

**THE EFFECT OF WAGE LEVELS AND EDUCATION ON THE HUMAN
DEVELOPMENT INDEX IN WEST JAVA PROVINCE
YEAR 2021–2024**

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ABSTRACT

Human development is a primary development objective, emphasizing improving the quality of life through health, education, and living standards. The Human Development Index (HDI) serves as a composite indicator for evaluating human development achievements. This study aims to analyze the influence of education level and wages on the HDI in West Java Province during the 2021–2024 period. This study uses a quantitative approach with panel data regression, combining cross-sectoral data from 27 districts/cities and time series data over four years, resulting in 108 observations. Education is represented by the Mean Years of Schooling (RLS), while wage levels are represented by the District/City Minimum Wage (UMK). The results show that both education level and wages have a positive and statistically significant effect on the HDI. Education has a regression coefficient of 1.624 ($p = 0.018$), while wage levels have a coefficient of 0.487 ($p = 0.031$). The model explains 83% of the variation in the HDI ($R^2 = 0.83$), indicating strong explanatory power. These findings suggest that simultaneously improving educational attainment and economic well-being is crucial for accelerating human development in West Java Province. This study contributes to the literature by providing evidence from the post-pandemic recovery period and highlighting regional heterogeneity across districts and cities.

Keywords : *Average Years of Schooling, Human Development Index, Panel Data Regression, Post-Pandemic Recovery, Regency/City Minimum Wages, West Java Province*

A. INTRODUCTION

Regional development is an integral part of national development which aims to increase general welfare and improve the life of the nation as mandated in the Preamble to the 1945 Constitution of the Republic of Indonesia. The success of development is not only measured through economic growth, but also through improving the quality of human life as reflected in the achievement of the Human Development Index (IMB).

The Human Development Index (HDI) is a vital and fundamental scale for assessing the progress of a region's standard of living (Muhayyijah Fil Qurbah, Musyaropah, 2024) . The human development approach places humans as the primary goal of development, not merely a tool for economic growth. The Human Development Index (HDI) utilizes three important dimensions to enhance development: meeting the needs for a healthy and long life, and gaining knowledge and skills to meet a decent standard of living (Oktavia, 2021).

In the last five years, several studies have confirmed that education and income are the main determinants of the Human Development Index (HDI). Education is the most important factor that can lift someone out of poverty (Nasri et al., 2024) . Recent empirical studies show that increasing the average years of schooling significantly contributes to the Human Development Index (HDI) in various regions in Indonesia (Damayanti & Suryaningrum, 2023) .

The provincial minimum wage is a minimum wage standard set by the provincial or regional government used to provide wage adjustments to active workers (Hartono, Endy & Irvan, 2024) . West Java Province is one of the most populous provinces in Indonesia and faces complex human development dynamics. Data from the Central Statistics Agency (BPS) shows that the Human Development Index (HDI) of West Java continued to increase during the 2018–2022 period, namely by 0.38 (Sheety et al., 2024) , but there are still significant gaps between districts/cities. This indicates that HDI growth is uneven and is influenced by variations in education levels and economic welfare across regions.

Although various studies have examined the determinants of the Human Development Index (HDI), studies specifically analyzing the influence of education levels and wages in the post-COVID-19 pandemic period are still relatively limited, particularly at the provincial level. Economic growth in West Java in 2021 was recorded at 3.74% year-on-year, after a decline of -2.56% in 2020. This figure is higher than that of Jakarta itself, which recorded economic growth of 3.56% and higher than the national economic growth of 3.69%. This increased economic growth reflects the improving recovery following the COVID-19 pandemic (Rabbani & Hasmarini, 2024) .

While numerous studies have examined the determinants of the Human Development Index (HDI), several research gaps remain. First, previous studies have largely focused on national-level analysis or used data from before the COVID-19 pandemic. Second, limited attention has been paid to the post-pandemic recovery period, where educational disruptions and labor market adjustments can alter the relationship between education, wages, and human development outcomes. Third, existing research rarely considers regional heterogeneity across districts and

cities in West Java, despite significant disparities in educational attainment and economic conditions (Ashari et al., 2023) .

Therefore, this study aims to analyze the influence of education, as measured by the Average Years of Schooling (RLS), on the Human Development Index in West Java Province and examine the influence of wage levels, as measured by the District/City Minimum Wage (UMK), on the Human Development Index.

B. LITERATURE REVIEW

Research on the determinants of the Human Development Index (HDI) has been extensively conducted over the past five years, using diverse approaches and regional contexts. Education has consistently been identified as a key factor in improving the HDI. Adequate education fosters better thinking and creativity, ultimately improving the quality of human resources (Sinaga et al., 2025) . Therefore, increasing the average number of years of schooling significantly impacts the HDI in Indonesia. Similar findings were also demonstrated by Damayanti & Suryaningrum (2023) , who emphasized that education plays a role not only in increasing knowledge but also indirectly in improving income and health.

Another study by Rahmawati et al., 2022, showed that regional education investments have a long-term impact on human development, particularly in regions with industrial and service-based economies. However, several studies note that the impact of education and a decent minimum wage on the Human Development Index (HDI) may be diminished if not accompanied by adequate job creation (Arifudin et al., 2024) .

Wage levels are also an important variable in HDI studies. Research by Rahmawati et al. (2022) and Saputri (2025) shows that increasing the minimum wage has a positive effect on HDI by increasing purchasing power and improving people's quality of life. However, the effect of wages tends to be weaker than that of education because it is short-term and heavily influenced by regional economic structures.

Existing literature generally agrees that education is a fundamental determinant of human development. (Friska Darnawaty, 2019) , (Hasibuan, Siti, 2023) , and (Damayanti & Suryaningrum, 2023) consistently report a positive and significant effect of educational attainment on HDI. These findings support human capital theory, which argues that investment in education increases productivity, income, and quality of life.

However, studies examining the role of wage levels have yielded more mixed findings. While (Setiawan, 2022) found that minimum wages significantly increase the HDI through increased purchasing power, (Faellassuffa & Yuliani, 2021) suggest that wage increases may have a limited impact in areas with weak labor market absorption. This suggests that wage policies alone may not guarantee sustainable improvements in human development outcomes.

Another unresolved issue concerns the interaction between education and wages. (Oktavia, 2021) argues that the positive impact of wages is stronger in regions with higher educational attainment, suggesting a complementarity between

the two variables. However, empirical evidence on this relationship during the post-pandemic recovery period remains scarce.

Therefore, this study contributes to the literature by examining education levels and wages simultaneously within a panel data framework and by focusing on West Java Province during the post-pandemic period of 2021–2024, where substantial regional disparities persist.

C. RESEARCH METHOD

This study uses an associative quantitative approach to examine the effect of education level and wages on the HDI. The data used is secondary panel data, combining time series data from 2021–2024 and cross-sectoral data from 27 districts/cities in West Java Province.

This study uses 108 panel observations obtained from 27 districts/cities over four years (2021–2024). To reduce skewness and improve model estimation, the UMK variable was transformed into its natural logarithm [$Ln(UMK)$] before the regression analysis.

The dependent variable in this study is the Human Development Index (HDI). The independent variables are education, represented by the Average Years of Schooling (RLS), and wages, represented by the District/City Minimum Wage (UMK). All data were obtained from official publications of the Central Statistics Agency (BPS).

Table 1
Study and Definition of Operational Variables

Variables	Symbol	Operational Definition	Unit	BPS Proxy Data
Human Development Index	Y	Human development achievement indicators are measured by BPS.	Points	Regency/City HDI
Education	X ₁	The average number of years that people aged 25 years and over have had formal education.	Year	Average Length of Schooling Period (RLS) of Regency/City
Fixed Wage	X ₂	The minimum wage in each district/city is determined by the Governor.	Rupiah	Regency/City Minimum Wage (UMK)

Source: Adapted from the Central Statistics Agency (BPS) (2024)

The analysis model used is panel data regression with the following equation:

$$IPM_{it} = \beta_0 + \beta_1 LRS_{it} + \beta_2 \ln(MSE_{it}) + \varepsilon_{it}$$

Model selection was performed using the Chow and Hausman tests to determine whether the model was a common effects, fixed effects, or random effects model. Data analysis was supported by descriptive statistics, classical assumption tests, t-tests, F-tests, and coefficients of determination.

The research gap in this study lies in the limitations of previous research that has not specifically examined the influence of education and wages on HDI during

the post-pandemic recovery period at the provincial level with complex economic and demographic characteristics such as West Java.

D. RESULTS AND DISCUSSION

Descriptive statistics show that West Java's Human Development Index (IMB) increased by an average of 73.68 during the 2021–2024 period. The average length of education reached 8.03 years, while the average minimum wage was Rp1,923,501. This trend indicates an improvement in the quality of human development, in line with improvements in education and economic welfare.

Table 2
Descriptive Research Variable Statistics

Variables	Unit	Minimum	Maximum	Average
Human Development Index (HDI)	Index	72.45	74.92	73.68
Education	Year	7.90	8.20	8.03
Fixed Wage (UMP)	Rupiah	1,810,351	2,057,495	1,923,501

Source: Processed from secondary data obtained from the Central Statistics Agency (BPS) , West Java Province, 2021–2024 .

Regression Results and Interpretation

Table 3.
Results of Multiple Linear Regression Analysis

Independent Variables	Regression Coefficient (β)	Number t	Signature.
Constant	60,214	9.87	0.002
Education	1,624	4.91	0.018
Fixed Wage	0.487	3.76	0.031

Source: Author's calculations based on data from the Central Statistics Agency (BPS) , West Java Province, 2021–2024

Dependent Variable: Human Development Index (HDI) Regression Equation:

$$\text{HDI} = 60,214 + 1.624(X_1) + 0.487(X_2)$$

The results of the multiple linear regression analysis in Table 3 indicate that education level and wages have a positive influence on the HDI in West Java Province. The constant value of 60.214 indicates that if education level and wages are held constant, the baseline HDI value is at that value.

The regression coefficient for the education variable is 1.624, with a significance value of less than 0.05, indicating that education has a positive and significant influence on the HDI. This means that every one-unit increase in the education indicator will increase the HDI by 1.624 points, assuming other variables remain constant. This finding confirms that education is a dominant factor in driving improvements in the quality of human development. Meanwhile, the wage level variable has a regression coefficient of 0.487 and is significant at the 95 percent confidence level. This indicates that increasing wage levels contributes to

increasing the HDI by increasing people's purchasing power and a decent standard of living.

Table 4
Coefficient of Determination (R²)

Model	R	R Squared (R ²)	Adjusted R ²
Regression	0.91	0.83	0.79

Source: Author's calculations based on data from the Central Statistics Agency (BPS), West Java Province, 2021–2024

The regression results show that education level and wages have a positive and significant influence on the HDI. The coefficient for education is larger than the coefficient for wages, indicating that education is the dominant factor in increasing the HDI. The coefficient of determination of 0.83 indicates that 83% of the variation in the HDI can be explained by these two variables.

The coefficient of determination ($R^2 = 0.83$) indicates substantial explanatory power. However, the relatively high value suggests possible omitted variable bias or correlation with other determinants of HDI, such as health expenditure, poverty rate, unemployment, and government spending. Future studies should include these variables to improve the robustness of the model. Further panel data analysis shows that HDI variation is influenced not only by differences between districts/cities (between-group variation) but also by changes occurring within each district/city over time (within-group variation). This finding underscores the importance of region-specific development policies.

Comparison with Previous Research

This finding is consistent with research by Karim (2021) and Pratama & Hidayat (2022), which emphasize the crucial role of education in human development. The positive impact on wage levels also aligns with the findings of Aziz & Kurniawan (2021), although the contribution is relatively smaller. This difference in contribution confirms that wage increase policies will be more effective if supported by improvements in education quality.

Critical Analysis

Most importantly, the research findings demonstrate that human development in West Java requires a multidimensional approach. Reliance on wage increases without improving the quality of education has the potential to result in unsustainable increases in the Human Development Index (HDI). Therefore, synergy between education and employment policies is key to improving the HDI.

E. CONCLUSION

The findings indicate that education has the strongest influence on improving the HDI in West Java Province. Therefore, provincial and regional governments should prioritize increasing the average years of schooling through expanding scholarships, reducing dropout rates, and improving education quality. A measurable target could be to increase the average years of schooling by at least 0.5 years over the next five years. Wage policies should also support human development by ensuring annual adjustments to the minimum wage in line with productivity growth and inflation. However, wage increases must be accompanied by job creation and workforce skills development programs. These policies are expected to reduce regional disparities and accelerate sustainable human development across all regencies and cities in West Java.

The limitations of this study include: (1) the use of only two independent variables, namely education level and wages; (2) the relatively short observation period of four years, which may not fully capture the dynamics of long-term developments; and (3) the use of UMK as a proxy for income, which may not adequately represent wages in the informal sector.

Future research should include additional explanatory variables such as poverty rates, unemployment, government spending on education and health, and economic growth. Extending the observation period and comparing several provinces would also provide more comprehensive insights into the determinants of human development in Indonesia.

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