EMPIRICAL ANALYSIS OF POVERTY IN YOGYAKARTA: A DISTRICT LEVEL PANEL DATA INVESTIGATION

[1]Gracia Jessica, [2]Pristanto Silalahi

Universitas Kristen Duta Wacana Jl. Dr. Wahidin Sudirohusodo No.5-25, Yogyakarta 55224

Corresponding Author: 11221211@students.ukdw.ac.id

Abstract

Poverty is one of the most intricate challenges faced by economies worldwide, including at regional levels. Addressing this issue requires a comprehensive and holistic approach. This study aimed to examine the effects of the Human Development Index (HDI), education, minimum wage, unemployment, and the Covid-19 pandemic on poverty levels in the Special Region of Yogyakarta. The analysis utilized a fixed-effects model through panel data regression, drawing on data from Yogyakarta's districts spanning the years 2013 to 2023. The results demonstrate that HDI, education, minimum wage, and unemployment collectively have significant effects on reducing poverty in the region. Specifically, improvements in HDI, higher levels of education, appropriate minimum wage policies, and reduced unemployment are associated with lower poverty rates. In contrast, the analysis shows that the impact of Covid-19 on poverty levels is statistically insignificant, indicating that the pandemic did not directly alter poverty rates in the region, despite its broader social and economic effects. These findings highlight the critical importance of focusing on human development, education, and labor market policies in efforts to combat poverty. To achieve sustained poverty reduction, continuous efforts must be made to improve these key variables. Policy interventions in Yogyakarta should prioritize strategies that foster education, increase minimum wages where appropriate, and further reduce unemployment to support long-term economic welfare for the population.

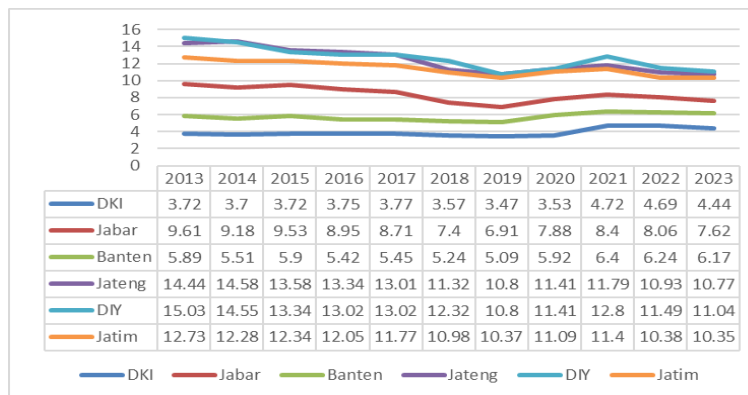**Keywords:** Poverty, Human Development Index (HDI), Education

INTRODUCTION

Since the past, poverty has been a major issue that has drawn attention as a continuous social obstacle in Indonesia's development path. The history of poverty in Indonesia not only reflects a lack of access to basic needs but also mirrors the complex trajectory of the nation's development. Since gaining independence in 1945, Indonesia has been committed to combating poverty and achieving welfare for all its citizens. However, poverty continues to be an unavoidable reality. In the post-independence era, government efforts focused on laying the foundations of the economy and building basic infrastructure, but inequality and social disparity remained prevalent.

Throughout its history, Indonesia has faced several events that worsened poverty conditions, such as the 1997-1998 crisis and a series of frequent natural disasters. In 2020, Indonesia, along with nearly all countries globally, was impacted by Covid-19, which further weakened the economy and exacerbated poverty. The Covid-19 pandemic dealt a heavy blow to Indonesia's economic resilience, introducing new challenges in efforts to reduce poverty. Since then, the development agenda has increasingly focused on inclusivity, with the government striving to improve access to education, healthcare, and employment for all segments of society.

Poverty is a complex challenge that significantly influences the dynamics of Indonesia's development. Even with economic growth, poverty in Indonesia remains a continually evolving issue. Mubyarto (2004) described poverty as the lack of income to meet basic or minimum living needs, such as clothing, food, shelter, education, and healthcare. According to the Central Statistics Agency (BPS), in March 2023, the percentage of poor people in Indonesia was 9.57%, down from 9.71% in 2021. The number of poor people reached 25.90 million, a decrease of 0.46 million compared to September 2022. Despite the reduction in the number of poor people, poverty remains a key focus of government attention, and studies on the factors affecting poverty levels continue to be important to understand and address.

The reality of poverty in Indonesia shows that people living in poverty often struggle to meet basic needs, such as access to education, healthcare, and sanitation. Moreover, poverty often affects quality of life and well-being, such as lower life expectancy, higher infant mortality rates, and poor education quality. Recently, Indonesia has experienced impressive economic growth. BPS (2024) reported that Indonesia's economy in the third quarter of 2023 grew by 4.94% (year-on-year). The provinces on the island of Java contributed the most to the economy, with a share of 57.12% and an economic growth rate of 4.83% (year-on-year). This highlights Java's significant contribution to the national economy. Recent data shows that in the second quarter of 2023, Java's economic growth reached 5.18%. However, upon closer examination of regional economies, serious challenges remain, with around 14.19 million poor people living on Java. This underscores the imbalance between significant economic growth and the complex socio-economic reality. BPS data from September 2022 shows that Yogyakarta, one of the provinces on Java, has the highest poverty rate.

Figure 1. Percentage of Poor Population by Regency/City (%), (2013-2023)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
DKI	3.72	3.7	3.72	3.75	3.77	3.57	3.47	3.53	4.72	4.69	4.44
Jabar	9.61	9.18	9.53	8.95	8.71	7.4	6.91	7.88	8.4	8.06	7.62
Banten	5.89	5.51	5.9	5.42	5.45	5.24	5.09	5.92	6.4	6.24	6.17
Jateng	14.44	14.58	13.58	13.34	13.01	11.32	10.8	11.41	11.79	10.93	10.77
DIY	15.03	14.55	13.34	13.02	13.02	12.32	10.8	11.41	12.8	11.49	11.04
Jatim	12.73	12.28	12.34	12.05	11.77	10.98	10.37	11.09	11.4	10.38	10.35

Source: BPS, 2024 (processed by the author)

Yogyakarta illustrates that rapid economic growth does not always reflect an improvement in equitable economic distribution. As of March 2023, the number of poor people in Yogyakarta Province was 448.47 thousand, a decrease of 15.2 thousand compared to September 2022. Compared to March 2022, the number of poor people in March 2023 dropped by 6.3 thousand. The poverty line in March 2023 was recorded at Rp 573,022 per capita per month, with the food poverty line making up Rp 414,480 (72.33%) and the non-food poverty line making up Rp 158,542 (27.67%) (BPS, 2023). In addition to being a center for culture and tourism in Indonesia, Yogyakarta plays a crucial role in the dynamics of social and economic development. Known not only for its artistic and cultural beauty but also as a city of students, Yogyakarta presents an interesting paradox. University graduates exhibit the highest open unemployment rate (TPT) in the region, reaching 4.91%, higher than the previous year's 4.04%. In 2023, the regional minimum wage in Yogyakarta was only Rp 2,324,775.50, which is significantly lower when compared to other cities like Semarang, where it reached Rp 3,243,969. From this data, we can conclude that poverty in Yogyakarta remains a pressing issue that needs to be addressed. Both the government and the community must collaborate to reduce poverty and foster a more balanced and sustainable economy. Although the Human Development Index (HDI) in Yogyakarta reached a satisfactory level of 81.09 in 2023, it is important to note that the relationship between HDI and poverty levels is negative. Therefore, improving the HDI in Indonesia, particularly in Yogyakarta, is a crucial step toward reducing poverty levels.

Figure 2. Comparison of the Number of Poor People and Poverty Rates in Java Island (2013-2023)
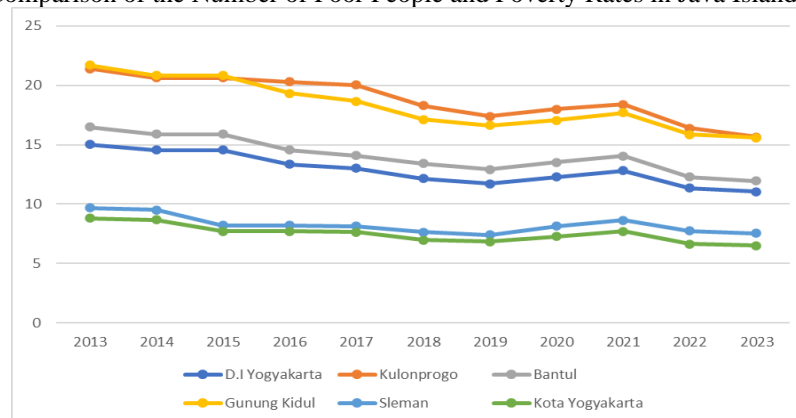
Sourcer: BPS, 2024 (processed by the author)

Given the poverty phenomenon in Indonesia, it is crucial to understand the factors that influence poverty levels in the country. Studies on the impact of various variables, including the Human Development Index (HDI), unemployment, education, regional minimum wages, and consumption, are essential to explore the dynamics of inequality and societal well-being in more detail. Key questions to be addressed include: How do changes in HDI and unemployment affect poverty levels? How can education enhance social mobility? And how can regional minimum wage adjustments play a role in improving the economic conditions of communities? This research also delves into the impact of consumption on poverty levels, offering a clearer picture of economic resilience and spending patterns amidst evolving social dynamics. Thus, this study aims to explore the deeper influences of factors driving high poverty levels in Indonesia. By integrating the latest data from the Central Statistics Agency (BPS) and acknowledging that Indonesia still faces significant poverty challenges, the research seeks to contribute to a better understanding of poverty issues across all provinces in the country. Through an in-depth analysis of HDI, education, unemployment, regional minimum wages, and consumption patterns in Indonesia, it is hoped that this study will provide relevant insights for stakeholders and help formulate more effective policies to address poverty issues at the national level.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Poverty

In general, poverty is seen as the result of various economic activities that involve the distribution of resources, economic opportunities, and economic policies that influence people's access to basic needs. The phenomenon of poverty is often associated with inequality in income and wealth distribution, as well as factors such as a lack of job opportunities, limited education, and restricted access to healthcare services. The Human Development Index (HDI) is an important indicator for measuring poverty, while regional minimum wages play a crucial role in addressing poverty by ensuring adequate wage standards for workers.

Keynesian theory (Keynes, 1937), which emphasizes the need for government intervention to address economic instability, suggests that fiscal policies that increase government spending can help reduce poverty. Despite criticism, the Keynesian multiplier concept remains relevant in considering how government actions can influence unemployment and public income, with the implementation of direct assistance programs as a potential strategy for reducing poverty.

The "Growth Pole" concept, introduced by Francois Perroux form Higgins (2017), states that economic growth occurs in specific locations, known as growth poles, forming the basis of regional industrial development strategies in many countries. However, its application in Indonesia has often resulted in negative outcomes, particularly through the backwash effect, which drains resources from surrounding areas. There is a significant economic gap between provinces in Indonesia, indicating uneven development, especially in terms of access to education and infrastructure. To reduce economic inequality and improve investment efficiency, it is essential to ensure equitable infrastructure development and raise minimum service standards in education and healthcare across Indonesia. Luo et al. (2020) long-term research on national income inequality and rural poverty in China emphasizes the strong link between education and income inequality. The study shows that educational achievement played an increasingly important role in income inequality in China until 2007, with some reductions between 2007 and 2013.

The Relationship Between HDI and Poverty

India is a country that ranks low in HDI compared to other countries. In 2011, India's HDI was recorded at 0.547. Due to its low HDI, India faces several challenges, one of which is poverty. Poverty issues in Asian countries result in severe consequences such as hunger, illiteracy, and inadequate healthcare services. Data collected between 1999 and 2005 shows that 34.5% to 47.3% of changes in poverty rates were due to changes in HDI. Thus, it can be concluded that the impact of HDI on poverty is negative—an increase in HDI leads to a reduction in poverty, and vice versa.

As stated by Maulana et al. (2022) if a country has a high HDI, its poverty rate will be low, and conversely, a low HDI will result in high poverty rates. Therefore, HDI and poverty are inversely related. Mirza (2012) also found that poverty negatively affects HDI. Other researchers, such as Suradi (2007) in his study "Human Development, Poverty, and Human Welfare," observed that poverty has a strong correlation with development processes prioritizing community participation. Similar findings were reported by Roshaniza and Selvaratnam (2015) in Malaysia, as well as by Roshaniza and Selvaratnam (2015) in Bulgaria, where they found a negative relationship between HDI and poverty. Based on the above theories and prior research, our hypothesis is:

H1: HDI has an impact on poverty in Yogyakarta from 2017 to 2022.

The Relationship Between Unemployment and Poverty

In the era of globalization, unemployment has become a major issue in many countries. Unemployment not only affects individuals but also has a close correlation with poverty. In Indonesia, youth unemployment (ages 15 to 24) has become a significant problem, with the unemployment rate reaching 54.96% in 2016. This is crucial because the youth should be the backbone of economic development, yet they face challenges in securing employment.

According to research by Suhaeri (2021), the main cause of high youth unemployment is the economic transformation toward digitalization. This shift has changed the demand for labor from manual to technology-based skills, increasing efficiency but reducing traditional job opportunities.

Similarly, in India, youth unemployment is a serious issue. According to research by Sanghi and Srija (2014), female unemployment in India is the highest among all categories. The dominance of the agricultural sector, employing almost 50% of the youth workforce, limits their opportunities in other sectors. Additionally, research by Kumar and Shobana (2015) indicates that India's high illiteracy rate contributes to youth unemployment, as many people remain in the informal sector. Based on the above theories and prior research, our hypothesis is:

H2: Unemployment has an impact on poverty in Yogyakarta from 2017 to 2022.

The Relationship Between Education and Poverty

Poverty, income inequality, and unemployment must be eliminated or reduced as primary goals of economic development to achieve maximum growth (Todaro & Smith, 2020). Education is one of the key factors supporting economic growth, as stated by Widiansyah (2017). Arsyad (2010) adds another dimension, arguing that education enhances skills essential for productivity and job efficiency, ultimately raising individual income. Education is crucial in combating poverty for two reasons: First, many people believe that higher education leads to greater business opportunities. Second, research by Deris Desmawan et al. (2021) shows that human capital, as measured by the Human Capital Index, significantly reduces poverty. Improved education and health increase a person's productivity, helping them escape poverty.

Education in Indonesia is still considered low, as shown by an international survey conducted by the Organisation for Economic Co-operation and Development (OECD) through the Programme for International Student Assessment (PISA), which ranks Indonesia 57th out of 65 countries. In contrast, Finland has transformed its education system into one of the best in the world, as noted by Putra et al. (2023).

The Relationship Between Regional Minimum Wages and Poverty

Subsistence of Wage Theory by Ricardo (1955) argues that as living costs rise, wages must also increase. Higher minimum wages improve societal welfare, reducing poverty. Poverty occurs due to a lack of societal welfare. Wages must be sufficient to meet the living needs of workers and their families, and they should be adjusted based on market prices and demand-supply dynamics. According to this theory, wages will change in response to fluctuations in market prices.

Research by Neumark (2014), found that minimum wages are set to improve the welfare of low-skilled workers and protect them from low pay. Similarly, Sutikno et al. (2019) found that minimum wage levels significantly influence poverty reduction in North Sulawesi, Indonesia. This finding is supported by Yowa et al. (2024), who showed that rising minimum wages from 2005 to 2020 significantly reduced poverty rates in East Java, Indonesia. Furthermore, Neumark and Wascher (2002) study in Cambridge, UK, found that increases in minimum wages over 1-2 years positively impacted poverty reduction, helping low-income families escape poverty and improving their household income.

Research Hypothesis

The hypothesis in this study is as follows,

H1: The Human Development Index (HDI) has an influence on poverty in Yogyakarta from 2013 to 2023.
    (HDI negatively affects poverty in Yogyakarta)

H2: Unemployment has an influence on poverty in Yogyakarta from 2013 to 2023.
    (Unemployment positively affects poverty in Yogyakarta)

H3: Education has an influence on poverty in Yogyakarta in 2013-2023
    (Education has a negative effect on poverty in Yogyakarta)

H4: Regional Minimum Wages has an influence on poverty in Yogyakarta in 2013-2023
    (Regional Minimum Wages have a negative impact on poverty in Yogyakarta)

RESEARCH METHOD

Data

The method used in this study is panel data, which combines cross-sectional and time-series data. According to Gujarati (2021), the advantage of using panel data is that it provides more informative and diverse data, reduces the correlation between variables, and is more efficient. In panel data analysis, two common methods are used: the fixed effect and random effect models (Silalahi & Falianty, 2023). This study employs panel data, integrating cross-sectional and time-series data from six regions (districts/cities) in Yogyakarta Province over the period 2013-2023. The data was sourced from the BPS (statistic Indonesia) and local government statistics.

Empirical Model

The empirical model in this study is designed to examine the impact of independent variables on the dependent variable, as represented in the following model:

$$Poverty_{i,t} = \alpha + \beta_1 HDI_{i,t} + \beta_2 Unemployment_{i,t} + \beta_3 Educ_{i,t} + \beta_4 Wage_{i.t}$$
$$+ \beta_5 Con_{i,t} + \beta_6 Covid-19_{i.t}$$

Where as,

$Poverty_{i,t}$	: Poverty rate in the area of i on the year of t
$HDI_{i,t}$	: Human Development Index rate in the area of i on the year of t
$Unemployment_{i,t}$	: Unemployment rate in the area of i on the year of t
$Educ_{i,t}$	: Education rate in the area of i on the year of t
$Wage_{i.t}$	: Regional Minimum Wage in the area of i on the year of t
$Con_{i,t}$	: Consumption in the area of i on the year of t
$\beta_6 Covid-19_{i.t}$	: Covid-19 in the area of i on the year of t

RESULTS AND DISCUSSION

A. Descriptive statistic

First, we conducted descriptive statistical tests on all the variables analyzed in this study. The purpose of these descriptive statistics is to provide a general overview of the characteristics of each variable used in this study, viewed from the mean, maximum, minimum, and standard deviation values.

Tabel 1 Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ID	66	3.5	1.720912	1	6
Year	66	2018	3.18651	2013	2023
Poverty	66	163.7023	152.9456	29.45	550.23
HDI	66	78.23394	5.915794	66.31	88.61
Education	66	9.393333	1.516319	6.22	12.11
Minimum wage	66	1522460	379680.4	947114	2324776
Consumption	66	13532.35	3419.183	8202	19920
Covid-19	66	0.2727273	0.4487746	0	1
Unemployment	66	3.83333	5.18163	1.49	9.16

In Table 4.1, the lowest poverty rate was recorded at 29.75% in Yogyakarta City in 2019, while the highest poverty rate reached 550.23% in D.I. Yogyakarta in 2015. Regarding the Human Development Index (HDI), the lowest value of 66.31 was achieved in Gunung Kidul in 2013, while the highest value of 88.61 was reached in Yogyakarta City in 2023. HDI and education have a positive correlation, where an increase in HDI is accompanied by a rise in education levels, and vice versa. This explains why the lowest education rate was recorded at 6.22% in Gunung Kidul in 2013, and the highest rate was 12.11% in Yogyakarta City in 2023. For the regional minimum wage, the lowest value of Rp 947,114 was recorded in Gunung Kidul and D.I. Yogyakarta in 2013, while the highest value of Rp 2,324,776 was noted in Yogyakarta City in 2023. Like HDI and education, the minimum wage and consumption also have a positive relationship. The lowest daily consumption was recorded at Rp 8,202 in Gunung Kidul in 2013, and the highest consumption was Rp 19,920 in Yogyakarta City in 2023. Finally, the lowest unemployment rate was recorded at 1.49% in Kulon Progo in 2018, while the highest rate of 9.16% occurred in Yogyakarta City in 2020. Comparing the minimum and maximum values, it is clear that variables like HDI, education, minimum wage, and consumption are generally lowest in rural areas such as Kulon Progo, while in Yogyakarta City, these variables increase every year. However, it should be noted that the highest poverty and unemployment rates are found in urban areas like Yogyakarta City and D.I. Yogyakarta, which is not unrelated to the effects of urbanization and the high population density in these regions.

B. Estimation Result

Table 2 Estimation results

VARIABLES	Poverty
Ipm	-197.5***
	(17.28)
Education	-497.0***
	(40.41)
Minimumwage	-0.000174***
	(3.75e-05)
Consumption	-0.136***
	(0.0157)
Covid19	15.31
	(30.22)
Unemployment	2.337**
	(0.915)
Constant	-8,588***
	(816.5)
Observations	66
Number of ID	6

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Estimation Results of HDI and Poverty

In this study, we used the Human Development Index (HDI) as an indicator to measure the quality of life based on health, education, and income. An increase in HDI reflects an improvement in quality of life, which can reduce poverty. Regions with a high HDI tend to have better access to education and healthcare services, which help increase productivity and income. However, Indonesia's economic growth, which has ranged between 5% to 6% per year, has not yet been able to reduce the number of poor people. In fact, the number of poor people has increased, now reaching around 37 million. The latest report from BPS, 2024 (Statistics Indonesia) shows that over the past five years, the middle-class population in Indonesia has decreased by 9.48 million people, or 16.5%. This poverty issue requires serious attention from various stakeholders.

Based on the statistical model estimation we conducted using data from BPS, the HDI variable has a significant influence. This is evidenced by the t-test result for the HDI variable, which is below the 1 percent p-value. Furthermore, the coefficient is negative at -197.75, meaning that when the HDI in a region increases by 1 basis point, it can reduce poverty by 197.5 thousand people, and vice versa. This result aligns with our research hypothesis and is consistent with the findings of Sachs (2006), who stated that one way to address poverty is through human capital development, as well as the studies of Megawati and Sebayang (2018);Rodliyah (2023), which found that an increase in HDI is followed by an increase in labor productivity. As labor productivity increases, individual income also rises, ultimately helping to alleviate poverty.

Estimation Results of Unemployment and Poverty

Next, we included the unemployment rate variable, where theoretically, a high unemployment rate will impact an increase in poverty. When many individuals are unemployed, their purchasing power decreases, affecting their ability to meet basic needs. With significant unemployment, more individuals and families will live below the poverty line. Based on the t-test results from the estimation table, the unemployment variable shows a significant estimation result with a p-value below the 5 percent significance level. The direction and magnitude of the coefficient are positive, at 2.337, meaning that when unemployment rises by 1 percent, it can increase the number of poor people by 2,337.

This result aligns with our research hypothesis and supports the theory by Saunders (2002), which states that unemployment increases the risk of poverty and can even contribute to inequality. This finding is also supported by previous research by Martínez et al. (2001), who found that the unemployed are the group most at risk of experiencing poverty.

Estimation Results of Education, Minimunm Wage and Poverty

Education plays a crucial role in reducing poverty. Good education enhances individuals' skills and knowledge, enabling them to secure better jobs and earn higher incomes. Better skills also help individuals adapt to changes in the job market, thereby reducing the risk of poverty. Using the average years of schooling data published by BPS, we tested the impact of education on poverty. Our t-statistics results show that education has a significant effect, with a p-value of 1 percent. The magnitude and direction of the coefficient are negative, at -497.5, meaning that if the level of education, as measured by the average years of schooling, increases by one year, it can reduce poverty by 497 thousand people. This result is consistent with our research hypothesis and aligns with previous findings by (Awan et al., 2011; Liu et al., 2021) and Aref (2011), which states that education is considered crucial for the development process and poverty reduction, especially in developing countries.

Furthermore, the minimum wage policy is established to ensure workers receive a decent minimum salary. An increase in the minimum wage contributes to improving people's purchasing power. When workers earn higher wages, they are better able to meet basic needs, which has the potential to reduce poverty. However, the impact of minimum wage increases in developing countries can be either positive or negative, depending on the labor market conditions (Gindling, 2024). The minimum wage is primarily intended for workers in the formal sector, which represents a limited portion of the workforce in many developing countries. In Indonesia, for instance, where the informal or shadow economy is still significant (Silalahi, 2022), the minimum wage policy may not directly affect poor households, as many poor households tend to work in the informal sector.

Based on the t-test results, the minimum wage has a significant effect on poverty, as indicated by a p-value below 1 percent. The direction and magnitude of the coefficient are negative, at -0.000174, meaning that for every Rp 1,000 increase in the minimum wage, poverty is reduced by 174 individuals. Our findings are consistent with our research hypothesis and align with previous studies, such as Merdikawati and Izzati (2024) which examined the role of minimum wage policy in reducing poverty in Java, Indonesia. Although the impact is not immediately evident in terms of per capita household expenditure, the influence of the minimum wage on poverty reduction is nonetheless present, albeit limited.

Estimation Results of Consumption and Poverty

The level of public consumption also influences poverty. Based on Keynes' theory (Keynes, 1937), consumption can impact poverty through the multiplier effect. If consumption increases, income will also rise, potentially reducing poverty. This occurs when increased consumption boosts production and employment, ultimately lowering poverty levels. High consumption generally indicates good purchasing power and can serve as an indicator of economic well-being. However, if consumption is overly dependent on debt, this can pose risks. Communities that consume wisely and have access to necessary goods and services tend to enjoy a better quality of life.

In this context, increased consumption not only reflects improved living standards but also drives economic activity that can lift individuals and households out of poverty by stimulating production and job creation. Nevertheless, balancing consumption with prudent financial management is crucial for long-term economic stability and poverty alleviation. This finding is also supported by research Miranti et al. (2014) which proves that there is a relationship between consumption and poverty, specifically they found that a 10 percent increase in per capita consumption can reduce the poverty rate by 25 percent.

CONCLUSION

Conclusion

The statistical test results indicate that all variables significantly affect poverty. It can be concluded that improving the Human Development Index (HDI), reducing unemployment, increasing education levels, setting appropriate minimum wage policies, and boosting consumption collectively can reduce poverty rates in Yogyakarta Province. Continuous efforts to enhance each of these variables are necessary to achieve better welfare for the population.

Limitations

This research specifically analyzes the phenomenon of poverty in Yogyakarta from its macroeconomic aspect. Some of the independent variables used, such as the consumption variable, use data on total per capita consumption, not specifically referring to consumption in certain fields or sectors that can influence poverty. Furthermore, limited research only looks at the macroeconomic side and does not include other factors that can determine welfare or poverty.

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