

Analysis of Factors Affecting the Human Development Index in Regencies/Municipalities of Banten Province in 2020–2024

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Keywords : Human Development Index, Poverty, Population Density, Labor Force Participation Rate, Life Expectancy, Minimum Wage, Environmental Quality.

Abstract: This study aims to analyze the factors affecting the Human Development Index in regencies and municipalities of Banten Province during 2020–2024. The dependent variable in this study is the Human Development Index, while the independent variables include Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index. This study uses secondary data in the form of panel data covering 8 regencies/municipalities in Banten Province during the 2020–2024 period. The analytical method employed is panel data regression, with the Random Effect Model selected as the best model. The results show that, partially, only Life Expectancy has a positive and significant effect on the Human Development Index. Meanwhile, Poverty Rate and Environmental Quality Index have negative but insignificant effects, while Population Density, Labor Force Participation Rate, and District/City Minimum Wage have positive but insignificant effects. Simultaneously, all independent variables affect the Human Development Index. The overall R-squared value of 0.8583 indicates that the independent variables explain 85.83 percent of the variation in the Human Development Index.

Introduction

In the conventional approach, economic development refers to the ability of a national economy which at the initial stage tends to be stagnant for a long period of time to then achieve an increase in gross national income or GNI (gross national income) per year (Todaro, 2006). On the other hand, economic development is also understood as a process that encourages the average income per capita of a country's population to continue to increase sustainably over the long term (Sadono, 2010).

Development is not only measured through an increase in per capita income, but also through changes in the quality of life of society as a whole. According to Sadono (2010), development is a process of increasing average income per capita in a sustainable manner in the long term. However, the human development approach emphasizes that humans must be the main goal of development, not just a tool to achieve economic growth.

According to Amartya Sen as quoted in Kuncoro (2006), human development is related to the individual's ability to achieve things of value in life. One of the main indicators for measuring human development is the Human Development Index (HDI), which reflects three main dimensions, namely education, health and a decent standard of living. HDI was introduced by the United Nations Development Program (UNDP) in 1990 through the Human Development Report as a measure of the success of human development at the national and regional levels.

HDI is a composite index that assesses the level of achievement of human development based on three main dimensions of human quality of life. These three dimensions include aspects of knowledge, long life expectancy accompanied by health, and a decent and dignified standard of living. Apart from that, human development indicators through HDI are very closely related to the Sustainable Development Goals (SDGs), especially the third, fourth and eighth goals. Overall, the SDGs agenda reflects the dimensions that are the foundation for the formation of HDI indicators, namely sustainable economic growth, health and education (Prasetyoningrum & Sukmawati, 2016).

From an Indonesian perspective, the quality of human resources can be reflected through the HDI value which in 2023 will reach 74.39. This figure indicates progress compared to previous periods, placing Indonesia in 112th position out of a total of 191 countries in the world. At the Asian level, Indonesia is ranked 18th, while in the Southeast Asia region it is in 6th place, higher than the Philippines, but still behind Vietnam, Thailand, Malaysia, Brunei Darussalam and Singapore. This position shows that there are still significant opportunities for Indonesia to continue to improve the quality of human development, especially through strengthening the fields of education, health and social welfare.

Banten Province, as a buffer zone for the capital city with massive economic activity and industrialization, faces challenges in the form of disparities in the quality of human resources between districts/cities. This phenomenon is clearly visible from the distribution of HDI data during the 2020-2024 period. Northern regions (such as the Greater Tangerang region) tend to record indicators that are far superior to southern regions (such as Lebak Regency and Pandeglang Regency).

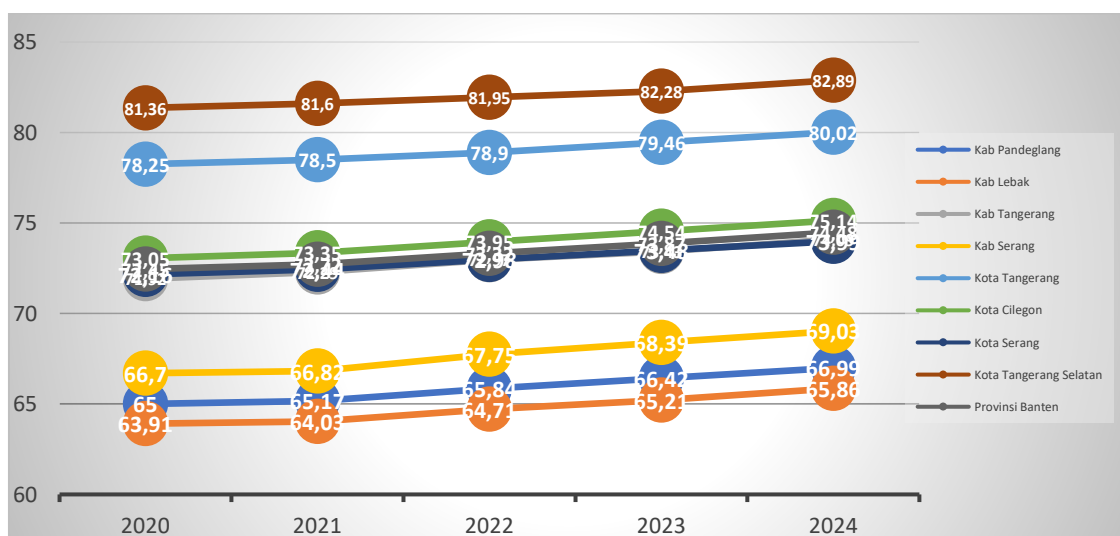


Figure 1. Banten Province Human Development Index 2020-2024

Based on the graph above, South Tangerang City occupies the highest position with HDI reaching 82.89 in 2024. On the other hand, Lebak Regency and Pandeglang Regency are still stuck at a lower achievement status. This inequality indicates the existence of a structural problem that needs to be studied empirically.

Several previous studies have examined the factors affecting the Human Development Index (HDI). Melliana and Zain (2013) found that poverty has a negative and significant effect on HDI, while Mirza (2011) explained that health conditions play an important role in improving labor productivity. In addition, several studies have shown that minimum wage and environmental quality are closely related to human development because they are associated with purchasing power, welfare, health, and people's quality of life. Nevertheless, these studies still have several limitations that provide opportunities for further research.

First, most previous studies focused on national or inter-provincial analysis, so they have not specifically explained disparities in human development among regions within a single province, particularly in Banten Province, which shows considerable differences in HDI between northern and southern areas. Second, variables such as population density, labor force participation rate, minimum wage, and environmental quality index are still rarely analyzed simultaneously within a single HDI model, even though these variables are relevant to the socio-economic conditions of regencies and municipalities in Banten Province. Third, the period of 2020–2024 is important to examine because it reflects post-COVID-19 pandemic conditions, where changes in the economy, employment, health, and quality of life still influenced regional human development outcomes.

Based on these research gaps, this study aims to analyze the effects of Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index on the Human Development Index in regencies and municipalities of Banten Province during 2020–2024. Therefore, this study is entitled *“Analysis of Factors Affecting the Human Development Index in Regencies/Municipalities of Banten Province in 2020–2024.”*

Research Method

This study employs a quantitative approach using panel data regression analysis to examine the factors affecting the Human Development Index (HDI) in regencies and municipalities of Banten Province during 2020–2024. The data used in this study are secondary data obtained from Statistics Indonesia (BPS), the Ministry of Environment and Forestry, and other related institutions.

The research objects consist of 8 regencies and municipalities in Banten Province during the 2020–2024 period, resulting in panel data that combine time series and cross-sectional data. The dependent variable in this study is the Human Development Index (HDI). Meanwhile, the independent variables include Poverty Rate (POV), Population Density (PD), Labor Force Participation Rate (LFPR), Life Expectancy (LE), District/City Minimum Wage (WAGE), and Environmental Quality Index (EQI).

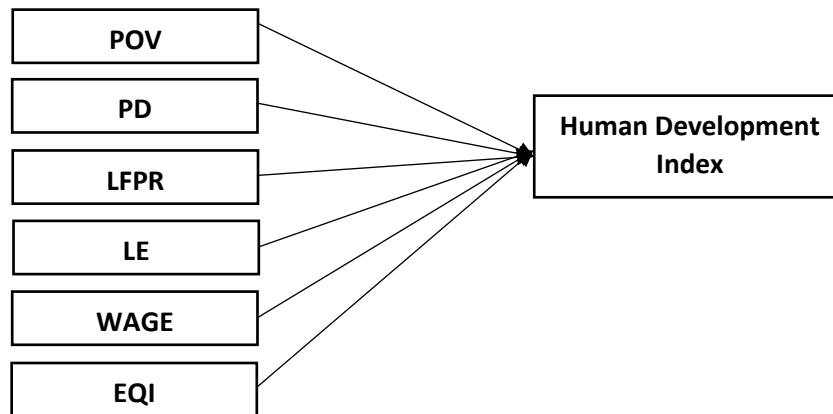


Figure 2. Conceptual Framework

The analytical method used is panel data regression with three estimation approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The best model selection is determined through the Chow test, Hausman test, and Lagrange Multiplier test. Furthermore, hypothesis testing is conducted using partial tests (t-test), simultaneous tests (F-test), and the coefficient of determination (R^2). Data processing in this study is performed using EViews software.

The panel data regression model in this study is formulated as follows:

$$HDI_{it} = \beta_0 + \beta_1 POV_{it} + \beta_2 PD_{it} + \beta_3 LFPR_{it} + \beta_4 LE_{it} + \beta_5 MW_{it} + \beta_6 EQI_{it} + \varepsilon_{it}$$

Where:

HDI = Human Development Index (Y)

POV = Poverty Rate (X1)

PD = Population Density (X2)

$LFPR$ = Labor Force Participation Rate (X3)

LE = Life Expectancy (X4)

MW = District/City Minimum Wage (X5)

EQI = Environmental Quality Index (X6)

i = regencies/municipalities

t = time period

ε = error term

Result and Discussion

This section presents the results of data analysis and discussion regarding the factors affecting the Human Development Index in regencies and municipalities of Banten Province during 2020–2024. The analysis begins with descriptive statistics to describe the characteristics of each research variable, followed by classical assumption tests, panel data model selection, regression estimation, partial hypothesis testing, and simultaneous hypothesis testing. The partial hypothesis test is conducted to examine the effect of each independent variable on the Human Development Index, while the simultaneous hypothesis test is used to determine whether all independent variables jointly affect the Human Development Index.

1. Descriptove Statistics

Descriptive statistics are used to describe the characteristics and distribution of the research variables during the observation period. The results of the descriptive statistics are presented in Table 1.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lnHDI	40	4,279329	0,0804184	4,157476	4,417514
POV	40	6,073500	2,357899	2,290000	10,720000
PD	40	3854,193	3877,909	405	12421
LFPR	40	64,41475	3,164680	58,13000	72,82000
LE	40	68,61925	2,762870	64,64000	73,31000
lnWAGE	40	15,17249	0,1897402	14,81270	15,38727
EQI	38	58,34629	5,596077	46,95000	69,98000

Source: Processed by the author

Based on Table 1, the lnHDI variable has an average value of 4.279329, with a minimum value of 4.157476 and a maximum value of 4.417514. These values indicate that the Human Development Index achievements among regencies and municipalities in Banten Province during the 2020–2024 period varied across regions, although the differences were relatively small after being transformed into natural logarithm form. Meanwhile, the POV variable has an average value of 6.073500 percent, with a minimum value of 2.290000 percent and a maximum value of 10.720000 percent. This condition indicates that poverty levels still differ among regions, where some areas experience relatively low poverty rates while others continue to face higher poverty levels.

The PD variable has an average value of 3854.193 people/km², with a minimum value of 405 people/km² and a maximum value of 12421 people/km². This wide range indicates considerable differences in population density between urban areas and regencies. The LFPR variable has an average value of 64.41475 percent, with a minimum value of 58.13000 percent and a maximum value of 72.82000 percent. This condition shows that labor force participation rates among regencies and municipalities in Banten Province still vary, although the differences are not as large as those in population density.

The LE variable has an average value of 68.61925 years, with a minimum value of 64.64000 years and a maximum value of 73.31000 years, indicating differences in health conditions across regions. The lnWAGE variable has an average value of 15.17249, with a minimum value of 14.81270 and a maximum value of 15.38727, showing variations in district/city minimum wages in Banten Province. Meanwhile, the EQI variable has an average value of 58.34629, with a minimum value of 46.95000 and a maximum value of 69.98000. The number of observations for EQI is only 38 because some data were unavailable for certain regions or years, resulting in fewer observations compared to the other variables.

2. Classical Assumption Test Results

A. Multicollinearity Test

The multicollinearity test was conducted using the Variance Inflation Factor (VIF) to identify the correlation among independent variables. A regression model is considered free from multicollinearity if the VIF value is less than 10.

Table 2. Multicollinearity Test Results

Variabel	VIF	1/VIF	Description
LE	5,07	0,197357	There is no multicollinearity
PD	4,74	0,210980	There is no multicollinearity
lnWAGE	3,93	0,254165	There is no multicollinearity
POV	3,88	0,258035	There is no multicollinearity
EQI	2,06	0,485358	There is no multicollinearity
LFPR	1,34	0,743590	There is no multicollinearity
Mean VIF	3,50	-	There is no multicollinearity

Source: Processed by the author

Based on Table 2, all independent variables have VIF values below 10, with the highest VIF found in LE at 5.07 and the lowest in LFPR at 1.34. The mean VIF value of 3.50 also remains below the threshold. Therefore, the model is free from multicollinearity problems.

B. Heteroscedasticity Test

The heteroscedasticity test was conducted to examine whether the regression model has unequal error variance. A model is considered free from heteroscedasticity if the probability value is greater than 0.05.

Table 3. Heteroscedasticity Test Results

Test Type	Statistics	Prob	Criteria	Conclusion
Heteroskedastisitas	chi2 : 4,59	0,7999	Prob. > 0,05	There is no heteroscedasticity

Source: Processed by the author

Based on Table 3, the probability value is 0.7999, which is greater than 0.05. Therefore, the regression model does not indicate heteroscedasticity problems.

C. Autocorrelation Test

The autocorrelation test was conducted to determine whether there is correlation among residuals in the panel regression model. A model is considered free from autocorrelation if the probability value is greater than 0.05.

Table 4. Autocorrelation Test Results

Test Type	Statistics	Prob	Criteria	Conclusion
Autokorelasi	F = 4,138	0,0814	Prob. > 0,05	There is no Autocorrelation

Source: Processed by the author

Based on Table 4, the autocorrelation test result shows a probability value of 0.0814, which is greater than 0.05. Therefore, it can be concluded that the regression model does not experience autocorrelation problems.

3. Panel Data Model Selection

Panel data model selection was conducted to determine the best model among the Common Effect Model, Fixed Effect Model, and Random Effect Model. The selection process used the Chow test, Hausman test, and Lagrange Multiplier test.

Table 5. Panel Data Model Selection Results

No.	Test Type	Model Test	Statistics	Prob	Decision
1	Uji Chow	Common Effect Model vs Fixed Effect Model	F = 286,50	0,0000	Fixed Effect Model is better than Common Effect Model
2	Uji Hausman	Fixed Effect Model vs Random Effect Model	chi2 = 8,98	0,1098	Random Effect Model is better than Fixed Effect Model
3	Uji Lagrange Multiplier	Common Effect Model vs Random Effect Model	chibar2 = 31,84	0,0000	Random Effect Model is better than Fixed Effect Model

Source: Processed by the author

Based on Table 5, the Chow test shows a probability value of 0.0000, indicating that the Fixed Effect Model is more appropriate than the Common Effect Model. The Hausman test shows a probability value of 0.1098, indicating that the Random Effect Model is more appropriate than the Fixed Effect Model. Furthermore, the Lagrange Multiplier test shows a probability value of 0.0000, confirming that the Random Effect Model is better than the Common Effect Model. Therefore, the Random Effect Model was selected as the best model for this study.

4. Random Effect Model Estimation Results

Based on the panel data model selection tests, the Random Effect Model was selected as the most appropriate model. This model was used to analyze the effects of Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index on the Human Development Index in regencies and municipalities of Banten Province during 2020–2024.

Table 6. Random Effect Model Estimation Results

Variable	Coefficient	Std. Error	z-stat	Prob.	Description
POV	-0,0017612	0,0013481	-1,31	0,191	Negative not significant
PD	0,00000244	0,00000135	1,80	0,071	Positive not significant
LFPR	0,0000368	0,0002453	0,15	0,881	Positive not significant
LE	0,0186304	0,0027723	6,72	0,000	Positive significant
lnWAGE	0,0451840	0,0266007	1,70	0,089	Positive not significant
EQI	-0,0001223	0,0001298	-0,94	0,346	Negative not significant
Constant	2,321557	0,266185	8,72	0,000	Positive significant

Source: Processed by the author

The estimation results with the Random Effect Model can be seen in Table 6 above. Based on the estimation results, the following equation can be created:

$$\ln HDI_{it} = 2,321557 - 0,0017612POV_{it} + 0,00000244PD_{it} + 0,0000368LFPR_{it} + 0,0186304LE_{it} + 0,0451840\ln WAGE_{it} - 0,0001223EQI_{it} + \varepsilon_{it}$$

the interpretation is as follows:

- The constant value of 2.321557 indicates that if the Percentage of Poor Population, Population Density, Labor Force Participation Rate, Life Expectancy, Regency/City Minimum Wage, and Environmental Quality Index are all equal to zero, then the value of lnHDI is 2.321557.
- The coefficient value of POV of -0.0017612 indicates that if the Percentage of Poor Population increases by 1 percentage point, then the Human Development Index will decrease by approximately 0.176 percent, *ceteris paribus*.
- The coefficient value of PD of 0.00000244 indicates that if Population Density increases by 1 person/km², then the Human Development Index will increase by approximately 0.000244 percent, *ceteris paribus*.
- The coefficient value of LFPR of 0.0000368 indicates that if the Labor Force Participation Rate increases by 1 percentage point, then the Human Development Index will increase by approximately 0.00368 percent, *ceteris paribus*.
- The coefficient value of LE of 0.0186304 indicates that if Life Expectancy increases by 1 year, then the Human Development Index will increase by approximately 1.863 percent, *ceteris paribus*.
- The coefficient value of lnWAGE of 0.0451840 indicates that if the Regency/City Minimum Wage increases by 1 percent, then the Human Development Index will increase by approximately 0.045 percent, *ceteris paribus*.
- The coefficient value of EQI of -0.0001223 indicates that if the Environmental Quality Index increases by 1 point, then the Human Development Index will decrease by approximately 0.012 percent, *ceteris paribus*.

Based on these estimation results, it can be concluded that the POV and EQI variables have a negative relationship with lnHDI, while the PD, LFPR, LE, and lnWAGE variables have a positive relationship with lnHDI. Among all independent variables used, the LE variable is the strongest in explaining changes in lnHDI, as it has the smallest probability value and a positive coefficient. Meanwhile, the POV, PD, LFPR, lnWAGE, and EQI variables have not shown a strong partial effect on lnHDI. However, simultaneously, all independent variables in the model significantly affect lnHDI, as indicated by the Prob > chi2 value of 0.0000. Therefore, the Random Effect Model can be used to explain the factors influencing the Human Development Index in regencies/cities of Banten Province during 2020–2024.

5. Coefficient of Determination

The coefficient of determination is used to measure how well the independent variables explain the dependent variable. Since this study uses the Random Effect Model, the coefficient of determination is based on the overall R-squared value.

Table 7. Coefficient of Determination

Description	Value
R-squared within	0,9621
R-squared between	0,8514
R-squared overall	0,8583

Source: Processed by the author

Based on Table 7, the overall R-squared value is 0.8583. This indicates that Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index explain 85.83 percent of the variation in the Human Development Index, while the remaining 14.17 percent is explained by other factors outside the model.

6. Partial Statistical Hypothesis Test

The partial hypothesis test was conducted by comparing the probability value with the significance level of 0.05.

a. Poverty Rate

$$H_0: \beta_1 \geq 0$$

$$H_1: \beta_1 < 0.$$

Poverty Rate has a coefficient of -0.0017612 and a probability value of 0.191. Since the probability value is greater than 0.05, H_0 fails to be rejected. Therefore, Poverty Rate is not proven to have a negative effect on HDI.

b. Population Density

$$H_0: \beta_2 \leq 0$$

$$H_1: \beta_2 > 0.$$

Population Density has a coefficient of 0.00000244 and a probability value of 0.071. Since the probability value is greater than 0.05, H_0 fails to be rejected. Therefore, Population Density is not proven to have a positive effect on HDI.

c. Labor Force Participation Rate

$$H_0: \beta_3 \leq 0$$

$$H_1: \beta_3 > 0.$$

Labor Force Participation Rate has a coefficient of 0.0000368 and a probability value of 0.881. Since the probability value is greater than 0.05, H_0 fails to be rejected. Therefore, Labor Force Participation Rate is not proven to have a positive effect on HDI.

d. Life Expectancy

$$H_0: \beta_4 \leq 0$$

$$H_1: \beta_4 > 0.$$

Life Expectancy has a coefficient of 0.0186304 and a probability value of 0.000. Since the probability value is less than 0.05, H_0 is rejected. Therefore, Life Expectancy is proven to have a positive effect on HDI.

e. District/City Minimum Wage

$$H_0: \beta_5 \leq 0$$

$$H_1: \beta_5 > 0.$$

District/City Minimum Wage has a coefficient of 0.0451840 and a probability value of 0.089. Since the probability value is greater than 0.05, H_0 fails to be rejected. Therefore, District/City Minimum Wage is not proven to have a positive effect on HDI.

f. Environmental Quality Index

$$H_0: \beta_6 \geq 0$$

$$H_1: \beta_6 < 0.$$

Environmental Quality Index has a coefficient of -0.0001223 and a probability value of 0.346. Since the probability value is greater than 0.05, H_0 fails to be rejected. Therefore, Environmental Quality Index is not proven to have a negative effect on HDI.

In conclusion, only Life Expectancy is proven to have a positive effect on the Human Development Index, while Poverty Rate, Population Density, Labor Force Participation Rate, District/City Minimum Wage, and Environmental Quality Index are not statistically proven to affect HDI partially.

7. Simultaneous Statistical Hypothesis Test

The simultaneous statistical hypothesis test was conducted using the Wald test to determine the effect of all independent variables simultaneously in the Random Effect Model. The decision criterion is when H_0 is rejected if the p-value < 0.05.

Table 8. Coefficient of Determination

Variable	Wald Test	P-value
Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, Regency/City Minimum Wage, and Environmental Quality Index	537,92	0,0000

Source: Processed by the author

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$, there is no simultaneous effect of Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index on the Human Development Index, ceteris paribus.

H_1 : at least one $\beta \neq 0$, there is a simultaneous effect of Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index on the Human Development Index, *ceteris paribus*.

Based on Table 8, the Wald test value is 537.92 with a p-value of 0.0000. Since the p-value is less than 0.05, H_0 is rejected and H_1 is accepted. This indicates that all independent variables simultaneously affect the Human Development Index in regencies and municipalities of Banten Province during 2020–2024.

8. Discussion

a. *The Effect of Poverty Rate on Human Development Index*

Based on the regression results, Poverty Rate has a negative but insignificant effect on the Human Development Index. This negative relationship indicates that an increase in poverty tends to reduce HDI because poor communities generally have limited access to education, healthcare, and decent living standards. This finding is consistent with Melliana and Zain (2013) as well as Chalid and Yusuf (2014), who found that poverty has a negative relationship with HDI. However, the insignificant effect in this study indicates that HDI in Banten Province is not determined solely by poverty levels, but is also influenced by other factors such as public service access, social assistance programs, education quality, and regional development policies.

b. *The Effect Population Density on Human Development Index*

Based on the regression results, Population Density has a positive but insignificant effect on the Human Development Index. This positive relationship indicates that densely populated areas tend to have better access to education, healthcare facilities, transportation, employment opportunities, and economic activities. This finding is consistent with Irham and Putri (2023), who stated that population density has a positive relationship with HDI. However, the insignificant result suggests that population density does not automatically improve HDI without equal distribution of public services, adequate infrastructure, and proper regional management.

c. *The Effect of Labor Force Participation Rate on Human Development Index*

Based on the regression results, Labor Force Participation Rate has a positive but insignificant effect on the Human Development Index. This positive relationship indicates that higher labor participation may increase community income and welfare. However, the effect is not significant because high labor participation does not always reflect good job quality. This finding is consistent with Endang and Anam (2024), who found that LFPR does not always have a strong effect on HDI. Therefore, increasing labor force participation should be accompanied by improvements in job quality, worker skills, productivity, and income stability.

d. *The Effect of Life Expectancy on Human Development Index*

Based on the regression results, Life Expectancy has a positive and significant effect on the Human Development Index. This result indicates that improvements in life expectancy significantly increase HDI because life expectancy is one of the main indicators in the health dimension of human development. Better health conditions provide greater opportunities for people to study, work, and participate productively in economic activities. This finding is consistent with Sukriani (2023) and Grossman's theory (1972), which explains that health is

part of human capital that can improve productivity and quality of life. Therefore, health is an important factor in improving human development in Banten Province.

e. The Effect of District/City Minimum Wage on Human Development Index

Based on the regression results, District/City Minimum Wage has a positive but insignificant effect on the Human Development Index. This positive relationship indicates that higher minimum wages tend to improve purchasing power and access to education, healthcare, and decent living standards. This finding is consistent with Chalid and Yusuf (2014) as well as Kumalasari and Setyowati (2023), who found that minimum wage has a positive relationship with HDI. However, the insignificant effect may occur because minimum wage policies mainly affect formal sector workers, while many people still work in informal sectors.

f. The Effect of Environmental Quality Index on Human Development Index

Based on the regression results, Environmental Quality Index has a negative but insignificant effect on the Human Development Index. Conceptually, good environmental quality should support human development because better air, water, and land quality can improve public health and quality of life. However, this finding indicates that the relationship between EQI and HDI does not always move in the same direction. This result is consistent with Pambudi (2020) as well as Priastiwati and Lestari (2025), who explained that the relationship between environmental quality and HDI may vary across regions and is not always significant in the short term. In the context of Banten Province, areas with high HDI are generally industrial and urban regions with strong economic activities, meaning that higher HDI is not always accompanied by better environmental quality.

Conclusion

Based on the results of panel data regression analysis using the Random Effect Model, this study examines the effects of Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index on the Human Development Index in regencies and municipalities of Banten Province during 2020–2024. The findings of this study can be summarized as follows:

1. Poverty Rate has a negative but insignificant effect on the Human Development Index. This means that an increase in the poverty rate tends to reduce HDI, although the effect is not statistically strong in this study.
2. Population Density has a positive but insignificant effect on the Human Development Index. This indicates that regions with higher population density tend to have better HDI, although the effect is not statistically significant.
3. Labor Force Participation Rate has a positive but insignificant effect on the Human Development Index. This means that an increase in labor force participation does not necessarily improve HDI unless it is supported by adequate job quality, income, and labor productivity.
4. Life Expectancy has a positive and significant effect on the Human Development Index. This result indicates that the health aspect plays an important role in improving the quality of human development in regencies and municipalities of Banten Province.
5. District/City Minimum Wage has a positive but insignificant effect on the Human Development Index. This suggests that increases in minimum wage tend to be associated with improvements in HDI, although the impact is not evenly distributed because not all people work in the formal sector.

6. Environmental Quality Index has a negative but insignificant effect on the Human Development Index. This finding indicates that environmental quality has not been proven to be a major factor explaining changes in HDI during the study period.
7. Simultaneously, Poverty Rate, Population Density, Labor Force Participation Rate, Life Expectancy, District/City Minimum Wage, and Environmental Quality Index significantly affect the Human Development Index. The overall R-squared value of 0.8583 indicates that the independent variables in the model explain 85.83 percent of the variation in HDI, while the remaining 14.17 percent is explained by other variables outside the research model.

References

- Azizah, A. N., & Asiyah, B. N. (2022). Pengaruh jumlah penduduk, Indeks Pembangunan Manusia, Produk Domestik Regional Bruto, dan pengangguran terhadap kemiskinan di Jawa Timur. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, dan Pendidikan*, 1(12), 2697–2718. <https://doi.org/10.54443/sibatik.v1i12.420>
- Azizah, E. W., Sudarti, & Kusuma, H. (2018). Pengaruh pendidikan, pendapatan per kapita dan jumlah penduduk terhadap kemiskinan di Provinsi Jawa Timur. *Jurnal Ilmu Ekonomi*, 2, 167–180.
- Badan Pusat Statistik. (2021). *Indeks Pembangunan Manusia 2020*. Badan Pusat Statistik.
- Badan Pusat Statistik Provinsi Banten. (2024). *Provinsi Banten dalam angka 2024*. Badan Pusat Statistik Provinsi Banten.
- Bappenas. (2021). *Panduan penanggulangan kemiskinan*. Kementerian Perencanaan Pembangunan Nasional/Bappenas.
- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.
- Chalid, N., & Yusuf, Y. (2014). Pengaruh tingkat kemiskinan, tingkat pengangguran, upah minimum kabupaten/kota dan laju pertumbuhan ekonomi terhadap Indeks Pembangunan Manusia di Provinsi Riau. *Jurnal Ekonomi*, 22(2), 1–12.
- Dores, E. J. (2014). Pengaruh angka melek huruf dan angka harapan hidup terhadap jumlah penduduk miskin di Provinsi Sumatera Barat. *Journal of Economic and Economic Education*, 2(2), 126–133.
- Endang, & Anam, M. S. (2024). Menuju ibu kota baru: Pengaruh tingkat partisipasi angkatan kerja dan tingkat pengangguran terbuka terhadap Indeks Pembangunan Manusia di Kalimantan Timur. *Economics and Digital Business Review*, 5(2), 652–661. <https://ojs.stieamkop.ac.id/index.php/ecotal/article/view/1475>
- Faizin, M. (2021). Pengaruh upah minimum, kemiskinan dan pengangguran pada IPM di kabupaten/kota Provinsi Jawa Timur. *Jurnal Samudra Ekonomi dan Bisnis*, 12(2), 214–227. <https://doi.org/10.33059/jseb.v12i2.3027>

- Ghozali, I. (2016). *Aplikasi analisis multivariate dengan program IBM SPSS 23* (Edisi 8). Badan Penerbit Universitas Diponegoro.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(2), 223–255.
- Gujarati, D. N. (2003). *Basic econometrics* (4th ed.). McGraw-Hill.
- Hafifah, N., & Suherty, L. (2023). Pengaruh Produk Domestik Regional Bruto, tingkat partisipasi angkatan kerja dan kemiskinan terhadap Indeks Pembangunan Manusia di Provinsi Kalimantan Selatan tahun 2011–2020. *Jurnal Ilmu Ekonomi dan Pembangunan*, 6(1), 848–857.
- Indriani, S. (2022). Analysis of the influence of poverty rates, open unemployment rates, economic growth, and district minimum wages on Human Development Index in West Java Province. *Proceeding of The URECOL*, 862–871.
- Irham, A. R., & Putri, R. M. (2023). Kepadatan penduduk terhadap Indeks Pembangunan Manusia di Provinsi Lampung. *Media Komunikasi Geografi*, 24(1), 91–100.
<https://doi.org/10.23887/mkg.v24i1.60261>
- Krugman, P. (1991). *Geography and trade*. MIT Press.
- Kumalasari, D., & Setyowati, E. (2023). Human Development Index in West Java Province 2017–2021. *Advances in Economics, Business and Management Research*.
- Kuncoro, M. (2006). *Ekonomika pembangunan: Teori, masalah, dan kebijakan*. UPP STIM YKPN.
- Malthus, T. R. (1798). *An essay on the principle of population*. J. Johnson.
- Mankiw, N. G. (2018). *Principles of economics* (8th ed.). Cengage Learning.
- Melliana, A., & Zain, I. (2013). Analisis statistika faktor yang mempengaruhi Indeks Pembangunan Manusia di kabupaten/kota Provinsi Jawa Timur dengan menggunakan regresi panel. *Jurnal Sains dan Seni POMITS*, 2(2).
- Mirza, D. S. (2012). Pengaruh kemiskinan, pertumbuhan ekonomi, dan belanja modal terhadap Indeks Pembangunan Manusia di Jawa Tengah tahun 2006–2009. *Economics Development Analysis Journal*, 1(1), 1–15.
- Nurkse, R. (1953). *Problems of capital formation in underdeveloped countries*. Oxford University Press.
- Pambudi, A. S. (2020). Analisis keterkaitan Indeks Pembangunan Manusia terhadap Indeks Kualitas Lingkungan Hidup di Sulawesi Selatan. *MONAS: Jurnal Inovasi Aparatur*, 2(1), 109–123.
- Pearce, D. W., & Turner, R. K. (1990). *Economics of natural resources and the environment*. Johns Hopkins University Press.

- Prasetyoningrum, A. K., & Sukmawati. (2016). Analisis pengaruh Indeks Pengeluaran Pemerintah, pertumbuhan ekonomi dan pengangguran terhadap kemiskinan di Indonesia. *Indonesian Treasury Review: Jurnal Perbendaharaan Keuangan Negara dan Kebijakan Publik*, 1(1), 39–50.
- Priastiwi, D., & Lestari, E. (2025). Indeks Pembangunan Manusia dan Indeks Kualitas Lingkungan Hidup: Analisis kausalitas di Indonesia. *COSTING: Journal of Economic, Business and Accounting*.
- Rahmani, A. R. (2010). Pengaruh gender ratio, dependency ratio, dan tingkat partisipasi angkatan kerja terhadap pertumbuhan ekonomi. *Jurnal Ekonomi Pembangunan*.
- Saragih, R. F., Silalahi, P. R., & Tambunan, K. (2022). Pengaruh Indeks Pembangunan Manusia, tingkat pengangguran terbuka terhadap tingkat kemiskinan di Indonesia tahun 2007–2021. *Jurnal Pendidikan, Sosial dan Humaniora*, 1, 73–79.
- Satyahadewi, N., Aprizkiyandari, S., & Oprasianti, R. (2023). Regresi data panel dalam analisis faktor-faktor yang mempengaruhi IPM di Kalimantan Barat. *Statistika*, 23(2), 123–131. <https://doi.org/10.29313/statistika.v23i2.2201>
- Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1–17.
- Sen, A. (1999). *Development as freedom*. Oxford University Press.
- Siregar, R. T., Silitonga, H. P., & Butarbutar, M. (2017). Analisis faktor-faktor yang memengaruhi Indeks Pembangunan Manusia di Indonesia. *Jurnal Ekonomi dan Pembangunan*.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94.
- Supandi, A., Yuniarti, D., & Sari, N. P. (2022). Regresi data panel untuk mengetahui faktor-faktor yang mempengaruhi IPM di kabupaten/kota Provinsi Daerah Istimewa Yogyakarta. *Jurnal Statistika*.
- Todaro, M. P. (2006). *Pembangunan ekonomi* (Edisi 9). Erlangga.
- Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). Pearson.
- United Nations Development Programme. (1990). *Human development report 1990*. Oxford University Press.
- World Commission on Environment and Development. (1987). *Our common future*. Oxford University Press.
- Zarkasi, R. N., Sifriyani, S., & Prangga, S. (2021). Identifikasi faktor-faktor yang mempengaruhi Indeks Pembangunan Manusia di Kalimantan menggunakan regresi panel. *BAREKENG: Jurnal Ilmu Matematika dan Terapan*, 15(2), 277–282. <https://doi.org/10.30598/barekengvol15iss2pp277-282>.