



SIGNIFICANT ROLE OF THE HUMAN DEVELOPMENT INDEX IN ALLEVIATING POVERTY

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ABSTRACT

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During the pandemic, most of the population not only experienced a decrease in income but also experienced losses in various dimensions of life, such as health, education, and a decent standard of living. So far, poverty is measured by expenditure, and it has not been able to capture all of the above dimensions. Assessing multidimensional poverty provides more specific information so that policies are more relevant. This study evaluates factors and policies related to poverty in Indonesia, especially during the pandemic, using pooled data regression. The variables used are the Human Development Index (HDI), gross domestic product (GDP), population, and wages in 34 provinces in Indonesia from 2012 to 2021. The results show that HDI has a significant negative influence and population has a positive and significant influence on poverty. In Indonesia, the pandemic reduced people's incomes, which increased poverty. Unlike other studies, this study shows that the 2020 wage stagnation policy implemented by the government effectively reduces poverty in Indonesia. During this period of economic recovery, the policies for providing employment and meeting public needs are believed to reduce the level of poverty.

Contribution/Originality: This study includes the HDI variable and compares poverty levels before and after the pandemic using a panel data approach in Indonesia, which other researchers have not done.

1. INTRODUCTION

Economic conditions that have experienced shocks due to the Covid-19 pandemic have impacted increasing poverty rates, including in Indonesia. Poverty has become one of the social problems that can disrupt the economy. In the 21st century, social inequality is increasing and is developing into multidimensional poverty, and not only in underdeveloped nations (Kormishkina, Kormishkin, Ermakova, & Koloskov, 2021; Liu & Xu, 2016). In 2020–2021, the world experienced the most severe global crisis since the second world war. This health crisis was caused by the Covid-19 virus. The disease spread quickly, and the slow response of the public and government policies caused supply shocks to economic demand. It is not without reason for the government's delay in responding to the spread of the Covid-19 virus. Non-pharmaceutical interventions in response to a pandemic, such as mandatory social distancing, lockdowns, closure of shops, among others, make a considerable contribution to economic costs (Decerf, Ferreira, Mahler, & Sterck, 2021; Foschiatti & Gasparini, 2020).

Poverty is a problem faced by all countries in the world to varying degrees. In addition, poverty has an uneven distribution between regions within a country. Almost half of all poor people live in the minority population of South Asia, but the level of inequality is still significant. In almost every country, poverty is concentrated in certain areas, usually rural or resource-poor areas. The problem of poverty is closely related to other problems such as environmental issues (Nguyen & Kakinaka, 2019).

Discussing the concept of poverty and overcoming it can't be separated from two principal paradigms, particularly the neo-liberal and social democracy paradigms. The primary awareness of the neo-liberal paradigm is the hassle of poverty and is primarily based on the use of earnings as the only indicator of the poverty line. On the opposite side, the paradigm of social democracy believes that the issue of poverty is structural trouble. Equality is a critical prerequisite for gaining independence and freedom to access resources, which include education, health care and sufficient earnings (Mad, Syarif, Saranani, & Rumbia, 2019).

Poverty is a multidimensional problem that has various impacts (Mankiw, 2019). Poverty is one of the normalizations of component indicators (Kovacevic & Pflug, 2011) thus it is the biggest problem facing all developing countries. However, some developing countries have succeeded in driving economic development in production and national income. The condition of poverty in a country or region also reflects the level of welfare of the population living in that country or region. Indonesia is still a developing country, and poverty is a significant concern.

Moreover, economic development aims to enhance the welfare and profit distribution for the network. The populace additionally performs an essential function in monetary improvement, consistent with Jhingan (2011) who states that the entire populace is related to increasing profits, which more or less displays the development of an outdated financial system.

Consistent with the views of political economist Joseph Schumpeter, the growth in a nation's profits may be volatile and the role of entrepreneurs is significant in influencing economic growth through innovation and technological change. In keeping with Schumpeter, funding inside the economic system may be divided into agencies, particularly independent funding (self-reliant funding) and capital funding (triggered funding). The neoclassical idea of low operating capital ratios in growing international locations will increase the extent of funding. Subsequently, loose marketplace reforms imposed on closely indebted global financial institutions ought to grow funding, increase productiveness, and lift dwelling requirements (Todaro, 2000). However, the classical view differs from that of Keynes, who stated that "supply determines its personal demand", which means the growth in items and capital in society will create growth in countrywide manufacturing for monetary improvement.

In early March 2020, the Covid-19 virus entered Indonesia with the number of victims increasing every week and the distribution of affected areas became increasingly widespread. The Indonesian government declared this outbreak a non-natural national disaster. With a variety of physical and cultural environments, and the fact that Indonesia is an archipelagic country, each region has a different response for dealing with a pandemic (Widiawaty, Lam, Dede, & Asnawi, 2022). The government has implemented various policies to prevent the spread and to interrupt the chain of Covid-19, which has led to monetary activities being affected and even stopping production. The government also limited the mobility of the population, which has affected economic activity. Urban areas that have a larger formal sector and are engaged in manufacturing and/or tourism experienced a significant reduction in mobility (Khoirunurrofik, Abdurrachman, & Rachmanto, 2022). The limited fiscal space of developing countries has caused them to collapse as a result of Covid-19, e.g., commodity prices, tourism, remittances, and capital flows (Hausmann & Schetter, 2022). This has led to a decrease in productivity and unemployment, resulting in the emergence of new poor people who, in the aggregate, have increased the number of poor people (Tarigan, Sinaga, & Rachmawati, 2020). This test models the proportion of poverty based on the human improvement index using PB-spline nonparametric regression. Through this version the authorities are anticipated to make efforts to manipulate sources to enhance the Human Development Index to lessen the share of poverty (Tarigan et al., 2020).

Efforts to deal with poverty have been made at both regional and national levels by the government. But until now, poverty has not completely disappeared from Indonesia. Approximately 30% of the population is poor or vulnerable to poverty, which shows that Indonesia's vulnerability to poverty is relatively high (Purwono, Tamtelahitu, & Mubin, 2020). One of the factors responsible for the increase in poverty is the increase in the number of people who have the potential to increase the number of unemployed. According to Statistics Indonesia data, in 2021, the percentage of open unemployment in Indonesia was 6.49%. The unemployment rate is quite high when compared to the percentage in the last five years. Population problems in the form of high mortality rates are caused by the poor quality of health facilities, which has the potential to increase poverty in Indonesia.

Poverty also intersects with problems related to GDP, education, health, and other problems that are generally closely related to poverty. GDP is the amount of gross value-added arising from all sectors of the economy in a region. An increase in GDP can also be interpreted as economic growth. According to Tarigan et al., (2020), economic growth is not just calculated from the overall GDP.

According to the United Nations Development Programme (UNDP), the development of a country is an exclusive development. Development only takes into account aspects of growth while ignoring the availability of employment, poverty alleviation and the environment, and sometimes there is a relationship between high economic growth with high unemployment and poverty rates, and environmental damage due to the development process. Economic growth can significantly reduce the number of poor people and further accommodate inequality or low-income equality. But it is worth paying attention to how income distribution spreads through the strata of society so that a decrease in GDP will impact household consumption (Rimawan, Alwi, Ismunandar, & Aryani, 2020).

Two processes are emphasized in the human development paradigm: The development of human capabilities and their use in society and how humans make decisions in all aspects of their lives (Dasic et al., 2020). The Human Development Index (HDI) can be said to be a strategic benchmark used in assessing the efforts and performance of a comprehensive development program in different regions. Therefore, the HDI can be regarded as an overview of the output of development programs realized a few years earlier. The HDI was developed in order to create permitting surroundings for humans to revel in protracted, wholesome, and innovative lifestyles (Al-Nasser & Al Hallaq, 2019). According to Statistics Indonesia, the Human Development Index reflects the development of quality resources, including education, health, income, and so on. The HDI is one of the critical methods used to measure human improvement and variables in overcoming the problem of poverty.

Law number 6 of 2014, which was then continued with government regulation number 43 of 2014, states the implications or obligations of development planning in Indonesia starting from the lowest level of government (village) and shows the government's political alignment and determination to encourage development in a balanced and equitable manner. Optimal and effective development planning requires accurate and comprehensive data at the district/city, sub-district, and village levels. To create a fairer economy and drive developments in poverty alleviation, the government's top priority is short-term, medium-term, and long-term development to improve the performance of human development (Amaluddin, Payapo, Laitupa, & Serang, 2018).

Based on the studies that have been carried out, many factors affect the poverty level. The unstable economic condition due to the Covid-19 pandemic has also exacerbated the condition of poverty. This study aims to analyze how the human development index, GDP, population, and wage rate affect the poverty rate in Indonesia. Unlike previous research, this study includes the factors of HDI, GDP, population, and wage on the poverty rate in Indonesia in the periods before and during the Covid-19 pandemic.

2. LITERATURE REVIEW

Poverty has been a problem for a long time. In previous studies, it has been shown that one of the factors that affects poverty is population size. Population has a positive influence and is able to increase the level of poverty

(Meo et al., 2018). Poverty is a circumstance in which someone's financial lack of ability to fulfill primary needs in the form of clothing, food, education, housing, and proper health care.

Human development is essentially the broadening of choices in society with the goal of reaching all members of society. Human improvement consists of numerous different elements; further to the financial issue, there also are social, political, and cultural elements that contribute to bettering humanity. Consequently, the human improvement paradigm consists of facets, specifically enhancing health, schooling and degrees of ability. The opposite facet is the usage of human capacities for effective cultural, social and political activities. This factor of human improvement may be visible by means of the HDI. The HDI is an opportunity to see the degree of improvement using gross domestic product. The HDI of a village or region shows how far the area has progressed in the achievement of its goals, especially life expectancy, basic training for all levels of society, and the ability of the community to afford basic needs.

Education level and the health of the populace are the dominant elements that must take precedence to enhance human attributes. The stages of education and the level of public health determine the ability to absorb and control financial assets, including technology and principles. Thus, the population's wealth will increase, which improves the welfare among communities. Financial improvement is one of the strategies for evaluating monetary improvement and generating profit. With monetary increase, it is expected that the profits of technology network owners will also increase, which, in turn, will increase GDP and reduce poverty. Poverty alleviation techniques need to recall structural, cultural and political elements (Yusuf & Dai, 2020).

Poverty can be divided into structural, natural, and cultural (Sambas, 2022). The poverty rate has a relationship with GDP in the long run. HDI and GDP have a negative relationship in the long run, while poverty levels and GDP have a positive relationship with poverty. Meanwhile, in the short term, HDI and GDP have no relationship with poverty (Athirah, 2015). Poverty can be reduced if the economy shows quality growth accompanied by higher employment and controlled inflation (Athirah, 2015; Murjani, 2019; Sambas, 2022). The low Human Development Index (HDI) is also one of the causes of poverty. The Human Development Index is one of the indicators of the development of an area that has a negative relationship with poverty conditions. The function of the HDI and other human development indicators will be the key to the implementation of direct planning and development (Berk, Dodd, & Henry, 2006).

According to Regina and Arifin (2020), empirical studies that have been carried out prove that the low level of poverty can be a stimulus for the increase in the Human Development Index in Indonesia. Poverty is seen as an inability due to helplessness to have access to or control of financial sources; therefore, poverty relief and equitable improvement are critical resources for the authorities (Efendi, Indartono, & Sukidjo, 2019; Regina & Arifin, 2020).

Efforts to increase the Human Development Index (HDI) through increasing human resources will help to overcome the problem of poverty because various economic development programs aimed at alleviating poverty will only be effective with the support of resource mobilization (Aisyah & Renggani, 2021) so that regional economic development becomes an important consideration in macroeconomic policy making (Nainggolan, Nainggolan, & Sembiring, 2020). The top priorities are to improve the quality of health services in communities and improve education in order to reduce poverty (Aisyah & Renggani, 2021; Fahrika, Salam, & Buhasyim, 2020; Nainggolan et al., 2020).

HDI is used as a determinant of whether or not a rustic belongs to an advanced, growing or underdeveloped economy and is additionally used as a measuring device for the effect of financial regulations (Abdelina & Saryani, 2021). On the other hand, income distribution is an important aspect in the public policy agenda that has growing support from the community as a driver of a higher minimum wage as an anti-poverty tool (Abdelina & Saryani, 2021; Sotomayor, 2021).

Within the labor marketplace, it is critical for an enterprise to agree the wages paid to its employees. Numerous rules concerning the minimum salary are set regarding the lowest amount that can be paid (Wahyuningsih,

Yunaningsih, Priadana, Darma, & Purwadi, 2020). Tackling poverty and inequality in a country can be done through the minimum wage, which appears to be immediate and costless when it comes to budgeting. The growth in wages will lessen the distinction in profit ranges among rural and urban regions so that oversupply of hard work will no longer cause issues regarding monetary increase (Budi & Adzim, 2017; Wahyuningsih et al., 2020).

In some developing countries, the debate has turned into decisive action. Despite increased social and community support and a higher minimum wage as a tool of anti-poverty policy, little is known about its effectiveness in reducing poverty or inequality in developing countries. Using various estimates of differences in taking advantage of regional income variations and 21 Brazilian national wage increases, the study conducted found that within a few months of this increase in the minimum wage, poverty and inequality decreased by 2.8% and 2.4%, respectively (Sotomayor, 2021).

A study of the US poverty price during the pandemic showed that the month-to-month poverty rate increased from 15% to 16.7% from February to September 2020 (Parolin, Curran, Matsudaira, Waldfogel, & Wimer, 2020). According to Pereira and Oliveira (2020), interventions in the social and economic spheres to overcome hunger and reduce the impact of poverty are challenges in controlling the Covid-19 pandemic in low-income countries. According to Li, Vidyattama, La, Miranti, and Sologon (2020), in the absence of government intervention, gross market income and disposable income will drop drastically, with severe consequences in this case causing an increase in income inequality and poverty rates. Based on several Covid-19 studies mentioned above, Covid-19 has an indirect influence in increasing inequality and poverty, but it can be suppressed through government intervention to contain the spread of Covid-19 (Li et al., 2020; Pereira & Oliveira, 2020).

The world economy over the past two decades has focused mainly on increasing economic growth or real national growth because this is considered a benchmark for economic performance. Figuring out excessive monetary increase is anticipated to help the authorities make use of all assets optimally (Ginting, Sudibia, Dewi, & Marhaeni, 2020). According to Sihite, Daulay, Lubis, and Parinduri (2019), economic growth has a positive impact on poverty, but the government must be more effective in managing village fund programs so that the poverty rate is reduced and the welfare in cities and villages increases.

According to Rimawan et al. (2020), the allocation of funds to villages does not affect poverty. This is likely due to the program carried out which prioritizes infrastructure development that does not increase community empowerment. Programs to reduce poverty and social inequality on a large scale are also implemented in some US states. The goal is to improve the economic and social levels of the (Kormishkina et al., 2021). Policymakers and implementers can make positive decisions when accompanied by a comprehensive analysis of the poverty status of citizens before designing programs to address the challenges (Danaan, 2018).

3. RESEARCH METHODS

This research uses data on the poverty rate, Human Development Index (HDI), poverty rate, GDP, and regional minimum wage levels in 34 provinces for the period from 2012–2021 and applies the panel data regression method. Panel data is a combination of time series data and cross-sectional data. The time series data in this study is the 2012–2021 period, and the cross-sectional data is from 34 provinces in Indonesia. Testing is divided into two periods, the period before the pandemic (2012–2019) and the period during the pandemic (2020–2021). A Hausman test was conducted to determine the right model between the fixed effects and random effects models, followed by a classic assumption test. The panel data regression equation can be written as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} \quad (1)$$

$i = 1, 2, \dots, N; t = 1, 2, \dots, T$

Where:

N = number of observations.

T = timeframe.

$N \times T$ = number of panel data.

3.1. Model Estimation

The constant impact version assumes that variations among people can be adjusted to intercept variations. To estimate the panel information, the constant effect version uses a dummy variable to intercept differences that the explanatory variables may cause. This estimation model is commonly referred to as the least squares dummy variable (LSDV) technique. The equation of estimating the model using the fixed effects model is shown in Equation 2.

$$Y_{it} = (\alpha + U_i) + X_{it}'\beta + V_{it} \quad (2)$$

Where Y_{it} is the dependent variable, X_{it} is a K -dimensional row vector of explanatory variables excluding the constant, α is the intercept, β is a K -dimensional column vector of parameters, U_i is an individual-specific effect, and V_{it} is an idiosyncratic error term.

The random effects model will estimate panel data where disruptive variables can correlate over time and between individuals. The advantage of using a random effects model is that heteroskedasticity is eliminated. This model is also called the error component model (ECM) or generalized least squares (GLS) technique. The equation for estimating the model using the random effects model is shown in Equation 3.

$$Y_{it} = \alpha + X_{it}'\beta + (U_i + V_{it}) \quad (3)$$

3.2. Model Determination

The Hausman test is a statistical test that aims to determine the most appropriate model between the fixed effects and the random effects models. The most appropriate model is chosen by looking at whether the probability value (p-value) is less or greater than $\alpha = 5\%$ (0.05). If the p-value $< \alpha = 5\%$ (0.05), then H_0 is accepted and the fixed effects model is chosen. However, if the p-value $> \alpha = 5\%$ (0.05), then H_0 is rejected and the random effects model is chosen.

3.3. Test of Classical Assumptions

The classical assumption test is a prerequisite that needs to be performed on regression analysis. According to Gujarati (2004), in the regression of panel data, it is unlikely that there is a multicollinearity problem between variables so the classical assumptions used are autocorrelation and heteroskedasticity tests. An autocorrelation test is a condition in which a variable of interference in a certain period corresponds to a variable in another period. Autocorrelation can be caused by several factors, including errors in determining the model, the use of lag on the model and including important variables (Gujarati, 2004).

Autocorrelation causes the estimated parameters to be biased and have the smallest variants, so they are inefficient. This test is performed to determine whether there is an autocorrelation problem in the model. The problem of heteroskedasticity arises when the residual value of the regression model has a non-constant variance. In other words, each observation varies greatly due to changes in basic conditions that are not included in the model specifications. This test is carried out to determine whether there is an inequality among variants from the residual in the model. If the assumption of heteroskedasticity is not met, then the model is declared invalid as a means of forecasting.

3.4. Newey–West Standard Error

The Newey–West estimator, developed by Whitney K. Newey and Kenneth D. West in 1987, can correct standard errors in regression results. The adjustment of the standard error with this method guarantees consistency in the covariance matrix. The Newey–West estimator is a method resulting from the development of the White standard error method, which is only immune to heteroskedasticity problems, while the Newey–West

method is immune to heteroskedasticity and autocorrelation problems (Wooldridge, 2010). If the assumption of heteroskedasticity is not met, then the model is declared invalid as a means of forecasting. Meanwhile, the impact of the autocorrelation problem in the data is that the result of regression or standard error will be biased (Wooldridge, 2010). The Newey–West standard error equation is as follows:

$$se_{newey-west}(\hat{\beta}_p) = \left(\frac{se(\hat{\beta}_p)}{\hat{\sigma}^2} \right)^2 \sqrt{\hat{v}} \quad (4)$$

Where, $se(\hat{\beta}_p)$ is the *standard error* parameter p of the initial regression, and $\hat{\sigma}^2$ is the estimator in a variety of early regression models.

4. RESULTS AND DISCUSSION

4.1. Panel Data Model Estimation, Fixed Effects and Random Effects

This testing is divided into two periods, namely before and during the Covid-19 pandemic. The first period is from 2012–2019 and the second period is from 2020–2021. The estimated fixed effects and random effects results for the periods before and during the pandemic can be seen in Table 1.

Table 1. R-squared values and Prob > F models.

Diagnostic test	Fixed Effects		Random Effects	
	Before pandemic	During pandemic	Before pandemic	During pandemic
R ²	0.852	0.710	0.833	0.954
Prob>F	0.000	0.001	0.000	0.000

The results of the fixed effects model estimates for R-squared and Prob>F values before the Covid-19 pandemic showed an R-squared value of 0.852, which means that the independent variables in the model can explain 85.2% against dependent variables and the rest is explained by variables outside the model. The results of the simultaneous test are seen in the Prob>F value of 0.000 or less than α 0.05. It can be concluded that the variables of HDI, GDP, population, and wage simultaneously have a significant influence on the poverty variable. The R-squared value during the pandemic is 0.710, which means that the independent variables in the model can explain 71% against dependent variables and the rest is explained by variables outside the model. The results of the simultaneous test are seen in the Prob>F value of 0.001, or less than the α 0.05, so it can be concluded that the variables of HDI, GDP, population, and wage simultaneously have a significant influence on the poverty variable.

The random effects model estimates for R-squared before the Covid-19 pandemic showed a value of 0.833, which means that the independent variables in the model can explain 83.3% against dependent variables and the rest is explained by variables outside the model. The results of the simultaneous test are seen in the Prob>F value of 0.000, or less than α 0.05, so it can be concluded that the variables of HDI, GDP, population, and wage simultaneously have a significant influence on the poverty variable. During the Covid-19 pandemic, the R-squared value is 0.954, which means that the independent variables can explain 95.4% against dependent variables and variables outside the model explain the rest. The results of the simultaneous test are seen in the Prob>F value of 0.000, or less than α 0.05, so it can be concluded that the variables of HDI, GDP, population, and wage simultaneously have a significant influence on the poverty variable.

Table 2. t-stat values and probability for the fixed effects and random effects models.

Variable	t-statistics				Probability			
	Fixed Effects		Random Effects		Fixed Effects		Random Effects	
	Before pandemic	During pandemic	Before pandemic	During pandemic	Before pandemic	During pandemic	Before pandemic	During pandemic
HDI	-5.38	0.21	-4.74	-2.55	0.000	0.901	0.000	0.011
GDP	-2.24	-4.48	-10.84	-0.52	0.026	0.000	0.000	0.601
POP	30.59	-0.83	16.12	9.38	0.000	0.412	0.000	0.000
WAGE	-2.26	0.23	3.76	-1.24	0.025	0.818	0.000	0.216

Table 2 describes the t-statistic and probability values for the fixed effects and random effects models. The results of the fixed effects model estimates for the t-statistic values and probabilities before and during the Covid-19 pandemic showed different results. Partial test results before the pandemic showed a probability value for the HDI variable of 0.000, or less than α 0.05, and a t-statistic value of -5.38. This can be interpreted to mean that the HDI variable has a negative and significant effect on poverty. The probability value for GDP is 0.026, or less than α 0.05, and the t-statistic value is -2.24. This can be interpreted to mean that the GDP variable has a negative and significant effect on poverty. The probability value of the population variable is 0.000, or less than α 0.05, and the t-statistic value is 30.59. This can be interpreted to mean that population variable has a positive and significant effect on poverty. The probability value of the wage variable is 0.025, or less than α 0.05, and the t-statistic value is -2.26. This can be interpreted to mean that the wage variable has a negative and significant effect on poverty.

The partial test results during the Covid-19 pandemic showed a probability value for the HDI variable of 0.901, or greater than α 0.05, and a t-statistic value of 0.21. This can be interpreted to mean that any increase in the Human Development Index has no impact on poverty. The probability value for GDP is 0.000, or less than α 0.05, and the t-statistic value is -4.48. This can be interpreted to mean that the GDP variable has a negative and significant effect on poverty. The probability value of the population variable is 0.412, or greater than α 0.05, and the t-statistic value is -0.83. It can, therefore, be interpreted that an increase in the population of any amount has no effect on the level of poverty. The probability value of the wage variable is 0.818, or greater than α 0.05, and the t-statistic value is 0.23, so it can be interpreted that an increase in wage of any amount has no effect on the poverty rate.

The random effects model showed different results for the t-statistic values and probabilities before and during the Covid-19 pandemic. Partial test results before the pandemic showed a probability value for the HDI variable of 0.000, or less than α 0.05, and a t-statistic value of -4.74. This can be interpreted to mean that the HDI variable has a negative and significant effect on poverty. The probability value for GDP is 0.000, or less than α 0.05, and the t-statistic value is -10.84. It can be interpreted that GDP has a negative and significant effect on the poverty rate. The probability value of the population variable is 0.000, or less than α 0.05, and the t-statistic value is 16.12. This can be interpreted to mean that the population variable has a positive and significant effect on poverty. The probability value of the wage variable is 0.000, or less than α 0.05, and the t-statistic value is 3.76. This can be interpreted to mean that the wage variable has a positive and significant effect on poverty.

Partial test results during the Covid-19 pandemic showed a probability value for the HDI variable of 0.011, or less than α 0.05, and a t-statistic value of -2.55. This can be interpreted to mean that the HDI variable has a negative and significant effect on poverty. The probability value for GDP is 0.601, or greater than α 0.05, and the t-statistic value is -0.52. It can be interpreted that the increase in GDP has no effect on the poverty rate. The probability value of the population variable is 0.000, or less than α 0.05, and the t-statistic value is 9.38. This can be interpreted to mean that population variable has a negative and significant effect on poverty. The probability value of the wage variable is 0.216, or greater than α 0.05, and the t-statistic value is -1.24. It can be interpreted that an increase in the wage of any amount has no effect on the poverty rate.

4.2. Hausman Test

After estimating the fixed effects and random effect models, to determine the right model, a third test is carried out. If the probability value of the Hausman test is less than 0.05 then the fixed effects model is the best choice. Table 3 presents the results of the Hausman test for the panel data model.

Table 3. Hausman test results.

Diagnostic test	Before pandemic	During pandemic
Prob>chi2	0.000	0.009

The Hausman test results showed a prob>chi2 value of 0.000, or less than α 0.05. Thus, it can be concluded based on Hausman tests in the periods before and during the Covid-19 pandemic that the estimated fixed effects model is more appropriate for this study.

4.3. Classical Assumption Autocorrelation and Heteroskedasticity Tests

An autocorrelation test is a condition in which a variable of interference in a certain period corresponds to a variable in another period. This test is carried out to find out whether or not there is an autocorrelation problem in the model.

Table 4. Autocorrelation and heteroskedasticity test results.

Classical Assumption	Diagnostic test	Before pandemic	During pandemic
Autocorrelation	Prob>F	0.000	0.000
Heteroskedasticity	Prob>chi2	0.000	0.000

The test results in Table 4 show that the Prob>F value before and during the pandemic was 0.000. Research can be said to be free from autocorrelation problems when the Prob>F value is greater than 0.05. So, it can be concluded that this study has an autocorrelation problem.

The problem of heteroskedasticity arises when the residual value of the regression model has a non-constant variance. In other words, each observation varies greatly due to changes in basic conditions that are not included in the model specifications. The criterion used to determine whether there is a heteroskedasticity problem is a Prob>chi2 value greater than 0.05. The test results show that the value of Prob>chi2 before and during the Covid-19 pandemic was 0.000. Based on the results of these tests, it can be concluded that in this study there is a problem of heteroskedasticity.

4.4. Newey–West Standard Error

Based on the results of autocorrelation and heteroskedasticity tests, it shows that there are autocorrelation and heteroskedasticity problems in the study. To solve the problem of autocorrelation and heteroskedasticity, it is necessary to do so using the regression of the Newey–West standard error model.

The results of the Hausman test determined that the right model to use was the fixed effects model. However, in this study there are problems of autocorrelation and heteroskedasticity, so it is necessary to correct the Newey–West standard error in the regression model, which is a procedure for correcting standard errors in the model; however, the standard error is not much different from the parameters. The Newey–West standard error method is a development of the White standard error method, which is only able to overcome heteroscedasticity problems, while the Newey–West standard error is able to overcome the problem of both heteroskedasticity and autocorrelation (Wooldridge, 2010). Next, transformations are carried out on the model with the aim of overcoming

the existing problems of heteroskedasticity and autocorrelation. The transformed standard error will result in a regression with an unbiased standard error and the test results become valid (see Table 5).

Table 5. Fixed effects with the Newey–West standard error.

Variable	t-statistic		Probability	
	Before pandemic	During pandemic	Before pandemic	During pandemic
HDI	-5.06	-3.16	0.000	0.002
GDP	-1.95	0.41	0.052	0.681
POP	12.91	6.76	0.000	0.000
WAGE	-1.63	-1.53	0.104	0.132

After corrections were made to the standard error in the period before the Covid-19 pandemic, the probability value for the HDI variable was 0.000, or less than α 0.05, and the t-statistic value was -5.06. This can be interpreted to mean that the HDI variable has a negative and significant effect on poverty. The probability value for GDP is 0.052, or greater than α 0.05, and the t-statistic value is -1.95. This can be interpreted to mean that the GDP variable has no effect on poverty. The probability value of the population variable is 0.000, or less than α 0.05, and the t-statistic value is 12.91. This can be interpreted to mean that population variable has a positive and significant effect on poverty. The probability value of the wage variable is 0.104, or greater than α 0.05, and the t-statistic value is -1.63. This can be interpreted to mean that the wage variable has no effect on poverty.

4.5. The Relationship Between the HDI and Poverty

The HDI variable in the period before the Covid pandemic (2012–2019) had a partial negative and significant influence on poverty in Indonesia. In the 2020–2021 period, during the Covid-19 pandemic, it also showed the same results where the HDI variable had a disastrous and vast impact on poverty in 34 provinces in Indonesia. Lower poverty indicates that the HDI can grow productivity among workers so that it provides sufficient earnings to fulfill the needs and desires of people to have a good standard of living. One of the causes of poverty is the variation in human resources. The low quality of human assets is a result of poor quality schooling, deprivation of opportunities, discrimination, or because of heredity (Landapa & Purbadharmaja, 2021). There are three additional factors of the HDI, specifically the overall life expectancy of society, the duration and frequency of training, and the issue of consistent capital expenditure. If these three factors progress, then it can be stated that there has been positive development. Training also has an important function in increasing the potential of the workforce and expanding capability in the financial sector.

High income ensures a high-quality level of schooling. This study reinforces the findings of preceding studies, specifically the study by Prasetyoningrum and Sukmawati (2018), which confirmed that the HDI has a sizeable negative impact on poverty in Indonesia. Those effects support the preceding idea that growth within the HDI could lessen poverty. The observation carried out by Dasic et al. (2020) in the Balkans also reinforced this argument; HDI, as a degree of common success in key factors of human improvement (having a good standard of living and being educated), performs a vital function in poverty reduction efforts in the Western Balkan nations.

4.6. The Relationship of GDP Variables to Poverty

The GDP variable in the 2012–2019 period before the pandemic had a partial negative but insignificant effect, while during the pandemic, GDP had a positive but insignificant influence on poverty. This means that if the per capita income of a community decreases, the poverty level will increase. The per capita income of the people in an area can be used as a parameter for the level of welfare. When per capita income rises, people can meet their basic needs easily and poverty can be reduced. It also identifies that the greater the per capita income of a community, the more prosperous the area will be.

The improvement of GDP can, in a roundabout way, lessen poverty that is constantly diagnosed by the lack of ability of the network to satisfy basic needs. It can be stated that once the financial system of an area increases, the poverty level will decrease. For a few areas, the improvement of GDP has no longer had an effect on all ranges of society. Concerning efforts to enhance public welfare, excessive GDP also needs to be observed by means of equitable improvement. Movements centered on excessive GDP will pose important issues, particularly financial inequality and poverty.

4.7. The Relationship of Population Variables to Poverty

The population variable in the 2012–2019 period before the pandemic had a partial positive and significant influence on poverty. In the 2020–2021 period during the pandemic, it also showed the same results where the population variable had a positive and significant effect on poverty in 34 provinces in Indonesia. Population growth affects poverty because humans develop much faster than the production of agricultural products, which causes the population to have difficulty meeting basic needs and thus has an impact on increasing poverty.

Population growth is a dynamic balance between the power of adding and the power of subtracting. The population increased due to the increase in losses. But simultaneously, the number of inhabitants is reduced by the death of people of different ages. Meanwhile, the same situation also occurs in migration where migrants enter an area, increasing the population. In other words, population growth is a comparison between the main components, namely fertility, mortality, immigration, and emigration (Bucci, Eraydin, & Müller, 2018). Population growth rates in developing countries are generally higher than in developed countries, and population growth rates in rural areas are also higher, as found in supporting studies, e.g., Vitenu-Sackey and Barfi (2021).

4.8. The Relationship of Wage Variables to Poverty

The wage variable in the 2012–2019 period before the Covid-19 pandemic had no effect on poverty. Likewise, in the 2020–2021 period during the pandemic, the wage variable did not affect poverty. From the calculation results, it was found that wage had a negative but insignificant effect on poverty.

The Covid-19 pandemic has had an impact on economic conditions and the ability of companies to fulfill workers' rights, especially the minimum wage requirements. The problem of minimum wage isn't always the most effective way of determining the amount paid; the efforts made by local governments and enterprises to draw funding to the areas need to be addressed. This, in turn, will influence the introduction of more job opportunities. With the pandemic almost over, the growth of the minimum wage has a new effect on both workers and employers or companies. For workers, the increase in the minimum wage is believed to be able to support the purchasing power and consumption of households and can maintain stability and create a conducive atmosphere for industrial relations. However, from the point of view of companies, if the current conditions force the minimum wage to continually rise, it will not benefit workers if companies are forced to close. For employers who are unable to pay the minimum wage to workers, the consequence will be termination of employment. The impact of this will add to the unemployment rate going forward (Mangeswuri, 2021).

In the midst of the Covid-19 pandemic, the decision not to raise the minimum wage in 2021 has become a dilemma for the central government. The government could provide other solutions, such as policies in the form of stimulus and relaxation for business actors. It is also important to strengthen the social safety net, especially through the expansion of the target of direct cash transfer programs for unprotected groups of workers. This not only has an impact on workers' welfare and social stability, but also helps the economic recovery. In terms of capable entrepreneurs, it is also expected that good faith will not enable Covid-19 to prevent wages from increasing. The willingness of all parties to work together through difficult times is essential.

5. CONCLUSION

This study aimed to evaluate factors and policies related to poverty in Indonesia, especially during the pandemic, using pooled data regression. The HDI variable in the period before the Covid pandemic (2012–2019) had a partial negative and significant influence on poverty in Indonesia. In the 2020–2021 period, during the Covid-19 pandemic, it also showed the same results where the HDI variable had a disastrous and vast impact on poverty in 34 provinces in Indonesia. The lower cost of poverty due to the growth of the HDI grows productivity among workers. Hence, it provides sufficient earnings to fulfill the needs and desires of people to have a good standard of living. A good standard of education is ensured by substantial income. Training is essential for boosting one's capacity to absorb the modern culture and expanding one's capacity to achieve financial growth. This analysis supports the conclusions of earlier studies that the HDI has a sizable detrimental effect on poverty in Indonesia. The ability of the network to meet fundamental necessities is a continual indicator of poverty, and an increase can indirectly reduce GDP. A community's prosperity will increase as its per capita income rises. Financial inequality, and poverty in particular, will be significant issues raised by movements focused on excessive GDP.

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REFERENCES

- Abdelina, A., & Saryani, L. (2021). Poverty factor analysis and economic growth against the index human development (ipm) in padangsidempuan city. *Journal of Industrial Engineering & Management Research*, 2(3), 18-28.
- Aisyah, S., & Renggani, T. D. (2021). Determinants of Indonesia non-oil and gas exports to non-traditional market. *Business and Accounting Research (IJEBAAR) Peer Reviewed-International Journal*, 5(3), 1136–1142.
- Al-Nasser, A., & Al Hallaq, S. S. (2019). Impact of human poverty on the human development index in Jordan within the period 2003-2016. *International Journal of Business and Society*, 20(2), 552-562.
- Amaluddin, A., Payapo, R. W., Laitupa, A. A., & Serang, M. R. (2018). A modified human development index and poverty in the villages of west seram regency, Maluku province, Indonesia. *International Journal of Economics and Financial Issues*, 8(2), 325-330.
- Athirah, N. (2015). Gross domestic product (GDP) relationship with human development index (HDI) and poverty rate in Malaysia. *Perkem Proceedings, (September)*, 10, 211–217.
- Berk, M., Dodd, S., & Henry, M. (2006). The effect of macroeconomic variables on suicide. *Psychological Medicine*, 36(2), 181-189. Available at: <https://doi.org/10.1017/s0033291705006665>.
- Bucci, A., Eraydin, L., & Müller, M. (2018). Dilution effects, population growth and economic growth under human capital accumulation and endogenous technological change. *Journal of Macroeconomics*, 62, 103050. Available at: <https://doi:10.1016/j.jmacro.2018.08.003>.
- Budi, S. A., & Adzim, F. (2017). Determinant of poverty in Indonesia. *Economics Development Analysis Journal*, 6(1), 22-29. Available at: <https://doi.org/10.15294/edaj.v6i1.22197>.
- Danaan, V. V. (2018). Analysing poverty in Nigeria through theoretical lenses. *Journal of Sustainable Development*, 11(1), 20-31. Available at: <https://doi.org/10.5539/jsd.v11n1p20>.
- Dasic, B., Devic, Z., Denic, N., Zlatkovic, D., Ilic, I. D., Cao, Y., . . . Le, H. V. (2020). Human development index in a context of human development: Review on the western Balkans countries. *Brain and Behavior*, 10(9), e01755.
- Decerf, B., Ferreira, F. H., Mahler, D. G., & Sterck, O. (2021). Lives and livelihoods: Estimates of the global mortality and poverty effects of the Covid-19 pandemic. *World Development*, 146, 105561. Available at: <https://doi.org/10.1016/j.worlddev.2021.105561>.

- Efendi, R., Indartono, S., & Sukidjo, S. (2019). The relationship of indonesia's poverty rate based on economic growth, health, and education. *International Journal of Multicultural and Multireligious Understanding*, 6(2), 323-330. Available at: <https://doi.org/10.18415/ijmmu.v6i2.704>.
- Fahrika, A. I., Salam, H., & Buhasyim, M. A. (2020). Effect of human development index (HDI), unemployment, and investment realization toward poverty in South Sulawesi-Indonesia. *The International Journal of Social Sciences World (TIJOSSW)*, 2(2), 110-116.
- Foschiatti, B. C., & Gasparini, L. (2020). The asymmetric impact of quarantine. Work Document No. 261.
- Ginting, T., Sudibia, I. K., Dewi, N. P. M., & Marhaeni, A. (2020). The effect of education and dependency ratio on economic growth and poverty in Papua. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 4(6), 186-195.
- Gujarati, D. N. (2004). *Basic econometric* (4th ed.). New York: The McGraw-Hill Companies.
- Hausmann, R., & Schetter, U. (2022). Horrible trade-offs in a pandemic: Poverty, fiscal space, policy, and welfare. *World Development*, 153, 105819. Available at: <https://doi.org/10.1016/j.worlddev.2022.105819>.
- Jhingan, M. L. (2011). *The economics of development and planning*. New Delhi: Vrinda Publications.
- Khoirunurrofik, K., Abdurrachman, F., & Rachmanto, U. N. (2022). Socioeconomic and policy determinants of mobility during COVID-19: Evidence from Indonesian cities. *Journal of Urban Management*. Available at: <https://doi.org/10.1016/j.jum.2022.07.003>.
- Kormishkina, L., Kormishkin, E., Ermakova, E., & Koloskov, D. (2021). An approach to assessing the national multidimensional poverty line in Russia. *Journal of Eastern European and Central Asian Research*, 8(3), 324-336. Available at: <https://doi.org/10.15549/jeecar.v8i3.778>.
- Kovacevic, R. M., & Pflug, G. C. (2011). Does insurance help to escape the poverty trap? A ruin theoretic approach. *Journal of Risk and Insurance*, 78(4), 1003-1028. Available at: <https://doi.org/10.1111/j.1539-6975.2010.01396.x>.
- Landapa, S. I. I., & Purbadharmaja, I. B. P. (2021). The effect of economic growth, foreign investment, and human development index on poverty in Indonesia. *International Journal of Innovative Science, Engineering & Technology*, 8(7), 166-172.
- Li, J., Vidyattama, Y., La, H. A., Miranti, R., & Sologon, D. M. (2020). The impact of COVID-19 and policy responses on Australian income distribution and poverty. *arXiv preprint arXiv:2009.04037*.
- Liu, Y., & Xu, Y. (2016). A geographic identification of multidimensional poverty in rural China under the framework of sustainable livelihoods analysis. *Applied Geography*, 73, 62-76. Available at: <https://doi.org/10.1016/j.apgeog.2016.06.004>.
- Mad, A., Syarif, M., Saranani, F., & Rumbia, W. A. (2019). The impact of human development index on poverty in Southeast Sulawesi. *International Journal of Economics and Management Studies*, 6(12), 30-36. Available at: <https://doi.org/10.14445/23939125/ijems-v6i12p104>.
- Mangeswuri, D. R. (2021). *The prospect of increasing domestic tourism during TheCovid-19 pandemic*. Jakarta: Info Singkat-Puslit DPR.
- Mankiw, G. N. (2019). Six guidelines for teaching intermediate macroeconomics. *The Journal of Economic Education*, 50(3), 258-260.
- Meo, M. S., Khan, V. J., Ibrahim, T. O., Khan, S., Ali, S., & Noor, K. (2018). Asymmetric impact of inflation and unemployment on poverty in Pakistan: New evidence from asymmetric ARDL cointegration. *Asia Pacific Journal of Social Work and Development*, 28(4), 295-310.
- Murjani, A. (2019). Short-run and long-run impact of inflation, unemployment, and economic growth towards poverty in Indonesia: Ardl Approach. *Journal of Development Economic Dynamics*, 2(1), 15-29.
- Nainggolan, L. E., Nainggolan, L. E., & Sembiring, L. D. (2020). Factors affecting poverty in North Sumatra. *International Journal of Research and Review*, 7(12), 526-533.
- Nguyen, K. H., & Kakinaka, M. (2019). Renewable energy consumption, carbon emissions, and development stages: Some evidence from panel cointegration analysis. *Renewable Energy*, 132, 1049-1057. Available at: <https://doi.org/10.1016/j.renene.2018.08.069>.

- Parolin, Z., Curran, M., Matsudaira, J., Waldfoegel, J., & Wimer, C. (2020). Monthly poverty rates in the united states during the COVID-19 Pandemic. Poverty and Social Policy Working Paper, No. 1–24.
- Pereira, M., & Oliveira, A. M. (2020). Poverty and food insecurity may increase as the threat of COVID-19 spreads. *Public Health Nutrition*, 23(17), 3236–3240. Available at: <https://doi.org/10.1017/s1368980020003493>.
- Prasetyoningrum, A. K., & Sukmawati, U. S. (2018). Analysis of the effect of human development index (HDI), economic growth and unemployment on poverty in Indonesia. *Equilibrium: Journal of Islamic Economics*, 6(2), 217–240.
- Purwono, R. D., Tamtelahitu, J., & Mubin, M. K. (2020). The effect of exchange rates and interest rates of four large economies on the health of banks in ASEAN-3. *Journal of Asian Finance, Economics and Business*, 7(10), 591–599. Available at: <https://doi.org/10.13106/jafeb.2020.vol7.no10.591>.
- Regina, S., B., & Arifin. (2020). Analysis the effects of poverty, general allocation fund and economic growth to Human Development Index (HDI) in Indonesia. *Jurnal Economic Resources*, 3(1), 191–203. Available at: https://doi.org/10.1163/9789004486577_017.
- Rimawan, M., Alwi, A., Ismunandar, I., & Aryani, F. (2020). *Village fund allocation on economic growth, human development index and poverty*. Paper presented at the In 1st Annual Conference on Education and Social Sciences (ACCESS 2019). Atlantis Press.
- Sambas, P. N. (2022). Analysis of poverty in Indonesia. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 5(1), 7368–7373.
- Sihite, L., Daulay, M., Lubis, I., & Parinduri, R. E. (2019). The effect of village funds, human development index (HDI), and economic growth on decrease of poverty level in North Sumatera Province. *International Journal Public Budgeting, Accounting and Finance*, 4(1), 1–10.
- Sotomayor, O. J. (2021). Can the minimum wage reduce poverty and inequality in the developing world? Evidence from Brazil. *World Development*, 138, 105182. Available at: <https://doi.org/10.1016/j.worlddev.2020.105182>.
- Tarigan, H., Sinaga, J. H., & Rachmawati, R. R. (2020). The impact of the COVID-19 pandemic on poverty in Indonesia. *Working Paper, Center for Socio-Economic and Agricultural Policy*, 3, 457–479.
- Todaro, M. P. (2000). Migration and development. *Population and Development Review*, 26(3), 611–611.
- Vitenu-Sackey, P. A., & Barfi, R. (2021). The impact of Covid-19 pandemic on the global economy: Emphasis on poverty alleviation and economic growth. *The Economics and Finance Letters*, 8(1), 32–43.
- Wahyuningsih, D., Yunaningsih, A., Priadana, M. S., Darma, D. C., & Purwadi, P. (2020). Why are unemployment and poverty still happening in Borneo Island, Indonesia? *International Journal of Economics and Financial Issues*, 10(2), 235–241. Available at: <https://doi.org/10.32479/ijefi.9214>.
- Widiawaty, M. A., Lam, K. C., Dede, M., & Asnawi, N. H. (2022). Spatial differentiation and determinants of COVID-19 in Indonesia. *BMC Public Health*, 22(1), 1–16. Available at: <https://doi.org/10.1186/s12889-022-13316-4>.
- Wooldridge, J. (2010). *Econometric analysis of cross section and panel data* (2nd ed., pp. 245–254). Cambridge: The MIT Press.
- Yusuf, L. A., & Dai, S. I. (2020). The impact of unemployment and human development index on poverty in gorontalo province 2008–2017. *Jambura Equilibrium Journal*, 2(1), 7–16. Available at: <https://doi.org/10.37479/jej.v2i1.4495>.

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