



Analysis of the Effect of Open Unemployment Rate, Poverty Rate, and Economic Growth on the Human Development Index (HDI)

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Received: 30-06-2025

Reviewed: 31-07-2025

Accepted: 15-10-2025

Abstract

This study aims to analyze the influence of open unemployment, poverty levels, and economic growth on the Human Development Index (HDI). HDI serves as a crucial indicator reflecting the quality of life in terms of health, education, and a decent standard of living. Utilizing time series data from 2013 to 2022 and employing multiple linear regression analysis, this research examines the relationship between these macroeconomic variables and human development achievements. The findings reveal that both poverty and open unemployment have a significant negative impact on HDI, while economic growth does not show a statistically significant effect. These results suggest that improving human development quality is not solely dependent on economic growth, but is strongly influenced by lower levels of unemployment and poverty. Therefore, policy strategies focused on reducing unemployment and poverty are essential to sustainably enhance human development.

Keywords: Open Unemployment, Poverty, Economic Growth, Human Development Index.

Introduction

The current development paradigm is undergoing a transformation, initially focused on growth or product orientation, then shifting to community-centered development (BPS West Java, 2021). Indonesia is blessed with abundant natural resources, and its economic potential can be enhanced through wise management of these resources, especially if carried out by competent human resources (Totonafu Saro Hia et al., 2023).

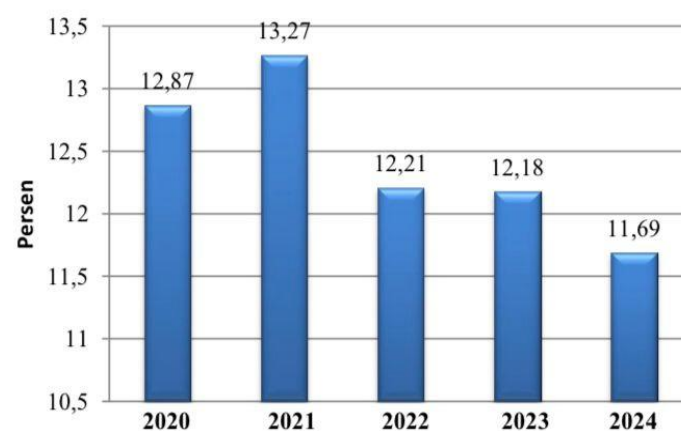
Adam Smith stated that human resources are a crucial element in the production chain that influences a nation's prosperity (Anggraini et al., 2023). This understanding emphasizes that nature or land has no significant economic value without human resources capable of managing it profitably (Yuniarti & Imaningsih, 2022). This means that the economic value of a natural resource only arises when there are human resources who can utilize it effectively (Ningrum j.w., 2020).

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As a step to improve the welfare of its population, a country can engage in development efforts, particularly in the economic sector, as a pathway to increased prosperity (Priambodo, 2021). Assessment of the quality of human resources and economic achievement is often conducted through the Human Development Index (HDI) (Sri Muljaningsih, 2021)

The HDI explains that the health dimension is measured based on estimated life expectancy calculated from birth, while the education sector is assessed using two benchmarks (Abdul Rahim et al., 2022): the average number of years of schooling for the population aged 25 and over and the estimated number of years of schooling for children just entering school. The standard of living dimension is reflected in the size of the national aggregate income divided by the population.

Figure 1. Graph of the Human Development Index of Bojonegoro Regency 2020-2024



In Figure 1, reflecting impressive progress in the Bojonegoro region's HDI, showing an increase throughout the period, the Bojonegoro Regency HDI experienced a growth of around 0.90 percent per year and managed to reach a "high" level since 2022. However, it appears that the COVID-19 pandemic did not significantly affect the achievement of human capacity transformation in the Bojonegoro region.

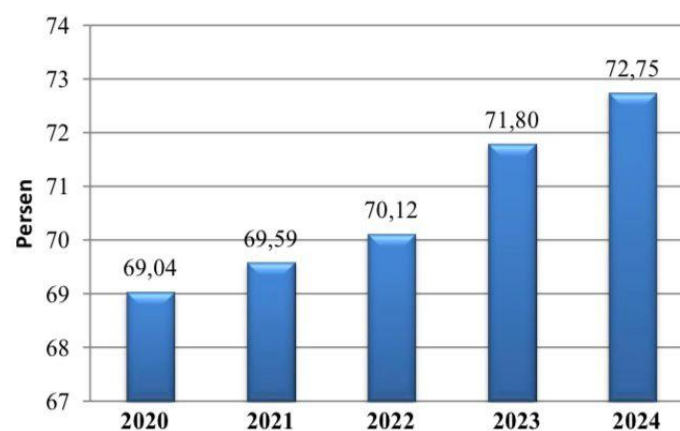


Figure 2. Graph of the Open Unemployment Rate

The Open Unemployment Rate is the ratio of the number of unemployed to the total workforce. Unemployed individuals with an educational background equivalent to high school, including college, particularly those aged 15-24, are referred to as educated unemployed. This new corner often arises due to a mismatch between available job options and market wage expectations. Some of those unemployed in this group choose not to work out of compulsion, but rather because they are waiting for suitable employment without the pressure of survival (Arwani et al., 2023). In terms of meeting their daily needs, they generally still have economic support from their families, so they don't feel pressured to work immediately.

Open unemployment, in the employment context, refers to a situation where individuals are unable to find work relevant to their qualifications, despite actively seeking it (Resmarani & Sishadiyati, 2023). This situation generally arises when the number of job seekers exceeds the availability of jobs, or when they have difficulty finding work that matches their skills. The consequences of this condition can include income uncertainty, weakened purchasing power, and hampered economic growth. (Asmara & Septiana, 2024).

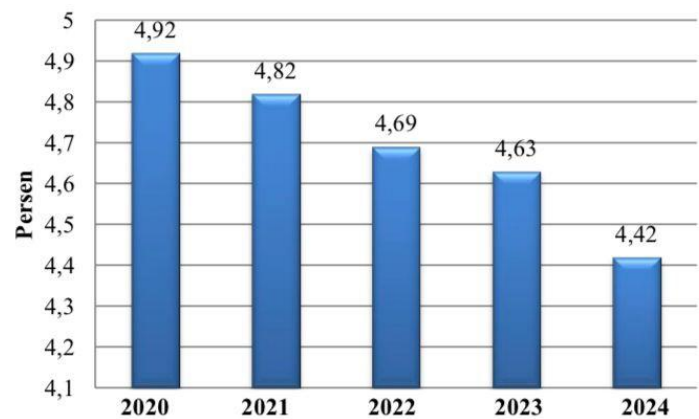


Figure 3. Graph of the Poverty Rate in Bojonegoro 2020-2024

Figure 3 in that time period, the percentage of poor people in Bojonegoro Regency indicates a decrease of 0.03 percent, down from 13.27 percent in March 2021 and changing to 12.21 percent in March 2022. Overall, in the 2013-2024 period, there is a tendency for a decrease in the poverty rate in Bojonegoro Regency. On the other hand, the ratio of the population with poor conditions in Bojonegoro Regency in 2013 was 15.95 percent, experiencing a decrease of -3.74 points or reaching 11.69 percent in 2024.

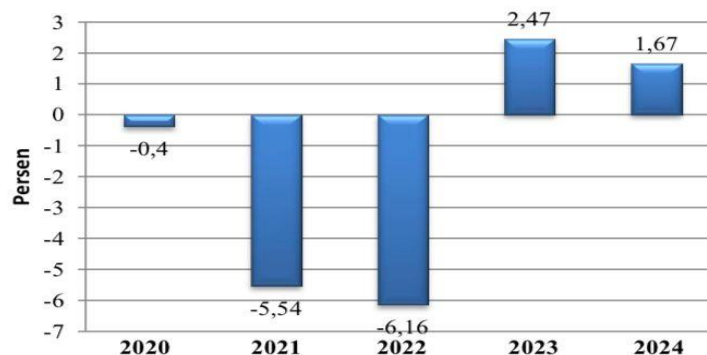


Figure 4. Graph of the Economic Growth in Bojonegoro 2020-2024

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Figure 4 shows that the economic growth of Bojonegoro Regency in the last four years has recorded fluctuating dynamics, while the economic growth of Bojonegoro Regency in 2019 began to experience contraction as a consequence of the Covid-19 pandemic, in 2020 there was a decline in economic growth of -0.4%, which decreased even more drastically in 2021 to reach -5.54% and continued to decline in 2022 by -6.16%.

In economic studies, economic growth reflects the increased potential for the production of goods and services within an economic system (Daniel et al., 2023). According to Suharjo (Firdania, 2022), economic development often has two primary focuses: increasing national income and reducing poverty.

Each regional government has a specific strategy for regional development, with the goal of ensuring residents enjoy a decent standard of living (Ashari & Athoillah, 2023). Factors contributing to the dynamics of economic growth in Bojonegoro involve both internal and external factors. In Bojonegoro Regency, the dynamics of economic growth are inextricably linked to the influence of internal factors such as natural resource potential and human resource capacity, as well as external factors including global market conditions and central government policies (Azis et al., 2021). As a region rich in natural resources, particularly the oil and gas and agricultural sectors, Bojonegoro has a significant opportunity to increase its economic growth by optimizing these leading sectors. However, this success depends heavily on the region's ability to efficiently manage local potential and its openness to technological developments and investment. Furthermore, regional economic stability is also influenced by external factors, such as fluctuations in global oil and gas prices and national regulations regarding regional income distribution. Therefore, a combination of strengthening local capacity and adapting to external dynamics is the benchmark for creating a growing, inclusive, and sustainable economy in Bojonegoro.

Literature Review

Operational Definition and Measurement of Research Variables

The operational definition and measurement of variables involve the process of translating or defining research concepts into measurable variables, including determining the appropriate methods and units of measurement for each variable. This transformation from concept to variable can be guided by established theories, prior research findings, empirical evidence, and relevant factual data. In this study, the operational definition and measurement of variables include:

1. Dependent Variable

a. Human Development Index (HDI)

The HDI emerged as a response to the limitations of using per capita income as an assessment of community prosperity, which only considers economic aspects. In a regional or territorial context, community prosperity is not limited to the economic realm alone, but also encompasses social aspects such as education and health levels. (BPS, 2022) defines the HDI

as a benchmark that assesses human development achievements in a region or country, considering three important indicators: health, education, and a decent standard of living (Runtunuwu, 2020). This data covers a time span of ten years, namely from 2013 to 2024.

2. Independent Variable

a. Open Unemployment Rate (X1)

Unemployment is defined as a situation where someone is willing and ready to work but has not yet found a job that matches their skills and desires. In this study, the unemployment variable is measured using the Unemployment Rate indicator, which is the percentage of the unemployed to the total available labor force.

b. Poverty Rate (X2)

The poverty rate indicates the change in the number of people classified as poor over time, expressed as a percentage (%).

c. Economic Growth (X3)

Economic growth describes changes in the economic structure that can be observed through indicators such as GDP and GRDP. This process reflects an increase in the production capacity of a region or country. On a sustainable basis, economic growth indicates an increase in output per capita, indicating ongoing progress in the community's economic activity. In the context of this study, the Economic Growth variable is measured using percentage (%) units for the period 2013 to 2024.

Research Method

This study utilizes multiple linear regression analysis as the primary tool to explore the relationships between the variables under study. Multiple linear regression analysis allows researchers to simultaneously investigate the impact of multiple independent variables on the dependent variable. By utilizing a set of individual data collected over a specific period, the results of this study are expected to broaden our understanding of the patterns of relationships between these variables.

The primary data source used in this study is time series data obtained from the Bojonegoro Statistics Agency (BPS), covering the period 2013-2024. Selecting time series data from BPS as the basis for this study provides reliability to the analysis, ensuring a strong link to the empirical situation being studied (Dalimunthe & Imsar, 2023). This study was designed with a specific objective: to analyze the influence of the Unemployment Rate, Poverty Rate, and Economic Growth on the Human Development Index (HDI) in Bojonegoro from 2013-2024.

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Results

Table 1. Multiple Linear Regression Results

Dependent Variable: IPM				
Method: Least Squares				
Date: 10/08/25 Time: 23:54				
Sample: 2015 2024				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	86.33584	5.965060	14.47359	0.0000
TPT	-0.643690	0.633745	-1.015692	0.3490
TK	-1.525633	0.467743	-3.261694	0.0172
PE	0.009528	0.063432	0.150210	0.8855
R-squared	0.810623	Mean dependent var	69.00800	
Adjusted R-squared	0.715934	S.D. dependent var	2.134665	
S.E. of regression	1.137730	Akaike info criterion	3.385122	
Sum squared resid	7.766577	Schwarz criterion	3.506156	
Log likelihood	-12.92561	Hannan-Quinn criter.	3.252348	
F-statistic	8.560935	Durbin-Watson stat	1.548472	
Prob(F-statistic)	0.013758			

Based on the image above, the multiple linear regression equation is obtained as follows:

$$Y = 86.33584 - 0.643690X_1 - 1.525633X_2 + 0.009528X_3 + e$$

From the regression equation above, the following explanation is obtained:

1. The constant value of 86.33584 indicates that if all independent variables, namely the open unemployment rate (X1), poverty rate (X2), and economic growth (X3), remain constant or unchanged, the volume of the human development index (Y) is estimated to increase by 86.33584 percent.
2. The coefficient of -0.643690 for the Unemployment Ratevariable (X1) indicates a negative correlation with the HDI. This means that if the Unemployment Rate increases by 1 percent, the HDI will decrease by 0.643690 percent. Conversely, a 1 percent decrease is estimated to increase the HDI by 0.643690 percent.
3. The coefficient of -1.525633 for the poverty rate variable (X2) indicates a negative correlation with the HDI. If the number of poor people increases by 1 percent, the HDI could potentially decrease by 1.525633, and conversely, a 1 percent decrease would increase the HDI by the same amount.
4. The coefficient of 0.009528 on the economic growth variable (X3) indicates a positive relationship with the HDI. This means that every 1% increase in economic growth is estimated to drive an increase of 0.009528. Conversely, every 1% decrease will drive the HDI down by 0.009528.

Partial Test (T-Test)

The t-test, also known as the partial test, is used to evaluate the partial effect of independent variables (such as labor force, unemployment rate, and education) on poverty levels in Ngawi Regency. Decisions in the t-test are based on the following criteria:

- The null hypothesis (H_0) is accepted if the probability value (p-value) of the t-test is greater than 0.05 or if the calculated t-value is smaller than the t-table value. This indicates that the independent variable does not have a significant influence on the dependent variable partially.

- The alternative hypothesis (H_a) is accepted if the probability value (p-value) from the t-test is less than 0.05 or if the calculated t-value is greater than the table t-value. This means that the independent variable has a partial significant effect on the dependent variable.

Based on Table 1 above, it can be explained as follows:

T-table calculation:

a) $\alpha = 0,05$

b) $df = n - k - 1 = 12 - 3 - 1 = 8$

c) $t\text{-tabel} = (\alpha/2; df) = (0,025 ; 8) = 2,30600$

1. Open Unemployment Rate (X1)

The calculated t-value was -1.015692 with a significance level of 0.3490. Because the calculated t-value is smaller than the t-table ($-1.015692 < 2.30600$) and the significance level exceeds the 0.05 limit ($0.3490 > 0.05$), it can be concluded that the Open Unemployment Rate (OPT) has a negative but insignificant effect on the HDI in Bojonegoro when viewed partially.

2. Poverty Rate (X2)

The test results show a calculated t-value of -3.261694 with a significance level of 0.0172. Because the calculated t-value is smaller than the t-table ($3.261694 > 2.30600$) and the significance level is below 0.05 ($0.0172 < 0.05$), it can be partially concluded that the poverty rate has a negative and significant effect on the HDI in Bojonegoro.

3. Economic Growth (X3)

Based on the calculation results, the calculated t-value is 0.150210 with a significance level of 0.8855. Because the calculated t-value is smaller than the t-table ($0.150210 < 2.30600$) and the probability value exceeds 0.05 ($0.8855 > 0.05$), it can be concluded that the economic growth variable does not have a significant effect on the HDI in Bojonegoro partially.

Simultaneous Test (F Test)

The F-test, also known as the simultaneous significance test, is used to evaluate whether all independent variables in a regression model collectively have a significant effect on the

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dependent variable. In the context of this study, the F-test was applied to determine whether independent variables such as the number of workers, the unemployment rate, and education level simultaneously contribute significantly to changes in poverty levels in a region. The results of this test serve as the basis for assessing the overall relevance of the constructed regression model in explaining variations in poverty levels.

The F test criteria are as follows:

- H_0 is accepted: if the F-statistic probability is greater than 0.05.
- H_a is accepted: if the probability of F-statistic is less than 0.05.

Based on Table 1, to evaluate the joint influence of independent variables on the dependent variable, it can be analyzed through the following calculation results:

- a) The significance level (α) used is 0.05.
- b) The number of variables (k) is 4.
- c) The number of observations (n) is 12.
- d) The first degree of freedom (df_1) is calculated from $k - 1$, resulting in 3.
- e) $df_1 = n - k = 12 - 4 = 8$.
- f) F Table ($df_1; df_2$) = (3; 8) = 4.07.

Test assumptions:

H_0 is accepted if $F \text{ count} \leq 4.07$

H_0 is rejected if $F \text{ count} > 4.07$

H_0 is accepted if $\text{Prob} > F < 0.05$

H_0 is rejected if $\text{Prob} > F < 0.05$

Based on the calculations above, we can obtain:

From the results of the analysis that has been carried out, the F-statistic probability value was obtained at 0.013758, which is lower than the significance level of 0.05. In addition, the calculated F value was recorded at 8.560935, which is higher than the F table value of 4.07. Based on these results, it can be concluded that the independent variables consisting of the number of Unemployment Rate, poverty level and economic growth simultaneously have a significant effect on the HDI in Bojonegoro.

Coefficient of Determination Test (R^2)

The purpose of the coefficient of determination test is to assess the proportion of variation in the dependent variable that can be explained by the independent variables used. Based on the results listed in Table 4.8, the R^2 value obtained was 0.810623. This figure indicates that approximately 81% of fluctuations in the HDI in Bojonegoro Regency can be explained by the independent variables used in the model, namely the Unemployment Rate, poverty rate, and economic growth. Meanwhile, the remaining approximately 19% is influenced by aspects outside the focus of this study.

The Influence of the Unemployment Rate on Human Development Index in Bojonegoro Regency

Based on Figure 1, the analysis revealed that the partial unemployment rate did not significantly impact the Human Development Index (HDI) in Bojonegoro during the 2013–2024 period. This finding suggests that an increase in the Unemployment Rate rate in Bojonegoro tends to lower the HDI of Bojonegoro Regency. The analysis aligns with the existing hypothesis that rising unemployment rates can reduce community welfare.

This condition reflects the fact that the economic structure of Bojonegoro Regency is still dominated by capital-intensive and less labor-friendly sectors, thus limiting their contribution to job creation. Furthermore, the low skills and education levels of the majority of the workforce also hinder their ability to meet the qualifications required by existing industries (Regina et al., 2020). This mismatch between workforce competencies and job market needs leads to high unemployment, which in turn weakens the community's quality of life. Therefore, although economic growth in Bojonegoro may experience an increase, this will not necessarily be followed by an increase in the HDI without policies that encourage improved human resource quality and equal employment opportunities across various productive sectors.

One policy that can be implemented to address the high unemployment rate in Bojonegoro Regency is through the development of competency-oriented job training adapted to the demands of local industry, particularly the oil and gas and MSME sectors. Furthermore, the local government needs to encourage partnerships between educational institutions and the business community to create relevant curricula and open internship opportunities for students and job seekers. Furthermore, supporting MSMEs through access to capital and business mentoring is also crucial as a strategy for creating new jobs. Efforts to diversify the local economy and implement labor-intensive programs in villages are other alternatives that can directly absorb the workforce. These policies are expected to reduce unemployment and encourage a sustainable increase in the Human Development Index (HDI) in Bojonegoro. The results of this study support the findings obtained by (K.s Dewi, 2021).

The Influence of Poverty Rate on Human Development Index in Bojonegoro Regency

Referring to Figure 1, Based on the data analysis, it was found that the poverty rate variable exhibited a negative and statistically significant effect on the Human Development Index (HDI) in Bojonegoro from 2013 to 2024. This finding indicates that any increase in the percentage of poor people in the Bojonegoro region tends to reduce the HDI achievement. In other words, the higher the poverty rate, the lower the quality of human development, as reflected in the HDI (Tuasela, 2023). The analysis results align with the existing hypothesis, that the poverty rate has a negative and significant effect on the HDI. This means that if poverty levels are not controlled, the quality of human development, as reflected in the HDI, will decline. Conversely, a decrease in the poverty rate will improve the quality of human resources, ultimately strengthening the region's long-term competitiveness.

Poverty directly impacts the health index within the HDI, primarily through limited access to adequate health services. Residents with low economic status generally face obstacles in ensuring adequate nutrition, adequate housing, and access to preventive and curative medical

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services. Consequently, life expectancy, a key indicator of health, tends to decline. In Bojonegoro Regency, high poverty rates contribute to unequal access to health services between urban and rural areas, and exacerbate health risks for vulnerable groups such as infants and the elderly. The inability of the poor to access health services reflects the low contribution of the health index to the overall increase in the Human Development Index (HDI).

Beyond health aspects, poverty also significantly impacts the education dimension of the HDI, particularly in terms of expected years of schooling and average years of schooling. Economic limitations prevent most underprivileged families from having the financial capacity to adequately fund their children's education, leading to high dropout rates and minimal community involvement in higher education. In Bojonegoro, this condition is evident in the low educational attainment in several districts with relatively high poverty rates. This imbalance contributes to the weak quality of human resources, as education is a key factor in improving the skills and productivity of the population. Thus, high poverty rates indirectly hinder the rate of HDI increase through obstacles in the education sector. This study shows consistency with previous research conducted by (Za & Bhakti, 2019), (Ningrum j. w., 2020), (K.s Dewi, 2021).

The Influence of Economic Growth on Human Development Index in Bojonegoro Regency

Referring to Figure 1, during the 2012–2023 period, the education variable showed a negative relationship with the poverty rate. This relationship meets the criteria for statistical significance. This is indicated by a significance value of 0.0038, which is smaller than the 0.05 level. Thus, it can be concluded that the education variable has a statistically significant influence on the poverty rate. Therefore, H_0 is rejected and H_a is accepted.

Education, represented by the average years of schooling (ALS), has a negative and significant effect. This means that when ALS increases, the poverty rate decreases, and conversely, when ALS decreases, the poverty rate increases. According to Susanto & Indah (2019), low levels of education make it difficult for individuals to find work, ultimately leaving them without income and prone to poverty. Conversely, individuals with higher levels of education have a greater chance of finding work with decent wages, thereby improving well-being and reducing poverty.

This opinion is reinforced by Bloom's theory (2006), which asserts that education plays a crucial role in improving a society's social and economic well-being. Education not only provides basic knowledge and skills but also expands access to better job opportunities and boosts individual productivity. With adequate education, individuals are more likely to obtain decent employment, earn a stable income, and engage in high-value economic activities. This ultimately improves individual and household well-being and contributes to a sustainable reduction in poverty levels. This finding is in line with the research of Surbakti, et al (2023) which concluded that education has a positive and significant influence on poverty.

Conclusion

The Unemployment Rate indicates no significant effect on the Human Development Index (HDI) in Bojonegoro from 2013 to 2024. However, based on the significance value of 0.3490, which exceeds the 0.05 threshold, the test results are statistically insignificant. This means that an increase or decrease in the Unemployment Rate has no significant impact on the HDI in Bojonegoro. Therefore, it can be concluded that the available evidence is insufficient to reject the null hypothesis (H0), while the alternative hypothesis (Ha) states a significant effect between the Unemployment Rate and the HDI.

The poverty rate variable shows a significant relationship with the HDI in the 2013–2024 period. This result is confirmed by statistical testing with a significance level of 0.0172, which is below the 0.05 level. This finding indicates that as the poverty rate increases, HDI achievement tends to decline significantly. Thus, sufficient evidence is found to reject H0 and support Ha, which states that poverty has a significant influence on the development of the HDI in Bojonegoro.

Economic growth shows a statistically insignificant relationship with the HDI during the 2013–2024 observation period. This is evidenced by a significance value of 0.8855, which is well above the 0.05 significance limit. In other words, although in theory economic growth should drive an increase in the HDI, in this context this relationship is not yet strong enough to have an empirically significant effect. Therefore, the null hypothesis (H0) and the alternative hypothesis (Ha) cannot be rejected regarding the speculation of a significant effect of economic growth on the HDI.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

Funding acknowledgment (optional)

We would like to thank all the parties involved in this research.

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