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Analysis of economic and social factors affecting the Human Development Index (HDI) in Central Java

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Abstract

Purpose – *This study aims to analyze the influence of economic and social factors on the Human Development Index (HDI) in districts and cities of Central Java Province during the period 2014–2023.*

Methods – *The study employs a panel data regression approach to analyze variables including GRDP per capita, school participation rates at various education levels, the number of people living in poverty, and the number of healthcare facilities.*

Findings – *The results indicate that GRDP per capita and the number of health facilities have a positive and significant impact on HDI, while poverty has a negative and significant effect. School enrollment at the primary and secondary levels shows mixed results, with senior high school enrollment positively contributing to HDI.*

Implication – *The findings highlight the need for regional policymakers to focus on poverty alleviation, economic productivity, and the expansion of healthcare infrastructure to enhance human development outcomes.*

Originality – *This research provides a recent and comprehensive analysis of HDI determinants at the sub-provincial level in Central Java using a panel data approach, incorporating school enrollment by level to capture nuanced educational effects often overlooked in previous studies.*

Abstrak

Tujuan – Penelitian ini bertujuan untuk menganalisis pengaruh faktor ekonomi dan sosial terhadap Indeks Pembangunan Manusia (IPM) di kabupaten/kota Provinsi Jawa Tengah pada periode 2014–2023.

Metode – Penelitian menggunakan pendekatan regresi data panel untuk menganalisis variabel yang meliputi PDRB per kapita, angka partisipasi sekolah pada berbagai jenjang pendidikan, jumlah penduduk miskin, dan jumlah fasilitas kesehatan.

Temuan – Hasil penelitian menunjukkan bahwa PDRB per kapita dan jumlah fasilitas kesehatan berpengaruh positif dan signifikan terhadap IPM, sedangkan tingkat kemiskinan berpengaruh negatif dan signifikan. Pengaruh angka partisipasi sekolah bervariasi; pada jenjang SMA berpengaruh positif signifikan, sedangkan jenjang lainnya menunjukkan hasil yang tidak konsisten.

Implikasi – Temuan ini mengindikasikan pentingnya peran kebijakan daerah dalam mengurangi kemiskinan, meningkatkan produktivitas ekonomi, dan memperluas infrastruktur layanan kesehatan untuk mendorong peningkatan pembangunan manusia.

Orisinalitas – Penelitian ini menyajikan analisis terkini dan komprehensif mengenai determinan IPM di tingkat kabupaten/kota di Provinsi Jawa Tengah dengan pendekatan data panel, serta memperhatikan pengaruh angka partisipasi sekolah berdasarkan jenjang pendidikan yang sering kali luput dalam kajian sebelumnya.

Introduction

National development and human development are two closely interrelated concepts that serve as the foundation for achieving sustainable social welfare. National development encompasses systematic efforts to improve the quality of life of the community through various sectors, including economic, social, political, and infrastructure (Todaro & Smith, 2020). Meanwhile, human development emphasizes improving the quality of life for individuals by providing access to basic services such as education, health, and a decent standard of living (UNDP, 2023). These two concepts are reciprocal: high-quality human development will strengthen the foundation of national development, and conversely, progressive national development will accelerate improvements in human quality.

One indicator commonly used to measure the quality of human development is the Human Development Index (HDI), developed by the United Nations Development Programme (UNDP). The HDI encompasses three main dimensions: a long and healthy life (measured by life expectancy), knowledge (measured by average years of schooling and expected years of schooling), and a decent standard of living (measured by expenditure or per capita income) (UNDP, 2023; BPS, 2023). Although Indonesia's national and regional HDI has shown an upward trend over the past few years, disparities persist between regions. Central Java Province, for example, saw its HDI increase from 68.78 in 2014 to 73.39 in 2023 (BPS Central Java, 2023). However, this achievement remains below other provinces on the island of Java, such as Jakarta (82.46) and Yogyakarta (81.07), which are already categorized as very high HDI (BPS, 2025). This indicates room for improvement in human development in Central Java, particularly from an economic and social perspective. From a development perspective, social and economic inequalities, such as poverty, low educational participation, and limited access to healthcare facilities, contribute to the low quality of human resources (Khasanah, 2020; Laode et al., 2020). Poverty, for example, limits an individual's ability to meet basic needs, directly impacting health and education, which in turn leads to low productivity and development backwardness (Sen, 1999).

Initial research by Muliza et al. (2017) provided an essential foundation for understanding the factors influencing the Human Development Index (HDI). This study examined the influence of government spending in the health and education sectors, poverty levels, and GRDP on the HDI in Aceh Province. This study used panel data regression analysis, which showed that although government spending in the education and health sectors did not significantly influence the HDI, GRDP had a positive and significant effect. In contrast, poverty had a negative and significant impact. These findings formed the basis for further research linking economic factors to the HDI. Building on the previous study, Arniwita et al. (2020) added a new perspective by including the number of medical personnel, the number of basic health facilities, the number of poor people, and the number of elementary school teachers as factors influencing the HDI in Jambi Province. Using panel data regression and Pearson correlation, this analysis strengthened previous findings by showing that GRDP per capita, medical personnel, and health facilities contributed to the increase in the HDI, while poverty remained a negative factor.

Another study by Maharda & Aulia (2020) expanded the scope by examining the effect of government spending on the Human Development Index (HDI) in 12 provinces with the lowest HDI levels using a fixed-effect model. They found that government spending in the education sector contributed significantly to the HDI, while the health sector showed no significant impact. These results suggest that differences in the effect of policies in the education and health sectors can influence levels of human development across regions. Furthermore, Handayani & Woyanti (2021) examined the economic factors by analyzing the impact of GRDP, poverty, unemployment, and capital expenditure on the HDI in Central Java Province using a panel data regression with a fixed-effect model (FEM). They found that poverty remained a negative factor, while

unemployment and capital expenditure had a positive effect on the HDI. These results reinforce previous studies on the importance of economic improvement and capital expenditure policies in enhancing human development.

Consistent with previous research, Fadillah & Setiartiti (2021) examined the factors influencing the HDI in the Special Region of Yogyakarta using a panel data approach. This study used a panel data regression analysis method with a Fixed Effect Model (FEM) approach, which found that GRDP and government spending in the health sector had a positive and significant influence on the HDI, in line with previous findings. Narrowing the focus, research by Saputro (2022) specifically analyzed the effect of poverty on the HDI in North Bengkulu Regency, further confirming that poverty has a significant negative impact on the HDI, supporting previous research suggesting that poverty alleviation policies are essential to improving the HDI. Meanwhile, Maulana et al. (2022) examined the relationship between GRDP, the unemployment rate, and the number of poor people on the HDI in Banten Province, concluding that simultaneously, all three variables influence the HDI. However, the unemployment rate and the number of poor people have a partially insignificant positive effect. These results demonstrate the complexity of the relationship between the economy and human development, which can vary from region to region. Further research, Aprilia & Cerya (2023) examined the effect of School Participation Rate and poverty rate on HDI in West Sumatra which found that School Participation Rate had a positive effect on HDI, while poverty still had a significant negative effect so that this finding confirms that education is one of the crucial factors in human development and poverty reduction. Strengthening previous research, Williyan & Hasmarini (2024) analyzed the effect of GRDP per capita, the number of poor people, and investment on HDI in 10 districts/cities in East Kalimantan Province with the Fixed Effect Model (FEM) which showed that partially, the variables GRDP per capita, Domestic Investment (PMDN), and the number of poor people have a positive effect on HDI. As the latest study in this series, Hidayat & Perwithosuci (2024) examined the relationship between GRDP per capita, minimum wages, labor absorption, and the number of poor people and the Human Development Index (HDI) in West Java Province using panel data regression. The Fixed Effect Model (FEM) was chosen, indicating that GRDP per capita, labor absorption, and the minimum wage had a positive effect on the HDI. However, labor absorption and the number of poor people did not have a positive effect on the HDI.

Therefore, this study aims to analyze the influence of several economic and social determinants on the Human Development Index (HDI) in Central Java Province, such as Gross Regional Domestic Product (GRDP) per capita, school enrollment rates, the number of poor people, and the number of health facilities. The results of this study are expected to contribute to the formulation of evidence-based human development policies, particularly in regions lagging in HDI achievement.

Research Methods

This study uses a quantitative method with secondary data obtained from the Central Statistics Agency (BPS). The data used is panel data, which is a combination of cross-sectional data and time series data. In this study, the panel data analyzed covers the period 2014-2023 for 35 regencies/cities in Central Java Province. The purpose of this study is to investigate the influence of GRDP per capita, school enrollment rates, poverty rates, and health facilities on the Human Development Index (HDI) in Central Java. The variables representing this study are shown in the variable operationalization shown in Table 1.

The following equation represents the basic model based on theory and previous research:

$$HDI_{it} = f(RGDP_{it}, SPRE_{it}, SPRJ_{it}, SPRS_{it}, POV_{it}, HF_{it}) \quad (1)$$

To estimate the model using panel data, the functional form is specified in a linear panel data regression model as follows:

$$HDI_{it} = \beta_0 + \beta_1 RGDP_{it} + \beta_2 SPRE_{it} + \beta_3 SPRJ_{it} + \beta_4 SPRS_{it} + \beta_5 POV_{it} + \beta_6 HF_{it} + \varepsilon_i + \mu_{it} \quad (2)$$

In the equation, HDI_{it} is the Human Development Index in the region, $RGDP_{it}$ indicates Gross Regional Domestic Product per capita, $SPRE_{it}, SPRJ_{it},$ and $SPRS_{it}$ represents the school

enrollment rates at the elementary, junior high, and senior high school levels at i in year t, respectively. Furthermore, POV_{it} is the poverty rate, while HF_{it} refers to the availability of health facilities (e.g., the number of community health centers) i in year t. The coefficient β_0 is the general intercept, while $\beta_0 - \beta_6$ indicates the influence of each independent variable on HDI. The ε_i component represents the fixed effect specific to each district/city that captures the unique but persistent characteristics of each region that are not directly observed in the model. μ_{it} is an error term that varies with time and region.

Table 1. Operational Definition of Variables

Variable	Symbol	Unit	Definition
Dependent			
Human Development Index	HDI	Index	Composite indicator used to measure the quality of human development through three main dimensions, namely health, education, and a decent standard of living.
Independent			
Regional Gross Domestic Product per Capita	RGDP	Rupiah	The total value of goods and services produced in a region for one year, divided by the population in that region.
School Participation Rate Elementary School	SPRE	Percent	The percentage of the population in the elementary school age group currently attending school compared to the total population in the elementary school age group.
School Participation Rate Junior High School	SPRJ	Percent	The percentage of the population in the junior high school age group currently attending school compared to the total population in the junior high school age group.
School Participation Rate Senior High School	SPRS	Percent	The percentage of the population in the high school age group currently attending school compared to the total population in the high school age group.
Poverty	Pov	People	A condition in which individuals or groups are unable to meet their basic living needs, both in terms of food and non-food consumption. In this study, poverty is measured based on the number of people living below the poverty line in each district/city.
Health Facility	HF	Number	The number of health service facilities, such as hospitals, community health centers, and clinics available in an area.

The analysis begins with modeling using three main approaches: the Common Effects Model (CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). To determine the most appropriate model, three stages of testing were conducted. First, the Chow test was used to compare the CEM with the FEM. Second, the Lagrange Multiplier (LM) test was used to select between the CEM and the REM. Third, if the FEM and REM competed as the best candidates, the Hausman test was performed to choose between the two. The results of this series of tests indicated that the Fixed Effects model was the most appropriate model because it could accommodate individual fixed effects from each district/city that cannot be directly observed but influence the Human Development Index (HDI).

Results and Discussion

The initial analysis was conducted to provide an initial overview of the condition of the data. The descriptive study was conducted by performing a fundamental analysis of the conditions of each variable. Table 2 shows that the Human Development Index (HDI) has a minimum value of 62.35 and a maximum value of 84.99, with an average value of 71.83 at a standard deviation of 4.66. The GRDP per capita value ranges from a minimum of 10.82 million rupiah to a maximum of 95.5 million rupiah, with an average of 27.737 million rupiah and a standard deviation of 17.863 million rupiah. The Elementary School Participation Rate value has a minimum value of 97.36% and a maximum value of 100 with an average value of 99.63% at a standard deviation of 0.38%, then the School Participation Rate at Junior High School has a minimum value of 86.4% and a maximum value of 100% with an average value of 96.17% at a standard deviation of 2.61%. Furthermore, the School Participation Rate of high schools has a minimum value of 43.66% and a maximum value

of 91.39% with an average value of 70.81% at a standard deviation of 9.23%. The poverty condition has a minimum value of 7.45 thousand people and a maximum value of 355.1 thousand people, with an average value of 118.430 thousand people at a standard deviation of 68.129 thousand people. The condition of health facilities, represented by the number of Community Health Centers, ranges from a minimum of 2 units to a maximum of 40 units, with an average of 24.197 units and a standard deviation of 9.078 units.

Table 2. Descriptive Statistics

Variable	Mean	Min.	Max	Std. Dev.
Human Development Index	71.837	62.35	84.99	4.661
Regional Gross Domestic Product per Capita	27.737	10.82	95.5	17.863
School Participation Rate (Elementary School)	99.638	97.36	100	0.386
School Participation Rate (Junior High School)	96.170	86.4	100	2.610
School Participation Rate (Senior High School)	70.812	43.66	91.39	9.231
Poverty	118.430	7.45	355.1	68.129
Health Facility	24.197	2	40	9.078
Observation	350	350	350	350

The primary analysis in this study was conducted by estimating the determinant models of the HDI. This was done step by step, with each model estimated and then the best model selected. Initial model estimation results for the overall model are shown in Table 3, which shows the results for the Common Effect, Random Effect, and Fixed Effect models.

Table 3. Estimation Results for the Overall Model

Variable	CEM		FEM		REM	
	Coef.	Prob.	Coef.	Prob	Coef.	Prob.
Constant	79.111	0.015	91.113	0.000	84.816	0.000
Regional Gross Domestic Product per Capita	0.116	0.000	0.215	0.000	0.186	0.000
School Participation Rate (Elementary School)	-0.443	0.170	-0.305	0.008	-0.270	0.023
School Participation Rate (Junior High School)	0.269	0.000	0.045	0.093	0.065	0.020
School Participation Rate (Senior High School)	0.139	0.000	0.073	0.000	0.076	0.000
Poverty	-0.020	0.000	-0.053	0.000	-0.045	0.000
Health Facility	0.009	0.634	0.079	0.000	0.102	0.000
R-Squared	0.760		0.692		0.700	
F-Statistic	180.76		174.55		1010.06	
Prob. F-stat	0.000		0.000		0.000	
Observation	350		350		350	

Based on the model above, a model testing process was conducted to identify the best model to serve as the basis for the analysis. This testing process involved the Chow test, which was used to compare CEM with FEM. Then, the Lagrange Multiplier (LM) test was used to select between CEM and REM. Finally, if FEM and REM competed as the best candidates, a Hausman test was performed to choose between the two. The results of this series of tests indicated that the Fixed Effects model was the most appropriate model.

Table 4. Panel Data Model Selection Test Results

Chow Test			
Stat. Test	Nilai F	df	Prob.
Uji Chow	84.06	(34, 309)	0.0000
LM Test			
Effect Test	Statistic	df	Prob.
Cross-Section Chi-square	963.64	(01)	0.0000
Hausman Test			
Effect Test	Statistic	df	Prob.
Cross-Section Chi-square	23.25	(6)	0.0007

The selection of panel data models is carried out through three stages of testing, namely the Chow test, the Lagrange Multiplier (LM) test, and the Hausman test. The Chow test is used to determine the best model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The test results show that the cross-section probability value F of 0.0000 is smaller than the significance level of $\alpha = 0.05$, so H_0 is rejected and FEM is selected as a more appropriate model than CEM. Next, the Lagrange Multiplier (LM) test is conducted to compare the Common Effect Model and the Random Effect Model (REM). The test results show a Breusch-Pagan probability value of $0.0000 < \alpha = 0.05$, which means H_0 is rejected and REM is selected as a more appropriate model than CEM. Finally, the Hausman test is used to determine the best model between FEM and REM. The test results show a probability value of 0.0007, which is also smaller than $\alpha = 0.05$. Thus, H_0 is rejected, and the Fixed Effect Model (FEM) is determined to be the most appropriate model for use in this study.

Table 5. Fixed Effect Model Results

Variable	*Coefficients*	*Std. Error*	*t- Statistic*	Probability
Constant	91.113	11.583	7.87	0.000
Regional Gross Domestic Product per Capita	0.215	0.014	15.12	0.000
School Participation Rate (Elementary School)	-0.305	0.113	-2.69	0.008
School Participation Rate (Junior High School)	0.045	0.027	1.69	0.093
School Participation Rate (Senior High School)	0.073	0.010	7.37	0.000
Poverty	-0.053	0.004	-13.13	0.000
Health Facility	0.079	0.015	5.41	0.000
R-Squared		0.692		
F-Statistic		174.55		
Prob. F-stat		0.000		
Observation		350		

This study uses a panel data regression model with a Fixed Effects Model (FEM) approach to examine the influence of economic and social variables on the Human Development Index (HDI) in regencies/cities in Central Java Province during the period 2014–2023. Estimations were conducted on six independent variables: GRDP per capita, School Participation Rate at elementary, junior high, and senior high schools, the number of poor people, and the number of health facilities. The results indicate a significant effect of most variables on the HDI, both positive and negative.

The estimation results indicate that GRDP per capita has a probability value of 0.000, less than the 5% significance level ($\alpha = 0.05$), thus statistically significant. A coefficient of 0.215 indicates that a one-million rupiah increase in GRDP per capita will increase the HDI by 0.215 percent. Theoretically, this result supports the human development approach to economic development. According to Todaro and Smith (2020), an increase in per capita income not only reflects economic growth but also has the potential to expand public access to basic needs such as education and health, which are key indicators of the Human Development Index (HDI). This research aligns with Muliza et al. (2017), who found that GRDP has a positive and significant relationship with the HDI in other provinces in Indonesia. An increase in GRDP per capita drives growth in people's purchasing power and household consumption, thereby contributing to improvements in quality of life, education, and life expectancy.

The School Participation Rate (SPR) for elementary shows a probability value of $0.008 < 0.05$, making it statistically significant. However, the coefficient is -0.305, meaning that an increase in Elementary School Participation Rate is associated with a 0.305 percent decrease in the HDI. This result contradicts the initial hypothesis and requires contextual analysis. During the 2019–2021 period, there was a gradual decline in the SPR for elementary in Central Java, from 99.77% to 99.66%, indicating a phenomenon of school dropouts or delayed entry into elementary school. UNICEF (2021) reported that before the pandemic, approximately 4.3 million children in Indonesia were out of school due to family economic burdens. The COVID-19 pandemic exacerbated this situation, particularly in poor and rural areas, where access to online learning was severely limited due to limited infrastructure and digital devices. Statistics Indonesia (BPS) Central

Java (2023) showed that the SPR for elementary was higher in urban areas than in rural areas. This reflects the gap in access to basic education. Therefore, although the SPR for elementary schools has statistically increased, its actual impact on the quality of human development is not linear, especially if improvements in the quality of basic education do not accompany the increase.

The SPR for junior high schools has a probability value of 0.093 > 0.05, making it insignificant on the Human Development Index (HDI), although its coefficient is positive at 0.045. This means that, in terms of the direction of the relationship, junior high school participation can increase the Human Development Index (HDI). Still, it is not statistically strong enough in this model. This insignificance is likely due to multiple factors, including educational quality, teacher distribution, and the unequal availability of junior high school education facilities. Nurmalasari et al. (2017) found that participation at higher levels of education, such as senior high school (SMA/MA), has a more significant contribution to the HDI than junior high school, as it provides greater opportunities for improving individual capabilities and access to the workforce.

The SPR for Senior High Percentage variable shows a probability of 0.000 < 0.05, indicating a significant effect on the HDI. The coefficient of 0.073 indicates that a 1 percent increase in the School Participation Rate in Senior High School will increase the HDI by 0.073 percent. These results support the view that senior high school education plays a crucial role in enhancing human resource competitiveness. Education at this level is considered a key asset in human development, as it improves skills, productivity, and social mobility. Research by Nastiti & Nailufar (2023) shows that the SPR for high school consistently has a positive impact on the Human Development Index (HDI) in various regions, primarily because individuals begin to realize the importance of education for their future at the age of 16–18.

The number of poor people variable shows a probability value of 0.000 < 0.05 and a coefficient of -0.053, meaning that a 1,000-person increase in the number of poor people will reduce the HDI by 0.053 percent. This finding aligns with Amartya Sen's theory of human development, which defines poverty not only as a lack of income but also as an individual's inability to achieve basic life functions, such as access to education, healthcare, and meaningful participation in social and economic life. According to Sen (1985; 1999), a capability-oriented development approach emphasizes the importance of expanding the fundamental freedoms everyone must live a life they value. Poverty restricts access to these two sectors, ultimately impacting the HDI. Handayani & Woyanti (2021) also found that increasing poverty rates have a significant negative impact on the HDI, primarily due to their influence on reducing nutritional quality and health and encouraging school dropouts.

The variable for the number of health facilities shows a probability value of 0.000 < 0.05 and a positive coefficient of 0.079. This means that adding one health facility (e.g., a community health center or clinic) will increase the HDI by 0.079 percent. Increasing health facilities contributes to the life expectancy indicator in the HDI. Research by Arniwita et al. (2020) emphasized that an adequate and evenly distributed number of community health centers increases community access to primary health services, such as immunization, prenatal care, and the prevention and treatment of infectious diseases. Wider access to health services directly impacts life expectancy and the community's quality of life.

From all estimation results, it can be concluded that the variables GRDP per capita, the School Participation Rate at the senior high school level, the number of health facilities, and the number of poor people have a significant effect on the HDI in Central Java Province. Meanwhile, the School Participation Rate at elementary schools shows a significant but opposite effect, and the School Participation Rate at junior high schools is insignificant in the model. These findings indicate that improving the HDI requires not only an expansion of the quantity of basic services but also attention to aspects of quality, equity, and the socio-economic context in each region.

In panel data regression analysis, the cross-section effect refers to differences in time-invariant characteristics between individuals or observed entities—in this case, districts/cities in Central Java Province. This effect is reflected through differences in intercept values between individuals, indicating structural heterogeneity that the independent variables in the model cannot fully explain. By including cross-section effects in the estimation, we can identify and control for

underlying differences between regions that may remain constant throughout the observation period, such as the quality of local institutions, culture, or long-term socio-economic structure.

Table 6. Cross-Section Effect Result

District/City	Effect	District/City	Effect	District/City	Effect
Kabupaten Cilacap	-3.422	Kabupaten Karanganyar	1.843	Kabupaten Batang	-3.577
Kabupaten Banyumas	6.897	Kabupaten Sragen	0.688	Kabupaten Pekalongan	-0.665
Kabupaten Purbalingga	1.753	Kabupaten Grobogan	4.241	Kabupaten Pemalang	3.054
Kabupaten Banjarnegara	-0.706	Kabupaten Blora	-2.634	Kabupaten Tegal	-1.396
Kabupaten Kebumen	3.602	Kabupaten Rembang	-0.543	Kabupaten Brebes	6.889
Kabupaten Purworejo	0.128	Kabupaten Pati	0.410	Kota Magelang	-3.762
Kabupaten Wonosobo	0.924	Kabupaten Kudus	-11.368	Kota Surakarta	-1.998
Kabupaten Magelang	1.087	Kabupaten Jepara	1.404	Kota Salatiga	0.951
Kabupaten Boyolali	2.058	Kabupaten Demak	3.828	Kota Semarang	-3.448
Kabupaten Klaten	5.221	Kabupaten Semarang	-1.478	Kota Pekalongan	-0.224
Kabupaten Sukoharjo	1.893	Kabupaten Temanggung	-2.877	Kota Tegal	-4.130
Kabupaten Wonogiri	-2.528	Kabupaten Kendal	-2.117		

The Fixed Effect Model (FEM) estimation results revealed significant variations in intercept values across regencies/cities in Central Java, reflecting intrinsic differences that influence the Human Development Index (HDI) levels in each region. One key finding is that Banyumas Regency has the highest intercept value at 6.897, indicating a relatively higher HDI trend after controlling for other economic and social variables in the model. This suggests unique and positive factors underlying human development achievements in this region—such as the quality of public services, the effectiveness of regional governance, or historical investments in education and health—that are not fully captured by the model variables. Conversely, Kudus Regency shows the lowest intercept value at -11.368, indicating a lower HDI trend compared to other regencies/cities. This low intercept value may reflect structural barriers or underdevelopment in fundamental aspects of human development, such as access to health and education services, unequal income distribution, or weak local institutional capacity. The difference in intercept values is critical to note because it shows that human development is not only influenced by economic factors alone, but also by contextual elements inherent in each region.

Conclusion and Implications

Based on the results of panel data regression analysis using the Fixed Effect Model (FEM) approach, this study concludes that several economic and social factors significantly influence the Human Development Index (HDI) in districts/cities in Central Java Province during the period 2014 to 2023. First, Gross Regional Domestic Product (GRDP) per capita is proven to have a positive and significant influence on the HDI, indicating that increasing community income directly drives improvements in the quality of human development. Second, the impact of the School Participation Rate varies by education level. At the elementary school level, the School Participation Rate has a negative and significant effect on the HDI, which likely reflects challenges in the quality of basic education and the impact of social conditions such as the pandemic. Conversely, the School Participation Rate at the high school level has a positive and significant effect, indicating that increasing access to senior secondary education plays an essential role in driving human development.

In contrast, the School Participation Rate at the junior high school level does not show a significant effect. Furthermore, the number of poor people has a negative and significant impact on the HDI, emphasizing that high levels of poverty are a major obstacle to achieving human development. On the other hand, the availability of health facilities, such as the number of community health centers (Puskesmas), showed a positive and significant impact on the Human Development Index (HDI), indicating the critical role of basic health services in improving the quality of life of the community.

Based on these findings, this study recommends that local governments continue to promote inclusive economic growth to increase per capita income. An in-depth evaluation of the

quality of basic education is also necessary to ensure that increased school enrollment truly impacts human development. Efforts to improve access to senior secondary education, especially in areas with low enrollment, also need to be strengthened. Furthermore, poverty alleviation must be a top priority in development policies, with an approach that directly addresses the basic needs of the community. Finally, investment in health facilities and services needs to be continuously increased as a crucial foundation for strengthening the quality of sustainable human development.

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