that primarily focused on increasing aggregate output. Inclusive development emphasizes that economic growth must benefit a broad range of society rather than being concentrated among specific economic groups. In this framework, development success is measured not only by the magnitude of economic growth but also by the degree to which economic opportunities are accessible to all members of society (Klasen, 2010).

Inclusive economic development aims to reduce poverty and inequality through the creation of productive employment opportunities and equitable access to economic resources. Economic growth can be considered inclusive when it generates widespread employment opportunities, reduces income disparities, and increases participation among marginalized groups in economic activities. In this context, economic development policies must address structural barriers that prevent certain groups from accessing productive resources and economic opportunities (Prasetyo, 2011).

In many developing economies, inequality and social exclusion remain significant barriers to sustainable development. High levels of inequality can reduce the effectiveness of economic growth in improving overall welfare because economic benefits tend to concentrate among a limited group of individuals or sectors. Therefore, inclusive economic development seeks to integrate growth strategies with policies that ensure equitable access to economic opportunities across different segments of society.

The connection between human development and inclusive economic growth lies in the concepts of accessibility and capability. Economic opportunities can only be utilized effectively when individuals possess the basic capabilities necessary to participate in economic activities. Without adequate education, health, and skills, individuals may remain excluded from productive sectors of the economy even when economic growth occurs (Klasen, 2010; Mankiw, 2018).

At the regional level, the implementation of inclusive economic development requires structural transformation that supports labor-intensive sectors and strengthens local economic activities. Policies that facilitate access to financial resources, infrastructure development, and alignment between education systems and labor market needs are essential components of inclusive development

strategies. Through these mechanisms, economic growth can generate broader social benefits and contribute to sustainable improvements in welfare (Arsyad, 2010; Asian Development Bank, 2014).

Concept of Social Welfare

Social welfare is a multidimensional concept that reflects the overall well-being of individuals and communities from both material and non-material perspectives. In classical economic theory, welfare was often associated with income levels and consumption capacity, where higher income levels were assumed to reflect improved living standards. However, contemporary development perspectives recognize that welfare encompasses a broader range of factors, including quality of life, security, access to basic services, and opportunities for social participation.

From a conceptual standpoint, welfare can be distinguished into objective welfare and subjective welfare. Objective welfare refers to measurable indicators such as income levels, health status, and educational attainment, which are often captured through aggregate indicators such as the Human Development Index (HDI). Subjective welfare, on the other hand, refers to individuals' perceptions of their quality of life, including life satisfaction and perceived well-being.

In the context of regional development, welfare outcomes are influenced not only by economic growth but also by the distribution of resources and opportunities. Even when economic growth occurs, unequal distribution of income and limited access to economic opportunities can prevent improvements in welfare from reaching all segments of society (Haq, 1995). Consequently, development policies must address both economic performance and social inclusion in order to achieve sustainable welfare improvements.

Within the framework of inclusive development, welfare should not be interpreted solely as the result of government assistance or social transfers. Instead, welfare is more effectively achieved when individuals possess the capabilities and opportunities necessary to improve their own economic conditions. This perspective emphasizes the importance of empowering individuals through education, health services, and economic opportunities so that they can actively participate in development processes.

Linking Human Development and Inclusive Welfare

The relationship between human development and inclusive welfare lies at the intersection of human capabilities and economic participation. Improvements in education and health enhance individuals' capacity to participate in economic activities, thereby increasing productivity and income-generating opportunities. When these improvements are supported by appropriate economic policies and labor market structures, they can lead to broader welfare improvements across society.

However, empirical evidence in many regions suggests that improvements in human development indicators do not automatically translate into inclusive welfare outcomes. In some cases, improvements in education and health may occur without corresponding improvements in employment opportunities or income distribution. This phenomenon creates a disconnect between human development achievements and economic welfare outcomes.

Addressing this disconnect requires a development framework that integrates human development policies with economic strategies aimed at expanding productive employment opportunities. When investments in human development are aligned with economic structures capable of absorbing skilled labor, the benefits of development can be distributed more broadly and contribute to sustainable improvements in welfare.

In this context, human development indicators such as HDI should not only be viewed as social indicators but also as strategic instruments for economic development. By strengthening the link

between human capital formation and economic participation, development policies can ensure that improvements in human development translate into inclusive and sustainable welfare outcomes.

3. Methodology

Research Design

This study employs a quantitative descriptive approach to examine the relationship between human development achievements and welfare dynamics in Kabupaten Jombang. The analysis relies on secondary time-series data obtained from the Indonesian Central Bureau of Statistics (BPS) and official financial reports of the local government of Jombang Regency. The data span multiple years in order to capture long-term trends in regional development indicators.

The research framework integrates several indicators representing both human development inputs and welfare outcomes, including economic growth projections, public expenditure in education and health, wage dynamics, and population growth. These indicators are used to analyze how improvements in human development are associated with changes in poverty levels, consumption patterns, and broader economic performance at the regional level.

The methodological approach is designed to examine both macroeconomic dynamics and welfare indicators simultaneously, enabling a comprehensive understanding of the relationship between human development achievements and inclusive economic welfare.

Economic Growth Projection Model

The first stage of the analysis involves projecting the economic growth of Kabupaten Jombang for the period 2025–2030. The projection serves as a strategic analytical tool to assess the potential capacity of the regional economy to absorb improvements in human capital and to support inclusive development policies.

Economic growth projection is estimated using a Multiple Regression Model, where regional economic growth is treated as the dependent variable influenced by several macroeconomic determinants.

General Form of the Multiple Regression Model

$$Y_t = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + \ldots + \beta_n X_{nt} + \varepsilon_t$$

Where: Y_t = Economic growth (GRDP growth rate) of Kabupaten Jombang in period t, α = Constant (intercept), β_i = Regression coefficients indicating the effect of each independent variable, X_{it} = Independent variables affecting economic growth, ε_t = Error term representing other factors not included in the model.

Independent Variables in the Economic Projection Model

The selection of independent variables follows standard economic growth theory and regional economic development considerations. The variables include:

Investment (X_1), Investment plays a central role in economic growth models such as the Harrod–Domar and Solow growth models. Investment variables may include domestic investment (PMDN), foreign investment (PMA), or government investment in infrastructure and productive sectors. Government Expenditure (X_2), Government spending, particularly capital expenditure, reflects public investment in infrastructure, education, and health sectors that support long-term economic productivity.

Savings Rate (X_3), Savings represent an important determinant of capital accumulation in economic growth theory. Inflation Rate (X_4), Inflation reflects macroeconomic stability and influences purchasing power and investment behavior.

Interest Rate (X_5), Interest rates affect borrowing costs and investment decisions within the regional economy. Human Capital Quality (X_6), Human capital indicators may include average years of schooling, education expenditure per capita, or human capital indices reflecting labor productivity and technological capacity.

Unemployment Rate (X_7), Unemployment reflects the efficiency of labor utilization in the regional economy. Ease of Doing Business Index (X_8), This variable captures the regulatory and institutional environment influencing investment decisions. Innovation Indicators (X_9), Innovation may be measured through indicators such as research expenditure, patents, or the number of start-ups.

Model Estimation Procedure

The empirical estimation process follows three main stages. Step 1: Model Estimation, The regression model is estimated using statistical software such as EViews, R, Python, SPSS, or Stata based on historical economic data. The estimation process ensures that the regression model satisfies classical econometric assumptions and achieves a high level of goodness-of-fit.

Step 2: Scenario Assumptions, Following the estimation stage, projections are generated under three economic scenarios: Moderate Scenario, This scenario reflects the most realistic economic conditions based on historical trends and regional development targets. For example: Investment growth: 8 percent annually, Government expenditure growth: 5 percent annually, Human capital improvement: 1 percent annually.

Optimistic Scenario, The optimistic scenario assumes favorable economic conditions such as strong investment inflows and successful policy implementation. Example assumptions: Investment growth: 15 percent annually, Government expenditure growth: 7 percent annually, Human capital improvement: 2 percent annually.

Pessimistic Scenario, The pessimistic scenario reflects potential economic shocks or policy constraints. Example assumptions: Investment growth: 3 percent annually, Government expenditure growth: 2 percent annually, Human capital growth: –0.5 percent.

Step 3: Economic Growth Projection, Projected values for the period 2025–2030 are generated by substituting scenario assumptions into the estimated regression equation.

For example, if the estimated regression model is:

$$Y = 2.1 + 0.35X_1 + 0.42X_2$$

then the economic growth projection for a specific year can be calculated by inserting the assumed values of investment and human capital growth.

Welfare Analysis

Beyond macroeconomic projection, this study also examines welfare outcomes using several empirical relationships. Education Expenditure and Poverty, Correlation analysis is conducted to examine the relationship between education spending per capita and poverty levels. Education expenditure represents government investment in human capital formation.

Health Expenditure and Poverty, Health expenditure is analyzed as a key determinant of human productivity and household economic resilience. Increased health spending may reduce poverty by improving labor productivity and reducing medical expenditure burdens on households.

Wage Dynamics and Household Consumption, The analysis also examines the relationship between wages and household food consumption to assess the effect of income dynamics on welfare indicators. Population Growth and Consumption Patterns, Population growth is analyzed to determine whether demographic expansion contributes positively to aggregate consumption or instead creates pressure on economic resources.

Additional Statistical Analysis

Compound Annual Growth Rate (CAGR)

To measure the average annual growth rate of indicators such as wages or sectoral employment, this study applies the Compound Annual Growth Rate (CAGR) formula:

$$CAGR = \left(\frac{V_f}{V_i}\right)^{\frac{1}{n}} - 1$$

Where: V_t= Final value, V_0= Initial value, n= Number of years, CAGR provides an estimate of the average annual growth rate over a specific period.

Regression Analysis

Regression analysis is used to evaluate the relationship between independent variables and dependent variables.

$$Y = \alpha + \beta X + \varepsilon$$

Where: Y= Dependent variable (e.g., poverty level), X= Independent variable (e.g., education or health expenditure), α= Constant, β= Regression coefficient, ε= Error term.

Regression results are interpreted to determine the magnitude and direction of the relationship between explanatory variables and welfare outcomes.

Analytical Framework

By integrating economic projections, public expenditure analysis, wage dynamics, and demographic factors, this methodological framework provides a comprehensive approach for examining how improvements in human development indicators interact with broader welfare dynamics in Kabupaten Jombang.

This integrated analysis allows the study to capture both macroeconomic trends and micro-level welfare indicators, offering a holistic understanding of the relationship between human development achievements and inclusive economic welfare.

4. Results

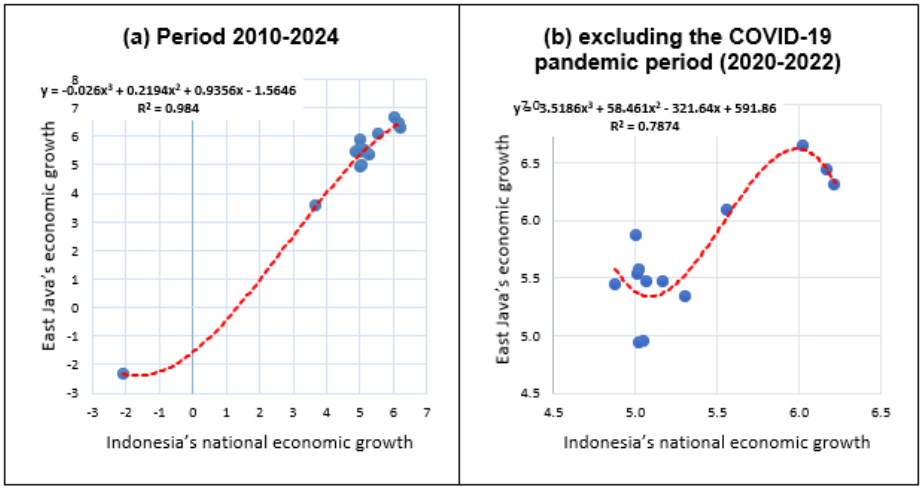
Economic Growth Projection of Jombang Regency (2025–2030)

The projection of economic growth for Jombang Regency during the period 2025–2030 is conducted not only as an attempt to estimate future regional economic performance but also as a strategic analytical instrument to evaluate the sustainability of inclusive economic development. The projection provides insight into whether improvements in human development indicators can be supported by sufficient economic expansion capable of absorbing an increasingly skilled labor force.

The estimation process begins by examining the historical relationship between national economic growth and regional economic growth in East Java Province. Understanding this relationship is essential because the economic performance of East Java is closely linked to national macroeconomic dynamics, which subsequently influence the economic trajectory of districts within the province.

The empirical relationship between Indonesia's national economic growth and East Java's economic growth is illustrated in Figure 1.

Figure 1. Relationship between East Java Economic Growth and Indonesia Economic Growth



Source: Author's analysis (2025)

The estimation results indicate a cubic polynomial relationship between national economic growth and economic growth in East Java during the period 2010–2024, including the COVID-19 pandemic years. The polynomial model yields a coefficient of determination of $R^2 = 0.984$, indicating a very strong correlation between national and provincial economic performance.

When the pandemic years 2020–2021 are excluded from the dataset, the cubic polynomial relationship still demonstrates a strong association, although with a lower coefficient of determination of $R^2 = 0.7874$. These findings confirm that fluctuations in national economic performance significantly influence the regional economic dynamics of East Java.

The relationship can be expressed through the following polynomial equation:

$$Y_{Jatim} = f(Y_{Indonesia})$$

where Y_{Jatim} represents the economic growth of East Java Province and $Y_{Indonesia}$ represents national economic growth.

Building upon this relationship, the next stage examines the relationship between economic growth in East Java and economic growth in Jombang Regency. The estimated relationship is illustrated in Figure 2.

The empirical estimation again indicates a cubic polynomial relationship, which forms the basis for constructing projections of economic growth in Jombang Regency for the period 2025–2030. The estimated equation is expressed as follows:

$$Y_{Jombang} = f(Y_{Jatim})$$

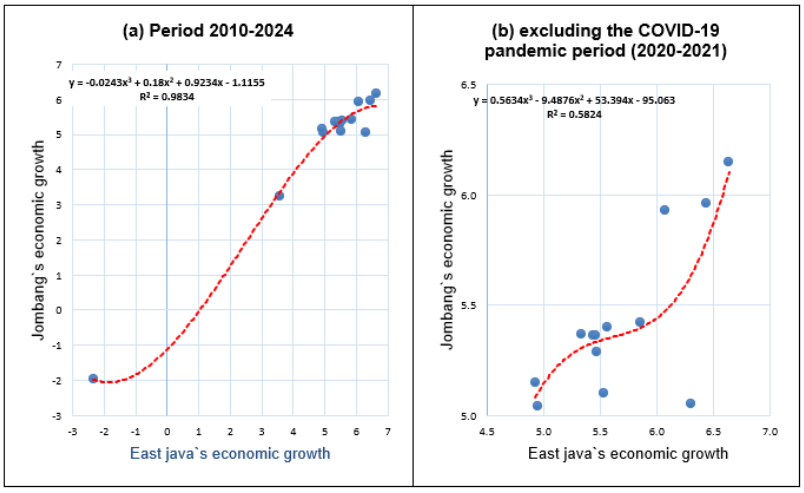
where $Y_{Jombang}$ represents economic growth in Jombang Regency and Y_{Jatim} represents economic growth in East Java Province.

The model demonstrates that the economic trajectory of Jombang Regency is strongly influenced by broader regional economic dynamics. Consequently, national and provincial economic performance serve as important external drivers of local economic growth.

Based on these relationships, two economic growth scenarios are constructed: moderate and optimistic scenarios. The moderate scenario assumes relatively stable economic conditions with

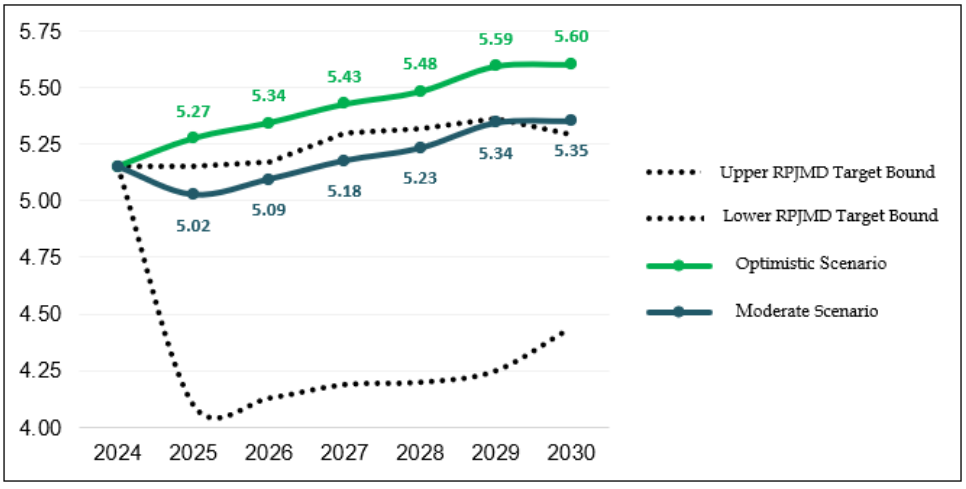
moderate external pressures, while the optimistic scenario reflects stronger economic recovery and higher investment inflows. The projection results are presented in Figure 3.

Figure 2. Relationship between Jombang Economic Growth and East Java Economic Growth



Source: Author's analysis (2025)

Figure 3. Economic Growth Projection of Jombang Regency (2025–2030)



Source: Author's analysis (2025)

The projection indicates that economic growth in Jombang is expected to remain relatively stable over the projection period. In 2024, economic growth was recorded at 5.22 percent. Under the moderate scenario, growth is projected to decline slightly to 5.02 percent in 2025 before gradually increasing to 5.35 percent by 2030. Meanwhile, the optimistic scenario predicts stronger recovery, with growth increasing from 5.27 percent in 2025 to 5.60 percent by 2030.

The gap between the two scenarios highlights the importance of policy interventions that enhance the productive capacity of human capital. If improvements in human development indicators can be effectively integrated with labor market expansion and regional economic development strategies, the

optimistic scenario may be achievable, enabling economic growth to generate broader welfare improvements.

Relationship between Education Expenditure and Poverty

The empirical analysis reveals a moderate to strong relationship between education expenditure per capita and poverty levels in Jombang Regency. The estimated model yields a coefficient of determination of $R^2 = 0.5542$, indicating that approximately 55 percent of the variation in poverty levels can be explained by changes in education spending during the period 2010–2024.

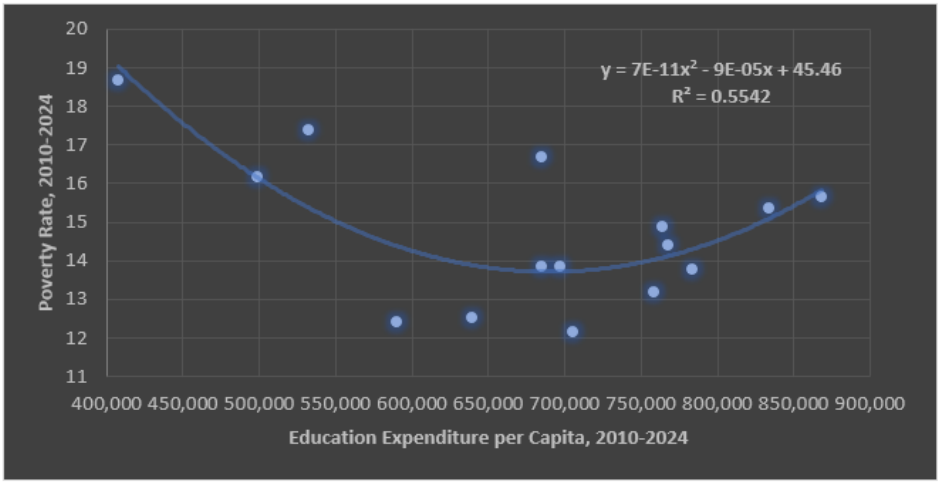
The relationship between education expenditure and poverty is represented by the following quadratic equation:

$$y = 7E^{-11}x^2 - 9E^{-05}x + 45.46$$

The positive quadratic coefficient indicates that the relationship follows a U-shaped curve pattern. At lower levels of education expenditure, increases in spending are associated with reductions in poverty levels. However, beyond a certain threshold, further increases in education spending appear to be associated with rising poverty levels.

This nonlinear pattern suggests that increasing education expenditure alone does not automatically guarantee improvements in welfare outcomes. The effectiveness of education spending depends largely on how well educational outcomes align with labor market opportunities and economic productivity. The relationship between education expenditure and poverty levels is illustrated in Figure 4.

Figure 4. Correlation between Education Expenditure per Capita and Poverty Rate in Jombang Regency



Source: Author's analysis (2025)

Relationship between Health Expenditure and Poverty

The analysis shows that health expenditure exhibits a very strong relationship with poverty levels, with a coefficient of determination of $R^2 = 0.8372$. This result indicates that approximately 84 percent of the variation in poverty levels can be explained by changes in health expenditure.

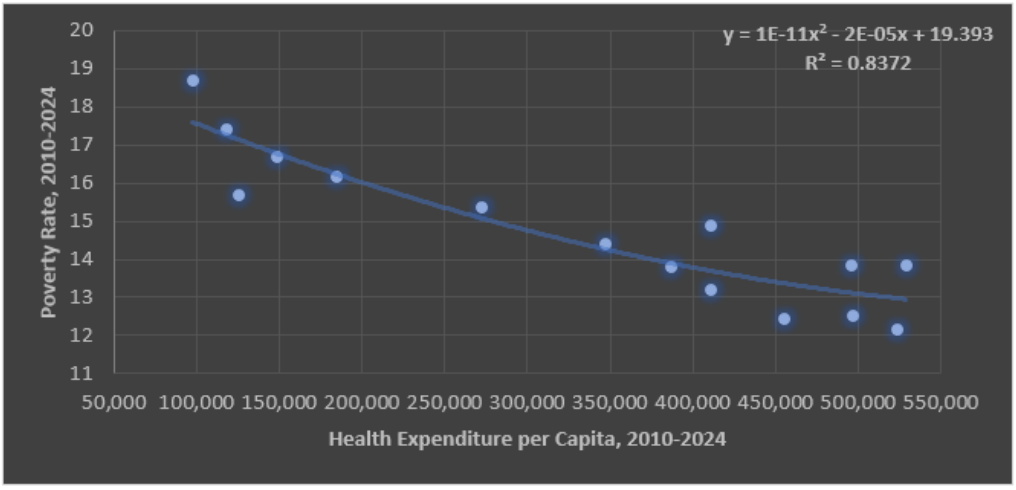
The mathematical relationship between health expenditure and poverty is expressed by the following quadratic equation:

$$y = 1E^{-11}x^2 - 2E^{-05}x + 19.393$$

The negative linear coefficient suggests that increasing health expenditure tends to reduce poverty levels. Compared with education expenditure, the relationship between health spending and poverty appears more stable and closer to a linear pattern.

This finding highlights the significant role of health investment in improving welfare outcomes. Improved health conditions enhance labor productivity and reduce the economic burden associated with medical expenses, thereby strengthening the economic resilience of households. The empirical relationship is illustrated in Figure 5.

Figure 5. Correlation between Health Expenditure per Capita and Poverty Rate in Jombang Regency



Source: Author's analysis (2025)

Relationship between Wages and Household Consumption

The empirical results demonstrate a very strong relationship between wages and household food consumption, with a coefficient of determination of $R^2 = 0.9439$. This indicates that nearly 94 percent of the variation in food consumption can be explained by changes in wage levels.

The quadratic relationship between wages and food consumption is expressed as:

$$y = 0.1506x^2 + 0.0533x - 0.0707$$

The positive quadratic coefficient suggests a nonlinear increasing relationship, meaning that increases in wages lead to disproportionately larger increases in food consumption once household income surpasses a certain threshold. The positive linear coefficient further confirms that even modest increases in wages positively influence consumption patterns. The empirical relationship is illustrated in Figure 6.

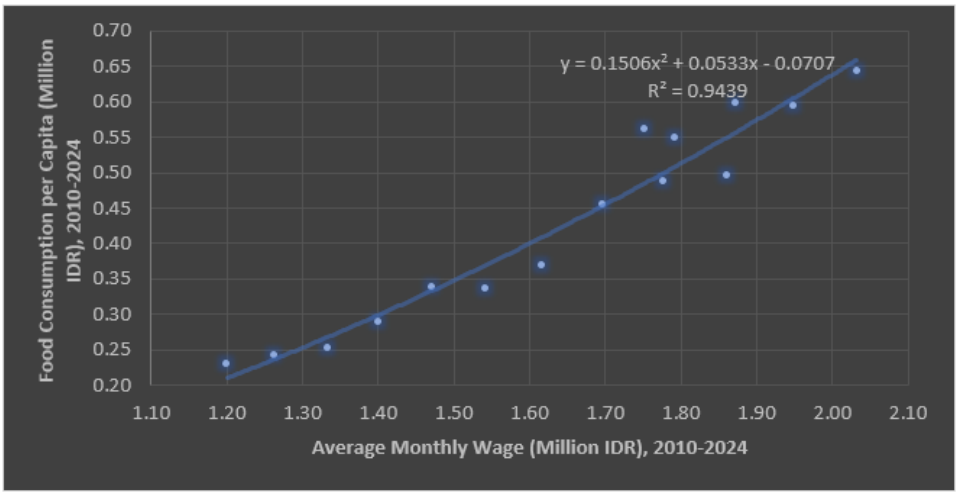
Relationship between Population Growth and Consumption

The analysis also identifies a strong relationship between population size and aggregate food consumption, with a coefficient of determination of $R^2 = 0.9516$. This suggests that approximately 95 percent of the variation in consumption levels can be explained by demographic changes.

The relationship between population size and food consumption is represented by the following quadratic equation:

$$y = -17.141x^2 + 46.585x - 31.045$$

Figure 6. Impact of Wages on Food Consumption in Jombang Regency

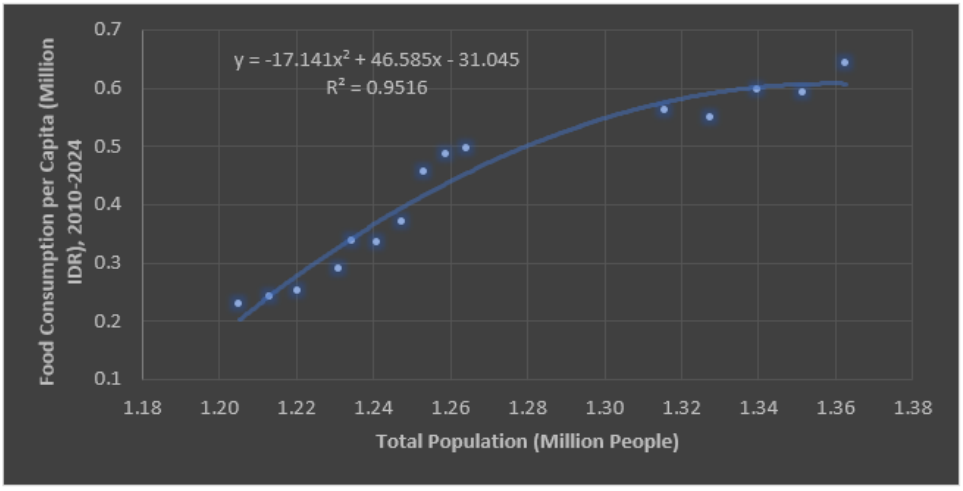


Source: Author's analysis (2025)

The negative quadratic coefficient indicates the presence of a diminishing marginal effect. Initially, increases in population lead to substantial increases in food consumption. However, beyond a certain threshold, the growth of consumption slows as population increases further.

This pattern reflects structural constraints in income distribution and resource availability, where additional population growth may not translate into proportional increases in consumption due to limitations in purchasing power. The relationship is illustrated in Figure 7.

Figure 7. Impact of Population Growth on Food Consumption in Jombang Regency



Source: Author's analysis (2025)

5. Discussion

The empirical findings of this study provide a comprehensive understanding of the structural relationship between human development and inclusive welfare at the regional level. Overall, the results indicate that improvements in human development, as reflected in HDI-related indicators, are necessary but not sufficient conditions for achieving inclusive economic welfare. This suggests the presence of a structural gap in the transmission mechanism linking human capability formation to economic participation.

The strong negative relationship between health expenditure and poverty ($R^2 = 0.8372$) confirms the fundamental role of health as a core component of human capability. This finding is consistent with the human development paradigm, which emphasizes that improved health conditions enhance labor productivity and reduce vulnerability to economic shocks (UNDP, 1990; Todaro & Smith, 2015). Health investment not only increases life expectancy but also acts as an economic stabilizer by reducing the financial burden associated with medical expenses. In this context, health expenditure functions as both a social protection mechanism and a productivity-enhancing investment, reinforcing its central role in inclusive development strategies.

In contrast, the relationship between education expenditure and poverty ($R^2 = 0.5542$) reveals a more complex dynamic. The quadratic specification:

$$y = 7E^{-11}x^2 - 9E^{-05}x + 45.46$$

indicates a nonlinear U-shaped relationship, suggesting that while initial increases in education spending contribute to poverty reduction, further increases may not yield proportional welfare improvements. This finding highlights potential inefficiencies in the allocation of educational resources and suggests a disconnect between educational outcomes and labor market absorption. As noted by Anand & Sen (2000), human capital development must be complemented by economic structures capable of absorbing skilled labor; otherwise, improvements in education may lead to underemployment or mismatches in the labor market.

The analysis of wage dynamics further reinforces the importance of income distribution in shaping welfare outcomes. The strong relationship between wages and food consumption ($R^2 = 0.9439$), as represented by the quadratic equation:

$$y = 0.1506x^2 + 0.0533x - 0.0707$$

demonstrates that increases in wages have a disproportionately positive effect on household consumption. This finding aligns with Keynesian theory, particularly the concept of the marginal propensity to consume, which posits that income increases lead to higher consumption levels. In the context of regional development, this implies that wage policies play a critical role in driving aggregate demand and improving living standards. Without adequate income growth, improvements in human development may fail to translate into tangible welfare gains.

Furthermore, the relationship between population growth and consumption ($R^2 = 0.9516$) reflects the presence of diminishing marginal effects, as indicated by the equation:

$$y = -17.141x^2 + 46.585x - 31.045$$

This finding suggests that while population growth initially contributes to increased aggregate consumption, its marginal impact declines over time. This pattern is consistent with the concept of diminishing returns, where additional increases in population do not necessarily lead to proportional increases in welfare due to constraints in income distribution and resource availability. In the absence of productivity improvements, population growth may exert pressure on economic systems and reduce overall welfare outcomes.

Taken together, these findings highlight a critical structural issue in regional development: the lack of integration between human development policies and economic systems. While Jombang Regency has demonstrated consistent improvements in HDI, these achievements have not been fully translated into inclusive welfare outcomes. This condition reflects a broader development paradox, where improvements in human development indicators coexist with persistent poverty and inequality (Acemoglu & Robinson, 2012).

From a theoretical perspective, the results reinforce the relevance of the Capability Approach, which emphasizes that development should focus on expanding individuals' abilities to participate in economic and social activities. However, the findings also suggest that capability expansion alone is insufficient without complementary economic structures that enable individuals to utilize their capabilities productively. In this regard, inclusive development requires not only investments in human capital but also the creation of economic opportunities that ensure equitable participation.

Moreover, the results underscore the importance of integrating macroeconomic dynamics with human development strategies. The economic growth projections indicate that regional economic performance is strongly influenced by national and provincial economic conditions. This interdependence suggests that local development strategies must account for external economic factors while simultaneously strengthening internal economic capacity. Without such integration, improvements in human development may remain disconnected from broader economic outcomes.

In summary, the discussion reveals that achieving inclusive welfare requires a holistic development approach that connects human development, labor market dynamics, income distribution, and demographic factors. The absence of such integration may lead to suboptimal outcomes, where improvements in human development indicators fail to generate meaningful improvements in welfare. Therefore, regional development policies must move beyond sectoral approaches and adopt a more integrated framework that aligns human development with economic transformation.

Policy Implications and Recommendations

The empirical findings of this study suggest the need for a fundamental shift in regional development strategies, particularly in aligning human development policies with economic structures that support inclusive growth. The nonlinear relationship between education expenditure and poverty indicates that increasing educational spending alone is insufficient to generate welfare improvements. This implies that policy interventions must move beyond budget expansion toward enhancing the effectiveness of education systems. In particular, strengthening vocational and technical education, aligning educational curricula with regional industrial needs, and fostering partnerships between educational institutions and the private sector are essential to ensure that human capital formation translates into productive economic participation.

At the same time, the strong negative relationship between health expenditure and poverty reduction highlights the critical role of health systems as a foundation for economic resilience. Health policies should prioritize preventive and primary healthcare services, expand access to affordable healthcare, and reduce out-of-pocket medical expenses. Such measures not only improve individual well-being but also enhance labor productivity and protect vulnerable households from falling into poverty due to health-related financial shocks.

Furthermore, the strong association between wages and household consumption underscores the importance of income dynamics in shaping welfare outcomes. Wage policies must therefore be designed to maintain and improve real income levels through fair wage standards, improved labor market conditions, and price stabilization of essential goods, particularly food. Ensuring stable purchasing

power is crucial for sustaining household welfare while simultaneously stimulating local economic activity.

In addition, the diminishing marginal effect of population growth on consumption indicates that demographic expansion must be accompanied by improvements in productivity. Without such improvements, population growth may place increasing pressure on economic resources. Policy responses should therefore focus on enhancing workforce skills, promoting labor-intensive sectors, and supporting small and medium enterprises (SMEs) as key drivers of employment and income generation. Through these measures, population growth can be transformed into a demographic dividend rather than an economic burden.

A broader implication of this study is the necessity of integrating human development indicators into regional economic policy frameworks. Human development should not be treated solely as a social outcome but rather as a strategic input for economic growth. This requires aligning public expenditure in education and health with broader economic development strategies, incorporating HDI indicators into regional planning processes, and strengthening cross-sectoral coordination among government institutions. Such integration ensures that improvements in human development contribute directly to inclusive and sustainable economic outcomes.

Finally, consistent with the Capability Approach, regional development policies should transition from a sectoral spending orientation toward a capability-based development framework. This approach emphasizes expanding individuals' capacities to participate in economic activities, linking human capital development with productive sectors, and ensuring equitable access to economic opportunities. By adopting this framework, regional governments can create a more inclusive development process in which human development achievements are effectively transformed into broad-based and sustainable welfare improvements.

6. Conclusion

This study examines the relationship between human development achievements and inclusive welfare outcomes in Jombang Regency by integrating economic growth projections, public expenditure analysis, wage dynamics, and demographic factors. The findings reveal that improvements in human development indicators, as reflected in rising HDI performance, do not automatically translate into inclusive and equitable welfare outcomes.

Empirically, the results demonstrate that health expenditure has a strong and consistent negative association with poverty, indicating its critical role as a foundation for economic resilience and productivity. In contrast, education expenditure exhibits a nonlinear (U-shaped) relationship with poverty, suggesting that increased spending alone is insufficient without effective alignment between educational outcomes and labor market absorption. Furthermore, wage dynamics are shown to be a dominant determinant of household consumption, highlighting the importance of income distribution in improving living standards. At the same time, population growth exhibits a diminishing marginal effect on consumption, indicating that demographic expansion without corresponding income growth may constrain welfare improvements.

These findings underscore the presence of a structural disconnect between human development and economic welfare, where improvements in human capabilities are not fully translated into productive economic participation. This condition suggests that human development should not be treated solely as a social outcome but must be integrated into broader economic development strategies.

From a policy perspective, this study highlights the need for a paradigm shift toward an integrated development framework that connects human capital formation with labor market dynamics and regional economic structures. Aligning education and health investments with productive sectors,

strengthening wage policies, and enhancing labor absorption capacity are essential to ensure that human development contributes to inclusive and sustainable welfare outcomes.

In conclusion, achieving inclusive development requires not only improving human development indicators but also ensuring that these improvements are effectively linked to economic opportunities. Without such integration, the potential of human development to drive welfare improvements will remain underutilized, limiting its contribution to long-term economic sustainability.

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