Threshold Levels of Poverty and Unemployment Rates on Economic Growth in Indonesia during COVID-19 Pandemic

Vita Kartika Sari[1], Malik Cahyadin[2*], Aranka Ignasiak-Szulc[3], Riayati Ahmad[4]

[1,2]Department of Economics, Universitas Sebelas Maret, Indonesia
[3]Department of Economic Policy and Regional Studies,
Nicolaus Copernicus University, Poland
[4]Fakulti Ekonomi dan Pengurusan UKM Bangi, Selangor 43000 Malaysia

*E-mail: malikcahyadin@gmail.com

Abstract

During the COVID-19 pandemic, poverty and unemployment rates obstruct economic growth in Indonesia. Therefore, this study examines the threshold levels of poverty and unemployment rates on economic growth for 34 provinces in Indonesia in 2020 and 2021. Cross-section threshold regression is employed. Besides, the robustness check sets a non-linear cross-section regression. The findings reveal that threshold poverty rates in 2020 and 2021 were about 13.97% and 6.38%, respectively. At the same time, threshold unemployment rates were about 3.09% and 4.71%, respectively. Poverty and unemployment rates contributed significantly under U-shape in 2021 and 2020, respectively. The local government can emphasize lower poverty and unemployment rates to enhance economic growth in the long-term.

Keywords: *threshold level, non-linear, poverty, unemployment, economic growth*
JEL Classification: C46, I32, J64, O47

INTRODUCTION

The health crisis known as the coronavirus disease 2019 (COVID-19) pandemic has damaged Indonesia's economic condition during 2020–2021. Evidence of such damage can be observed in the increase in poverty and unemployment rates. At the same time, the growth rate of the economy is negative. Recessions, economic crises, and political instability can trigger significant poverty levels (Al-Jundi et al., 2020). Kouadio & Gakpa (2022) mentioned that academic discussions on the impact of poverty on economic growth have been widely discussed and reveal that the higher the economic growth, the more it will be able to reduce the poverty rate. For instance, Almås & Johnsen (2018) found that China has been able to cut poverty rates when economic growth increases significantly. Purwono et al. (2021) revealed that there were approximately 6.7% of households in Indonesia suffered from chronic poverty, and inequality factors contributed significantly to the poverty rate. Therefore, Radosavljevic et al. (2021) remind policymakers to synchronize

various policy strategies and the involvement of various parties in reducing poverty rates to stimulate economic growth.

Economic growth can also be depressed due to unemployment rate factors. Bod'a & Považanová (2021) found that male unemployment is more sensitive to economic fluctuations than female unemployment. Furthermore, Okun's law is more significant when the unemployment rate falls than when it rises. In the short-term, the link between the unemployment rate and economic growth is significant (Schubert & Turnovsky, 2018). This condition signals that when an economic crisis lasts in the short-term, the link between the unemployment rate and economic growth is negative and significant. In addition, Tesfaselassie & Wolters (2018) revealed that low growth productivity results in a high unemployment rate.

One of the factors that can support economic growth is the *human development index* (HDI). A country's ability to guarantee high HDI levels will boost economic growth when poverty and unemployment levels are negatively impacted. Rahim et al. (2021) found an indirect transmission of HDI to economic growth. This indirect transmission occurs in countries that have relatively significant natural resources. Thus, HDI contributes significantly to economic growth at both the national and subnational levels (Zhang & Wang, 2021).

This study aims to estimate the threshold levels of poverty and unemployment rates on economic growth for provinces in Indonesia in 2020 and 2021. Previous empirical studies that reveal the effect of poverty rates on economic growth are Nakabashi (2018) and Breunig & Majeed (2020). Meanwhile, the effect of the unemployment rate on growth has been studied by Bod'a & Považanová (2021).

This study contributes to the existence of literature in several ways. First, this study focuses on the impact of poverty and unemployment rates on economic growth in 2020 and 2021. Second, this study considers the significant contribution of the human development index (HDI) to economic growth. The higher the HDI, the better the economic growth in the long-term. Third, cross-section threshold regression is applied according to Hansen's concept (1996 and 2000). Lastly, threshold levels of poverty and unemployment rates can be considered by policymakers to design policies and directions for reducing poverty and unemployment rates at the provincial level in Indonesia.

Poverty is a complicated issue that is still a burden in many developing countries. The COVID-19 pandemic has increased poverty worldwide (Appiah-Otoo et al., 2022) and further worsened income distribution (Acheampong et al., 2021). The condition is exacerbated by the absence of social security systems in many countries (Alkire et al., 2021) and the economic downturn. The onset of poverty is related to the rising unemployment rate. Al Jundi (2020) stated that in developing countries, the ratio of investment to national income is low, which causes high unemployment. According to Azzollini (2023), the impact of unemployment can extend to non-economic sectors, such as triggering social vulnerabilities and even lowering social trust.

The organization of this study is divided into several sections. The first section is an introduction that discusses research issues, objectives, and contributions. The second section is a method that discusses data and cross-

section threshold regression. The next section is a result and discussion that reveals the threshold levels of poverty and unemployment rates for 34 provinces in Indonesia in 2020 and 2021; lastly, the conclusion.

METHOD
Data

The study determined economic growth in 34 provinces to be variable-dependent. Several independent variables were applied to reveal the threshold levels of poverty and unemployment rates, namely: *labor force* (LF), *foreign direct investment* (FDI), *human development index* (HDI), *poverty rate* (PR), and *unemployment rate* (UER). In addition, the observation period was 2020 and 2021, the COVID-19 pandemic period. A detailed explanation of research variables can be found in Table 1.

In 2020, the economic growth rate in most provinces in Indonesia was negative. The average, minimum, and maximum values of economic growth are -2.47%, -20.13%, and 7.13%, respectively. Meanwhile, the economic growth rate is improving in 2021, with the average, minimum, and maximum being 4.18%, -2.47%, and 16.40%, respectively. This condition conveys that provincial economic growth will recover starting in 2021.

Signals of improvement in economic conditions in 2021 are also shown by the labor force (LF), foreign direct investment (FDI), and human development index (HDI). For instance, the maximum values of LF in 2020 and 2021 were 64.59% and 64.80%, respectively. The maximum value of FDI in 2020 and 2021 was 4793.70 million US$ and 5217.70 million US$, respectively. In addition, the maximum values of HDI in 2020 and 2021 were 80.77 and 81.11, respectively.

Nevertheless, poverty and unemployment rates increased during the observation period, e.g., in 2020, the maximum poverty and unemployment rates were 26.64% and 7.99%, respectively. In 2021, the two variables increased by 27.38% and 9.91%, respectively.

Econometric Techniques

This study estimated the threshold levels of poverty and unemployment rates on economic growth for 34 provinces in Indonesia during the COVID-19 pandemic (2020 and 2021). Threshold level estimation can be estimated using cross-section threshold regression. The effect of poverty rates on economic growth has been empirically studied by Nakabashi (2018). Nakabashi (2018) employed production function theory to estimate the effect of poverty rates on economic growth in the Brazilian States from 1980–2015 using static panel data and GMM estimation. Breunig & Majeed (2020) also estimated the impact of poverty on economic growth in 152 countries during 1956–2011 using GMM estimation. Meanwhile, Bod'a & Považanová (2021) focus on the impact of the unemployment rate on economic growth for 21 OECD countries over the period of 1989–2019 under Okun's Law using a seemingly unrelated regression (SURE) model.

Table 1. Research Variables and Descriptive Statistics

Variables	Description	2020			2021		
		Mean	Minimum	Maximum	Mean	Minimum	Maximum
Economic Growth (EG)	The growth rate of Gross Regional Domestic Product (GRDP) under constant price 2010 for 34 provinces (%).	-2.47	-20.13	7.13	4.18	-2.47	16.40
Labor Force (LF)	Total labor force for 34 provinces (%)	38.81	20.08	64.59	39.79	19.53	64.80
Foreign Direct Investment (FDI)	Total foreign direct investment for 34 provinces (Million US$)	843.14	6.50	4793.70	914.51	5.90	5217.70
Human Development Index (HDI)	A composite index of human development for 34 provinces (index).	70.93	60.44	80.77	71.36	60.62	81.11
Poverty Rate (PR)	Total poverty for 34 provinces (%)	10.43	3.78	26.64	10.43	4.56	27.38
Unemployment Rate (UER)	Total unemployment for 34 provinces (%)	4.46	1.25	7.99	5.49	3.01	9.91

Source: Central Bureau of Statistics

Cross-section threshold regression (Hansen, 1996, 2000) is applied to estimate threshold levels of poverty and unemployment rates for 34 provinces in Indonesia in 2020 and 2021. This method can reveal the right poverty and unemployment rates to determine the economic growth in 34 provinces during the COVID-19 pandemic.

The basic equation of cross-section regression of the impact of poverty rate on economic growth can be written as follows:

$$EG_i = \alpha_0 + \beta_1 PR_i + \beta_2 LF_i + \beta_3 FDI_i + \beta_4 HDI_i + \varepsilon_i \tag{1}$$

Equation (1) describes the determinants of economic growth (EG) consisting of poverty rate (PR), labor force (LF), foreign direct investment (FDI), and human development index (HDI). PR will be set as a threshold variable. The *i* indicates 1, 2, ….n. The α and β are constant and parameters of independent variables, respectively. Meanwhile, the ε is the error-term. The $\beta_2 - \beta_4$ should have more than (>) zero or a positive impact on economic growth.

Equation (2) expresses the impact of the unemployment rate on economic growth as follows:

$$EG_i = \alpha_0 + \beta_1 UER_i + \beta_2 LF_i + \beta_3 FDI_i + \beta_4 HDI_i + \varepsilon_i \tag{2}$$

UER is an unemployment rate. This variable becomes a threshold variable.

Equations (1) and (2) can be rewritten to draw a cross-section threshold regression model, resulting:

$$EG_i = (\beta_1 PR_i + \lambda_1 X_i)I(PR_i \leq \gamma) + (\beta_2 PR_i + \lambda_2 X_i)I(PR_i > \gamma) + \varepsilon_i \tag{3}$$

$$EG_i = (\beta_1 UER_i + \lambda_1 X_i)I(UER_i \leq \gamma) + (\beta_2 UER_i + \lambda_2 X_i)I(UER_i > \gamma) + \varepsilon_i \tag{4}$$

X is explanatory variables, namely: LF, FDI, and HDI. The γ equals the unknown threshold parameter, while *I(.)* denotes an indicator function of a low or high regime. Besides, ε is the error term.

Equations (3) and (4) are written in threshold form as follows:

$$EG_i = \begin{cases} \beta_0^1 + \beta_1^1 PR_i + \beta_2^1 X_i + \varepsilon_i, & PR_i \leq \gamma \\ \beta_0^2 + \beta_1^2 PR_i + \beta_2^2 X_i + \varepsilon_i, & PR_i > \gamma \end{cases} \tag{5}$$

$$EG_i = \begin{cases} \beta_0^1 + \beta_1^1 UER_i + \beta_2^1 X_i + \varepsilon_i, & UER_i \leq \gamma \\ \beta_0^2 + \beta_1^2 UER_i + \beta_2^2 X_{i_i} + \varepsilon_i, & UER_i > \gamma \end{cases} \tag{6}$$

β_1^1 is the parameter for provinces with a low regime, while β_1^2 explains the parameter for a high regime.

Furthermore, the robustness check establishes a non-linear cross-section regression to estimate the impact of poverty and unemployment rates on economic growth for 34 provinces in 2020 and 2021. Therefore, equations (1) and (2) can be rewritten as follows:

$$EG_i = \alpha_0 + \beta_1 PR_i + \beta_2 PR_i^2 + \beta_3 PR_i^3 + \beta_4 LF_i + \beta_5 FDI_i + \beta_6 HDI_i + \varepsilon_i \qquad (7)$$

$$EG_i = \alpha_0 + \beta_1 UER_i + \beta_2 UER_i^2 + \beta_3 UER_i^3 + \beta_4 LF_i + \beta_5 FDI_i + \beta_6 HDI_i + \varepsilon_i \qquad (8)$$

Equations (7) and (8) describe the impact of non-linear poverty and unemployment rates on economic growth. This impact can be realized through U-shaped relationships. This relationship means that the higher the poverty and unemployment rates, the lower the economic growth. This condition will stop at a certain point (optimal), which is continued with a directly proportional impact between poverty and unemployment rates on economic growth.

RESULTS AND DISCUSSION
Threshold Level of Poverty Rate on Economic Growth

Equation (3) was estimated using cross-section threshold regression. The findings describe that the threshold level of the poverty rate in 2020 was approximately 13.97% (Table 2). This threshold level was higher than the average poverty rate for 34 provinces, which was approximately 10.43%. This condition indicates that some provinces that can maintain poverty rates below the average or threshold level can better control the poverty rate during the first year of the COVID-19 pandemic. Some of these provinces are spread across the islands of Kalimantan and Sumatra.

Table 2. The Threshold Level of Poverty Rate on Economic Growth for 34 Provinces in 2020

	Global OLS	Regime 1 q<=13.97	Regime 2 q>13.97
Constant	-40.084 (26.14)	6.126 (24.25)	-75.456*** (17.06)
LF	-0.024 (0.14)	0.127 (0.12)	-0.901*** (0.16)
FDI	0.001 (0.01)	0.001 (0.01)	-0.037*** (0.01)
HDI	0.534 (0.39)	-0.191 (0.38)	1.558*** (0.30)
Threshold Estimate	13.97		
Confidence Interval	[11.409,14.989]		
R-squared	0.52	0.11	0.89
Heteroskedasticity Test (P-Value)	0.669		
LM-test for no threshold	8.696		
Bootstrap P-Value	0.180		
Observations	34	27	7

Note: The threshold variable is poverty rate. The dependent variable is economic growth. The standard error is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

The impact of the labor force (LF) and foreign direct investment (FDI) on economic growth is negative and significant at the 1% level under Regime 2. The higher the LF and FDI, the lower the economic growth. During the first period of the COVID-19 pandemic, almost all workers carried out a work-from-home (WFH) system. In addition, all countries have significant constraints to

encouraging investment availability. Nevertheless, the human development index (HDI) signals positive significance at the 1% level. These findings illustrate that the quality of human development contributed significantly to sustaining economic growth during the COVID-19 period.

The level of goodness in Regime 2 is more appropriate. It can be traced from the *R*-squared value of 0.89 or 89%, compared to Global OLS (0.52) and Regime 1 (0.11). In addition, the total observations were 34 provinces under Global OLS, broken down into 27 provinces under Regime 1 and seven provinces under Regime 2.

The threshold level of poverty rate on economic growth in 2021 was approximately 6.38% (Table 3). Meanwhile, the average poverty rate for 34 provinces was 10.43%. Some provinces that can maintain a poverty level below the average/ threshold level are Sumatra, Java, and Kalimantan. These findings indicated that the poverty rate in 2021 was lower than in 2020, i.e., in 2021, the poverty level improved in line with the national economic recovery process.

Table 3. The Threshold Level of Poverty Rate on Economic Growth for 34 Provinces in 2021

	Global OLS	**Regime 1** $q<=6.38$	**Regime 2** $q>6.38$
Constant	-40.084 (26.14)	94.434*** (11.21)	9.605 (18.25)
LF	-0.024 (0.14)	0.103 (0.06)	-0.172 (0.10)
FDI	0.001 (0.01)	0.013*** (0.01)	0.018* (0.01)
HDI	0.534 (0.39)	-1.329*** (0.19)	-0.001 (0.26)
Threshold Estimate	6.38		
Confidence Interval	[5.75, 14.43]		
R-squared	0.58	0.92	0.28
Heteroskedasticity Test (P-Value)	0.09		
LM-test for no threshold	8.288		
Bootstrap P-Value	0.215		
Observations	34	9	25

Note: The threshold variable is poverty rate. The dependent variable is economic growth. The standard error is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

Foreign direct investment (FDI) had positive and significant implications at the 1% level under Regime 1 and the 10% level under Regime 2, respectively. The more FDI increases, the higher the economic growth. These findings are consistent with the national economic recovery process in 2021. In contrast, HDI had a significant negative impact at the 1% level under Regime 1. The higher the HDI will ruin economic growth.

The highest *R*-squared occurred in the estimated cross-section threshold regression under Regime 1 of 0.92 (92%). This condition indicated that the estimated model under Regime 1 was more appropriate. In addition, the total observations were 34 provinces under Global OLS, broken down into nine provinces under Regime 1 and 25 provinces under Regime 2.

Threshold Level of Unemployment Rate on Economic Growth

Equation (4) was used to estimate the threshold level of unemployment rate on economic growth for 34 provinces in 2020 and 2021. In 2020, the threshold level of the unemployment rate was 3.09% (Table 4). However, the average unemployment rate in the same period was 4.46%. These findings mean that some provinces that are capable to maintain unemployment rates below the threshold level can sustain the local economy appropriately. The provinces are Bali, Central Sulawesi, and West Sulawesi.

Table 4. The Threshold Level of Unemployment Rate on Economic Growth for 34 Provinces in 2020

	Global OLS	Regime 1 q<=3.09	Regime 2 q>3.09
Constant	-40.084 (26.14)	-6.023 (15.64)	-59.001** (23.98)
LF	-0.024 (0.13)	-0.568*** (0.14)	0.049 (0.12)
FDI	0.001 (0.01)	0.095*** (0.01)	0.001 (0.01)
HDI	0.534 (0.39)	0.265 (0.25)	0.756* (0.35)
Threshold Estimate	3.09		
Confidence Interval	[3.079, 3.380]		
R-squared	0.43	0.84	0.35
Heteroskedasticity Test (P-Value)	0.380		
LM-test for no threshold	5.092		
Bootstrap P-Value	0.835		
Observations	34	7	27

Note: The threshold variable is unemployment rate. The dependent variable is economic growth. The standard error is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

The labor force negatively and significantly affects economic growth at the 1% level under Regime 1. However, HDI had a positive and significant impact at the 1% level. The findings outline the labor force's damaging pressures on economic growth during the COVID-19 pandemic.

In 2021, the threshold level of the unemployment rate on economic growth was approximately 4.71%. This threshold was lower than the average unemployment rate of 5.49%. This finding reveals that provinces in Indonesia can reduce the unemployment rate according to the threshold level because the 2021 period was an economic recovery process. Several provinces in Nusa Tenggara and Sulawesi have been able to reduce the unemployment rate below the threshold level.

However, only foreign direct investment (FDI) positively and significantly impacted economic growth at the 10% level under Global OLS and the 1% level under Regime 1. The higher the FDI will drive economic growth higher. Thus, policymakers at the provincial level can improve the facilitation of regional industrial development to attract foreign investment.

R-squared estimates under Global OLS and Regime 1 were 0.59 (59%) and 0.63 (63%), respectively. The independent variables only contribute 60% in determining economic growth for 34 provinces in 2021. Furthermore, the total observation was 34 provinces, divided into 14 provinces under Regime 1 and 20 provinces under Regime 2.

Table 5. The Threshold Level of Unemployment Rate on Economic Growth for 34 Provinces in 2021

	Global OLS	**Regime1 q<=4.71**	**Regime2 q>4.71**
Constant	21.942 (17.02)	16.689 (22.51)	5.472 (17.21)
LF	-0.069 (0.07)	-0.049 (0.11)	-0.001 (0.07)
FDI	0.019* (0.01)	0.046*** (0.01)	0.001 (0.01)
HDI	-0.228 (0.26)	-0.174 (0.35)	-0.035 (0.27)
Threshold Estimate	4.71		
Confidence Interval	[4.710,5.840]		
R-squared	0.59	0.63	0.03
Heteroskedasticity Test (P-Value)	0.967		
LM-test for no threshold	6.031		
Bootstrap P-Value	0.656		
Observations	34	14	20

Note: The threshold variable is unemployment rate. The dependent variable is economic growth. The standard error is in the parentheses (). *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

Robustness Checks

The Non-Linearity Impact of Poverty Rate on Economic Growth

Equation (3) was recalculated using non-linear cross-section regression to reveal the impact of non-linear poverty rates on economic growth for 34 provinces in 2020 and 2021. The findings describe that the impact of poverty rates follows U-shaped relationships in 2021, while the findings in 2020 are insignificant (Table 6).

Foreign direct investment (FDI) will positively and significantly impact the 5% level of economic growth in 2021. The significant contribution of FDI is in sync with the recovery process of the national economy. In addition, in the same year, the *R*-squared was 0.47 (47%).

The Non-linearity Impact of Unemployment Rate on Economic Growth

Equation (4) was recalculated to show the impact of the unemployment rate on economic growth for 34 provinces in 2020 and 2021. The findings outline that the impact of unemployment rates follows U-shaped relationships in 2020, whereas, in 2021, there was no empirical evidence. In 2020, the human development index (HDI) had a positive and significant impact at the 10% level. The higher the HDI quality, the higher the economic growth. Thus, policymakers can facilitate the improvement of the quality of education, public health, and welfare to ensure the improvement and sustainability of economic growth.

Table 6. The Non-Linear Impact of Poverty Rate on Economic Growth for 34 Provinces in 2020 and 2021

	2020	**2021**
Constant	-2.992 (-0.12)	9.135 (0.61)
LF	0.032 (0.21)	-0.081 (-0.84)
FDI	0.001 (1.02)	0.001 (2.21)**
HDI	0.011 (0.03)	-0.133 (-0.59)
PR	-0.886 (-0.37)	2.289 (1.42)
PR^2	0.118 (0.65)	-0.208 (-1.75)*
PR^3	-0.004 (-1.02)	0.005 (2.01)*
R-squared	0.41	0.47
Observations	34	34

Note: The t-statistics is in the parentheses ().The dependent variable is economic growth. *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

Table 7. The Non-Linear Impact of Unemployment Rate on Economic Growth for 34 Provinces in 2020 and 2021

	2020	**2021**
Constant	-74.092 (-2.78)***	16.664 (0.75)
LF	0.094 (0.60)	0.007 (0.07)
FDI	0.001 (0.24)	0.002 (3.17)***
HDI	0.578 (1.71)*	-0.257 (-1.20)
UER	21.908 (2.17)**	2.801 (0.29)
UER^2	-5.139 (-2.21)**	-0.477 (-0.29)
UER^3	0.356 (2.15)**	0.020 (0.23)
R-squared	0.32	0.36
Observations	34	34

Note: The t-statistics is in the parentheses ().The dependent variable is economic growth. *, **, and *** are statistical significant at the 1%, 5%, and 10%, respectively.

R-squared estimates were 0.32 (32%) in 2020 and 0.36 (36%) in 2021, respectively. It is only about 30% of the contribution of independent variables to economic growth for 34 provinces in 2020 and 2021.

Significant findings in this study state that the poverty rate in Indonesia during the COVID-19 pandemic in 2020 had increased quite drastically, with a threshold higher than the average poverty of 34 provinces in Indonesia. The level of labor contribution was also relatively low, but the HDI value could still be controlled. An intriguing comparison for 2021 was that the decrease in poverty indicated an improvement in government policies and social security. Fosu (2010) states that one of the stages of reducing poverty can start with reducing income inequality. Low-income countries have greater challenges in poverty alleviation.

Meanwhile, Ravallion (2007) stated that poverty alleviation required significant economic growth. A prosperous society indicates the community's quality of life and stable economic growth (Štreimikienė & Barakauskaitė-Jakubauskienė, 2012). The results of Nakabashi's research (2018) stated the effect of poverty in Brazil on the economy, especially in the capital formation process.

The involvement of FDI in 2021 provided a positive signal; the business world was active again to recover the national economy. The unemployment rate in Indonesia in 2021 was higher than the threshold level of unemployment. The workforce has not shown any significant contribution due to the shift from working in the office to at home. Meanwhile, some business sectors had excellent potential in 2021, which positively impacted FDI absorption.

The unemployment rate in 34 provinces during 2020-2021 remains a major challenge. These findings are reinforced by the results of previous studies, such as Hjazeen, Seraj, and Ozdeser (2021) that convey an inverse relationship between unemployment and economic growth in Jordan. In the Balkan countries, it is evident that an increase in unemployment leads to a decrease in national income growth (Kukaj, 2018). There is an inverse relationship between unemployment and economic output in Nigeria (Iloabuchi, 2019).

CONCLUSION

This study estimates the threshold levels of poverty and unemployment rates on economic growth for 34 provinces in 2020 and 2021. These two periods are the initial periods of the COVID-19 pandemic and national economic recovery. Furthermore, the threshold regression estimation employs the cross-section threshold introduced by Hansen (1999, 2000).

The main findings explain that the threshold level of poverty rates on economic growth in 2020 and 2021 were approximately 13.97% and 6.38%, respectively. Meanwhile, in the same period, the threshold levels of unemployment rates on economic growth were approximately 3.09% and 4.71%, respectively. Labor force (LF) and foreign direct investment (FDI) negatively and significantly affect economic growth for the threshold level of poverty rate under Regime 2 in 2020. LF also contributed negatively to the unemployment rate threshold levels under Regime 1 in 2020. In contrast, FDI has positive implications for the threshold level of poverty under Regimes 1 and 2 in 2021 and unemployment under Regime 1 in 2020 and 2021. The human development index (HDI) has a positive and significant impact on economic growth for the threshold level of poverty under Regime 2 in 2020 and the threshold level of unemployment rate under Regime 2 in 2021. Meanwhile, HDI contributes negatively to the threshold level of poverty under Regime 1 in 2021.

The policy implications can be broken down in several ways. Provincial governments can focus more on reducing poverty and unemployment rates during the economic recovery. Poverty and unemployment rates should be pushed toward a level lower than the threshold. They need to design and implement productive and labor-intensive programs. Both programs will encourage employment and increase the incomes of low-income people. Furthermore, various regional economic and business innovations are structured to create environmentally friendly FDI in the long-term.

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