

# Influencing Analysis Human Development Index in the Province Central Java 2018-2022

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## Abstract

The development of a country requires special attention to Human Resources (HR) as a key element of development. This article aims to study the influence of Population Size, Unemployment, Gross Regional Domestic Product (GRDP), and Poverty on the Human Development Index (HDI) in Central Java Province for the period 2018-2022. The research method used is quantitative with secondary data and employs a panel data approach. The data includes 29 districts and 6 cities in Central Java Province over the time frame of 2018-2022. The dependent variable is HDI, while the independent variables include Population Size, Unemployment, GRDP, and Poverty. Panel data regression analysis is conducted using the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM), along with the Chow test and Hausman test to select the best model. The research results show that Population Size has a positive influence on HDI, as a larger population creates economies of scale and enhances public purchasing power. Unemployment also has a positive influence on HDI due to the presence of frictional unemployment where individuals seek jobs matching their education level. GRDP shows a positive and significant effect on HDI, consistent with Kuznets' theory of economic growth. However, Poverty does not have a significant influence on HDI. Further studies are recommended to consider additional independent variables and to extend the study period.

## 1. Introduction

Consistent and sustainable development in all fields by a country's government is crucial to ensure the continuity of life within the country. Human Resources (HR), as a central element of development, must be consistently and continuously adapted to current developments to improve quality (Tumbuan et al., 2023). The primary factor influencing a country's development is its human resources. With strong human resources, an area can effectively manage and utilize limited natural resources and accelerate economic development. However, despite a country's abundance of natural resources, a lack of human resources can impede development and result in stagnation (Aryanti, 2023). The Human Development Index (HDI) is used to assess the extent of efforts to enhance individual capacity. Human development is a crucial aspect of development that focuses on improving human

resources through public empowerment (Fajri, 2021).

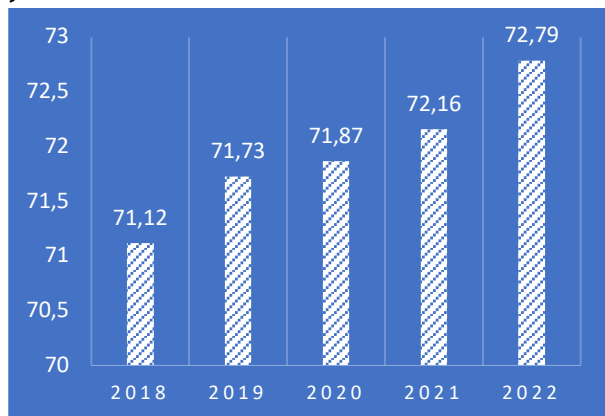
The Human Development Index indicates a more holistic view of development as it evaluates not only economic progress but also aspects such as happiness, health, and access to knowledge. The HDI value is based on a composite of three main dimensions: life expectancy (health), average years of schooling (education), and per capita income (standard of living) (Dartanto, 2020). Each of these dimensions has broad implications as they are connected to numerous factors. Human development should be considered a fundamental component of development, though it is sometimes viewed only from material and economic perspectives (Wahyuningrum & Soesilowati, 2021).

One objective of the Human Development Index is to provide a single statistic that can serve as a guideline for economic and social development (International & Van, 2017). The

HDI is arranged based on national, provincial, and district levels to evaluate rankings and levels of inequality in human development across regions. This is important as each region strives to achieve high performance through the development process (Business and Economics et al., 2020).

Central Java Province consists of 29 districts and 6 cities. This region is a significant center for improving the quality of human life. According to data from the Central Statistics Agency (2022), the total population in this area exceeds 37 million people. The high population density makes human resources a valuable asset, serving as the fundamental capital for development in Central Java Province and for national development.

**Figure f1. Development Human Development Index in the Province Central Java 2018-2022**



Source : Central Statistics Agency

Based on Graph 1.1 from the Central Statistics Agency, it can be seen that the Human Development Index (HDI) in Central Java has shown continuous improvement over the 5-year period from 2018 to 2022. The HDI in Central Java increased from 71.12 in 2018 to 72.79 in 2022. This rise indicates that the people in Central Java have experienced enhanced welfare and quality of life. However, there remains disparity in HDI achievements across districts and cities in Central Java, highlighting the need for sustainable development efforts to improve HDI more evenly throughout the region.

In addition to the Human Development Index, sustainable economic growth and equitable income distribution are essential for advancing regional development. These goals can be directed towards three main objectives: improving the distribution and availability of essential needs for society, enhancing the quality of life for communities, and boosting public participation in various social activities (Maratade, 2016).

According to the United Nations Development Program (UNDP), economic growth and the Human Development Index are interrelated and mutually reinforcing. The UNDP states that human development can be sustained if supported by economic growth. Although the two are not automatically linked, when combined in a coherent development policy, they can create a synergistic effect. Therefore, economic growth is highly effective in advancing human development (Anggraini & Muta'ali, 2013).

The focus should be on human resources in terms of both quantity and quality. Effective collaboration between the government and society can produce synergy and drive the implementation of policies to enhance residents' quality of life. According to Adam Smith (Jasasila, 2020b), the two main components of the development process are total output growth and population growth. Population growth impacts market expansion and the development of more specialized sectors. The development process accelerates through specialization and improved work productivity. A large population has the potential to contribute significantly to development quality from a developmental perspective (Irham & Putri, 2023).

According to Todaro (2008), human development is a development objective in itself and involves increasing a country's ability to absorb modern technology, create job opportunities, reduce unemployment, and achieve sustainable economic development goals. HDI plays a crucial role in human development.

In Indonesia, human development is closely associated with poverty alleviation. Since the primary asset of poor people is their labor, investments in education and health are particularly meaningful for the poor compared to the non-poor. Access to affordable education and health facilities significantly boosts productivity and, consequently, income. Thus, human development can be seen as not optimal if it focuses solely on poverty alleviation (Syofya, 2018).

Nurhayati (2015) states that human capital plays a critical role in development. Contrary to traditional views, population growth is not merely a problem; rather, it is a crucial factor in driving economic development. Previous studies using the autoregressive distributed lag model (ARDL) (Khan et al., 2018) have shown that economic growth does not impact Pakistan's HDI from 1990 to 2016.

Studies employing panel data regression analysis (Meydiasari & Soejoto, 2017a) have concluded that unemployment negatively and significantly affects HDI. Conversely, income distribution and educational expenditure did not influence Indonesia's HDI from 2010 to 2015 (TZ Muliza & Seftaria, 2017). Research using panel data regression found that GRDP positively and significantly affects HDI, while poverty negatively and significantly affects HDI. On the other hand, education and health expenditures did not affect Aceh's HDI from 2010 to 2014. Previous research (Nainggolan et al., 2021) using multiple regression analysis with a path analysis method concluded that economic growth does not have a significant impact on HDI in North Sumatra during 2018. This study analyzes the factors influencing the Human Development Index in Central Java Province from 2018 to 2022, based on the background and previous research.

## 2. Literature Review

### 2.1. Concept of Human Development Index (HDI)

The Human Development Index (HDI) is a composite indicator that measures progress in human development by considering three main

dimensions: life expectancy (health), average years of schooling (education), and per capita income (standard of living) (Dartanto, 2020). The HDI provides a more holistic picture of development by not only focusing on economic progress, but also aspects such as health, education, and overall quality of life (Wahyuningrum & Soesilowati, 2021). According to UNDP (International & Van, 2017), the HDI aims to provide a single statistic that can be used as a guideline in planning economic and social development.

### 2.2 Factors Affecting the HDI

#### a. Population Size

Population size can have a positive effect on the HDI because a larger population can create economies of scale and increase people's purchasing power. Previous studies have shown that population growth can improve quality of life by providing more economic and social opportunities (Meydiasari & Soejoto, 2017a).

#### b. Unemployment Rate

The unemployment rate has a positive impact on the HDI due to frictional unemployment, where individuals seek jobs that match their education level. Frictional unemployment can help improve job matching and, in turn, community welfare (Anggraini & Muta'ali, 2013). However, high unemployment can have negative effects if not handled properly, so effective employment policies are needed.

#### c. Gross Regional Domestic Product (GRDP)

GRDP is positively and significantly related to the HDI, in accordance with Kuznets' theory of economic growth, which states that economic growth contributes to improvements in human development indicators (Dartanto, 2020). GRDP growth improves economic conditions, which contributes to better health, education, and living standards.

#### d. Poverty

Poverty did not show a significant effect on the HDI in Central Java. This result indicates that

poverty alleviation efforts may need to be more focused in order to have a meaningful impact on increasing the HDI (TZ Muliza & Seftaria, 2017). Although poverty alleviation is important, its impact on the HDI may be moderated by other factors such as economic growth and educational attainment.

### 2.3 Related Research

Previous studies have shown various results regarding the influence of factors on the HDI. For example, a study using the autoregressive distributed lag (ARDL) model showed that economic growth did not affect the HDI in Pakistan (Khan et al., 2018). Panel data analysis shows that unemployment can have a negative impact on the HDI (Meydiasari & Soejoto, 2017a), while GRDP has a positive and significant effect on the HDI (Nainggolan et al., 2021). Research in Aceh and North Sumatra suggests that spending on education and health may not significantly affect HDI (TZ Muliza & Seftaria, 2017; Nainggolan et al., 2021).

### 3. Research Methods

This study is quantitative using secondary data and panel data methods to estimate the effect of Population Size, Unemployment, Gross Regional Domestic Product (GRDP), and Poverty on the Human Development Index (HDI) in Central Java Province in the period 2018-2022. The panel data used includes a combination of time series data and cross-sectional data. The cross-sectional data covers 29 districts and 6 cities in Central Java Province, while the time series data covers the period 2018-2022. The data source was obtained from the official report of the Central Statistics Agency (BPS) of Central Java Province. This study uses two types of variables: dependent variables and

independent variables. The dependent variable in this study is the Human Development Index (HDI), while the independent variables include Population Size, Unemployment, Gross Regional Domestic Product (GRDP), and Poverty. The stages of panel data regression analysis include the use of the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM) approaches. The best estimation model is selected using the Chow Test and the Hausman Test. In addition, the panel data regression is transformed into logarithmic transformation to obtain optimal results.

$$IPM_{it} = \beta_0 + \beta_1 \log JP_{it} + \beta_2 UNEM_{it} + \beta_3 \log PDRB_{it} + \beta_4 POV_{it} + \varepsilon_{it}$$

Where :

HDI : Human Development Index (%)

JP : Amount Population (Million People)

UNEM : Unemployment (%)

GRDP : Products Gross Regional Domestic ( Billion Rupiah)

POV : Poverty ( %)

Log : Logarithm

$\beta_0$  : Constant

$\beta_1 \dots \beta_4$  : Independent variable regression coefficient

$i$  : Cross Section

$t$  : Time Series

$\varepsilon$  : Error term (Error Factor)

### 4. Results and Discussion

Table 1 presents results estimation panel data regression with use approach *Pooled Ordinary Least Squares* (PLS), *Fixed Effect Model* (FEM), and *Random Effect Model* (REM).

**Table 1**  
**Cross section Panel Data Regression Results**

Variable	Regression Coefficients		
	PLS	FEM	BRAKE
$C$	78,21925	-58,59147	5,554699
$LOG(JP)$	-1,289022	7,525014	3,299172
$UNEM$	-0,117706	0,092332	0,163785
$LOG(GRDP)$	5,022133	8,383839	6,985494
$POV$	-0,322480	0,053401	-0,140848
$R^2$	0,708723	0,993300	0,438325

Adjusted . $R^2$	0,701869	0,991428	0,425109
F statistics	103,4092	530,5705	33,16658
Prob . F statistics	0,000000	0,000000	0,000000
1. Test Chow			
Prob Cross-section $F = 0,0000$			
2. Hausman test			
Prob Cross sections random $\chi^2 = 0.0000$			

Source : Appendix

Chow and Hausman tests were used for choose an estimation model best for PLS, FEM, or REM. If it turns out that the Chow test chooses FEM and the Hausman test chooses FEM, then FEM is an estimation model best. From Table 1 it can be seen that probability of F-statistics is 0.000 (< 0.01), so  $H_0$  is rejected. In summary, the estimation model is FEM. From

Table 1, we find that probability from cross section random  $\chi^2$  is 0.000 (<0.01), so  $H_0$  is rejected. In summary, the estimation model is FEM. Chow and Hausman Model effect tests fixed (FEM) is selected in a way a priori as an estimation model best. FEM model estimation results complete presented in Table 2.

**Table 2**  
**Estimation Model Fixed Effect Model**

$$\widehat{IPM}_{it} = -58.59147 + 7,525014 \log(JP)_{it} + 0,092332 UNEM_{it} + 8,383839 \log(PDRB)_{it} + 0.053401 POV_{it}$$

(0.000) \* (0.0048)  
(0.0000) \* (0.5840)

$R^2 = 0.993300$  ;  $DW = 1.204693$  ;  $F = 530.5705$ ; Prob .  $F = 0.000000$

Source : Appendix 1. Notes: \* Significant at  $\alpha = 0.01$ ; \*\* Significant at  $\alpha = 0.05$ ; \*\*\*Significant at  $\alpha = 0.10$ .

From Table 2 it can be seen that the probability of F-statistic is 0.00000 (<0.01). Therefore,  $H_0$  is rejected. In short, there is a FEM estimation model. The coefficient of determination ( $R^2$ ) shows the prediction of the Power estimation model. From Table 2 it can be seen that the  $R^2$  value of the Fixed Effect Model (FEM) is 0.993300. That means 99.3% of the variation in the Human Development Index variable is caused by variations in population, unemployment variables, and area. Domestic domestic product and poverty can be explained. The remaining 0.7% is influenced by variations in variables and other factors not included in the model. Based on the impact of the validity test in Table 2, it is known that the population (JP), gross regional domestic product (GRDP), and unemployment rate (UNEM) affect the human development index (HDI).

While poverty (POV) does not affect the human development index of the province/city of Central Java province from

2018 to 2022. The regression coefficient value of the population variable is 7.525014, with a log linear relationship pattern. This means that for every 1% increase in population, the Human Development Index increases by 0.007525014%. The regression coefficient value of the gross regional domestic product variable is 8.383839, with a log-linear relationship pattern. This means that for every 1% increase in gross domestic product, the human development index increases by 0.008383839%. The regression coefficient value of the unemployment rate variable is 0.092332, with a linear to linear relationship pattern. This means that a 1% increase in the number of unemployed will increase the Human Development Index by 0.092332%.

#### **4.1. Influence Amount Resident to Human Development Index**

Studies have found that the population size positively impacts the Human Development Index (HDI). This means that a larger population is indeed a potential market and a source of demand for various goods and services, which drives various economic activities and creates economies of scale in production. This results in a supply of labor at a lower cost, benefiting all involved parties, reducing production costs, and increasing public income. The positive impact of increased income is reflected in greater public wealth and happiness. Consequently, increased income allows individuals to meet their needs for education and health, thereby boosting their purchasing power, which can influence the HDI. Research by Jasasila (2020) supports this finding, showing that population growth is a significant factor in the rising HDI in Batang Hari District from 2011 to 2019. Umiyati et al. (2017) found that population size positively affects the HDI in districts and cities in Jambi Province. Furthermore, according to Nurnaningsih et al. (2019), the HDI in West Nusa Tenggara would increase if the large population could be utilized more effectively.

#### **4.2. Influence Unemployment to Human Development Index**

Unemployment has a positive impact on the Human Development Index (HDI) in Central Java from 2018 to 2022. This finding challenges the theory that unemployment negatively affects human development indicators. An increase in HDI is associated with a decrease in unemployment levels. Generally, Central Java's HDI has shown gradual improvement from 2018 to 2022. Further observations reveal that this positive impact is due to the presence of frictional unemployment. Higher education levels among the population increase the likelihood that individuals will find suitable jobs without remaining unemployed or struggling to match their education level with job opportunities. Findings by Primandari (2019) support this study's conclusion that a reduction in unemployment is a contributing factor to the

improvement of the Human Development Index in South Sumatra from 2004 to 2018. Meydiasari & Soejoto (2017) found that unemployment positively impacts the HDI in Indonesia. Specifically, according to Kiha et al. (2021), if high levels of unemployment are effectively managed, the HDI in the affected regencies will improve.

#### **4.3. The influence of GRDP on Human Development Index**

Gross Regional Domestic Product (GRDP) has a positive and significant influence on the Human Development Index (HDI). This finding aligns with Kuznets' theory, which posits that one characteristic of modern economic growth is high per capita output (Todaro, 2008). In this context, GRDP per capita represents production growth. Increased production leads to higher consumer behavior within society, which, in turn, improves purchasing power. Since public purchasing power, as reflected by income, is one of the composite indicators forming the HDI, its increase positively influences the HDI.

Therefore, it can be concluded that higher economic growth results in a higher Human Development Index across districts and cities in Central Java. Research by Muliza et al. (2017) supports this study's conclusion, indicating that an increase in GRDP is a significant factor in the improvement of the Human Development Index in Aceh Province. Ariwuni & Kartika (2019) found that higher GDP levels positively impact the Human Development Index in various provinces and cities in Bali Province. Additionally, Hidayat & Woyanti (2021) suggest that if high levels of GDP are effectively managed, the Human Development Index in Indonesia will improve.

#### **5. Conclusion**

Based on the research results, it can be concluded that the Fixed Effects Model (FEM) is the most appropriate tool for panel data analysis in this study. The selected model includes three independent variables: population size, Gross Regional Domestic Product (GRDP), and

unemployment rate, all of which have a positive and significant impact on the Human Development Index (HDI). However, poverty does not significantly affect the HDI in Central Java Province from 2018 to 2022. The government is encouraged to implement more effective measures to achieve a higher and more uniform HDI across all districts and cities in Central Java, thereby enhancing public well-being. Future researchers are advised to incorporate additional independent variables to explore other factors influencing the Human Development Index (HDI). Furthermore, it is recommended that future studies consider extending the time frame to compare differences across years more comprehensively.

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