# The Impact of Human Development Index, Minimum Wage, Labor Force Participation Rate, and Open Unemployment Rate on Economic Growth

[1]**Toni Irawan, [2]Rifki Khoirudin***

Corresponding Author: *rifki.khoirudin@ep.uad.ac.id
[1] Universitas Ahmad Dahlan, Yogyakarta, Indonesia

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ABSTRACT

This research aims to identify factors influencing the economic growth of Bali Province. The dependent variable used is economic growth, while the independent variables include the Human Development Index, Provincial Minimum Wage, Labor Force Participation Rate, and Open Unemployment Rate. The research employs a quantitative method, utilizing panel data regression with the Random Effect Model (REM). The findings reveal that the Open Unemployment Rate and Provincial Minimum Wage variables significantly and negatively impact economic growth. Conversely, the Labor Force Participation Rate variable significantly and positively influences economic growth. However, the Human Development Index variable does not demonstrate a significant impact and holds a positive value on economic growth.

## Introduction

Economic development serves as a pivotal benchmark for successfully implementing growth strategies, with the Gross Domestic Product (GDP) being a key indicator in assessing economic growth regionally and nationally [1]. Indonesia's cyclical nature of development is not automatic. It signifies that the nation's growth is intricately linked to the prosperity of each

region throughout Indonesia. The success of growth in individual regions plays a determining role in the overall success of Indonesia's economic growth. Consequently, fostering favorable growth processes in each region becomes imperative, necessitating policies that delegate managerial authority to provincial governments to execute development initiatives.

In Indonesia, the yardstick for economic growth is the annual growth of GDP, encompassing diverse economic sectors in each region, each with distinct strengths. The economic growth rates in the Bali province and Indonesia from 2012 to 2021 has fluctuations that have transpired over this period [2]. From 2012 to 2021, there were varying economic growth trends in Indonesia, with a notable surge of 4.67% in 2012 and a decline of 4.3% in 2013 [3]. In 2018, the growth rate rebounded to 3.93%, surpassing the 3.79% recorded in 2017 [4]. This growth was attributed to developments in the production sector, particularly in business fields and other services, achieving the highest growth of 8.99%. Additionally, significant growth was observed in the economic output components, especially in the non-profit household consumption sector, registering a substantial 9.08%.

However, 2020 marked a downturn for Indonesia, with negative growth driven by the impact of the COVID-19 pandemic [5]. The subsequent economic slowdown resulted from government-imposed restrictions, such as the Enforcement of Community Activity Restrictions, halting the performance of nearly all economic sectors except for the healthcare sector. This crisis reduced production activities, job losses, heightened unemployment rates, and decreased business mobility.

There was the fluctuating trends in Bali's Gross Regional Domestic Product from 2012 to 2021, visually representing economic shifts during this period. The trend demonstrates fluctuations, notably a decline in 2020 (-9.33%) and 2021 (-2.47%), primarily attributed to the lingering effects of the pandemic [6]. The sectors most impacted encompassed industries, tourism, trade, and finance.

In 2018, Indonesia hosted the IMF-World Bank meeting, with Bali as the venue, attracting 23,000 participants from 189 countries. The meeting discussed global finance, economic developments, and emerging issues. The selection of Bali as the host conferred numerous benefits, including significant infrastructure development such as airports, underpasses, and updates in the tourism sector. This infrastructure development, while geared towards accommodating international events, also contributes to the long-term well-being of the local populace. Bali, a province in Indonesia with its capital in Denpasar, is located in the western part of the Nusa Tenggara archipelago. With a population of 4,317,404 as of 2020 and 747 people/km² density, Bali comprises eight regencies, one municipality, 57 districts, 80

villages, and 636 hamlets. The province spans land and sea territories, covering a total area of 5,636.66 km², constituting approximately 0.29% of Indonesia's vast archipelagic expanse [7].

The preliminary study by Ref. [8] aimed to analyze the influence of the Human Development Index (HDI) and Poverty on the economic growth of regencies/cities in the Bangka Belitung Islands Province. The research utilized secondary data from the Central Statistics Agency (BPS) website. The study focused on understanding the impact of HDI and Poverty on the economic growth of regencies/cities in the province from 2010 to 2017. The data analysis employed the Fixed Effect Model through Panel Data Regression. The results indicated a significant negative influence of both the Human Development Index and Poverty on Economic Growth in the regencies/cities of the Bangka Belitung Islands Province during the specified period. The study contributes to understanding the dynamics between human development, poverty, and economic growth in this specific regional context, providing insights that can inform future research and policymaking in the area.

The research conducted by Ref. [9] in 2021 aims to analyze the influence of population size, Regional Gross Domestic Product, and Minimum Wage on the unemployment rate in regencies/cities in East Java Province. The study utilized secondary data processed using the EViews software. The primary objective was to analyze the partial and simultaneous effects of Population Size, Regional Gross Domestic Product, and Minimum Wage on the unemployment rate. The study employed multiple linear regression analysis to examine the significant impact of Population Size, Regional Gross Domestic Product, and Minimum Wage on the unemployment rate in regencies/cities of East Java Province from 2012 to 2018. The results revealed that Population Size and Regional Gross Domestic Product significantly negatively influenced the unemployment rate. Additionally, the Minimum Wage also significantly impacted the unemployment rate in the analyzed regions.

Ref. [10] aims to analyze the influence of inflation, the number of workers, and the minimum wage in the province on economic growth in Central Java. The study utilized panel data obtained from the Central Statistics Agency and applied the Fixed Effect Model (FEM) using STATA software. The results indicated that the variables of employment and provincial minimum wage positively and significantly impacted economic growth. In contrast, inflation did not show a positive influence on economic growth in the regencies/cities of Central Java from 2012 to 2020.

Ref. [11] research aimed to understand how poverty, labor, and physical decentralization influence economic growth in the former Residency of Surakarta (2006-2010). The study used secondary data from the Central Statistics Agency, applying the OLS panel data analysis method. The findings revealed a negative and significant influence of the poverty

variable on Regional Gross Domestic Product, indicating that poverty had a detrimental impact on economic growth in the analyzed region during the specified period.

## A. Research Objectives

The main objective of this study is to investigate the impact of the Human Development Index (HDI), Minimum Wage, Labor Force Participation Rate, and Open Unemployment Rate on economic growth in the province of Bali. Specifically, the research aims to:

1. Assess the influence of the human development index on economic growth.
2. Examine the impact of the labor force participation rate on economic growth.
3. Evaluate the effect of the open unemployment rate on economic growth.
4. Investigate the relationship between minimum wage and economic growth.

These research objectives are formulated based on the existing issues identified in the study. They are designed to provide insights into the key factors influencing economic growth in the specific context of Bali.

## B. Hypotheses for the Research

1. H1: Human Development Index (IPM)
   - Null Hypothesis (H0): There is no significant and positive influence of the Human Development Index on Economic Growth in Bali Province.
   - Alternative Hypothesis (H1): There is a significant and positive influence of the Human Development Index on Economic Growth in Bali Province.

2. H2: Open Unemployment Rate (TPT)
   - Null Hypothesis (H0): There is no significant and negative influence of the Open Unemployment Rate on Economic Growth in Bali Province.
   - Alternative Hypothesis (H1): There is a significant and negative influence of the Open Unemployment Rate on Economic Growth in Bali Province.

3. H3: Provincial Minimum Wage (UMP)
   - Null Hypothesis (H0): There is no significant and negative influence of the Provincial Minimum Wage on Economic Growth in Bali Province.
   - Alternative Hypothesis (H1): Provincial Minimum Wage has a significant and negative influence on Economic Growth in Bali Province.

4. H4: Labor Force Participation Rate (TPAK)
   - Null Hypothesis (H0): There is no significant and positive influence of the Labor Force Participation Rate on Economic Growth in Bali Province.
   - Alternative Hypothesis (H1): There is a significant and positive influence of the Labor Force Participation Rate on Economic Growth in Bali Province.

These hypotheses are formulated based on theoretical foundations, existing research findings, and the framework of thought related to the impact of the Human Development Index, Open Unemployment Rate, Provincial Minimum Wage, and Labor Force Participation Rate on economic growth in the context of Bali Province.

## Material and Methods

### A. Data Source

Secondary data was utilized in this study, obtained from various sources such as internet searches, documentation, and publications accessed through the Badan Pusat Statistika (BPS) website.

**Table 1.** Data Sources

| Variable | Code | Source | Unit |
|---|---|---|---|
| Economic Growth | PDRB | BPS | Percentage |
| Human Development Index | IPM | BPS | Percentage |
| Open Unemployment Rate | TPT | BPS | Percentage |
| Provincial Minimum Wage | UMP | BPS | Billion Rupiah |
| Labor Force Participation Rate | TPAK | BPS | Thousand Individuals |

The study adopts a data panel approach, combining time series and cross-sectional data. The analysis covers the period from 2012 to 2021.

### B. Operational Definition of Variables

Table 2 shows the detail of variable definition used in this study.

**Table 2.** Operational Defnition

| Variables | Variable Name | Operational Defnition |
|---|---|---|
| Dependent Variable | Economic Growth (PDRB) | Defined as the increase in the production of goods and services, measured as a percentage of the Gross Regional Domestic Product (PDRB) in Bali Province from 2012 to 2021. |
| Independent Variables | Human Development Index (IPM) | Human Development Index used to measure the success of building human life quality. Data from IPM in Bali Province from 2012 to 2021 is a percentage. |
| | Open Unemployment Rate (TPT) | The percentage of the labor force that is unemployed but actively seeking employment. Data on the unemployment rate in Bali Province from 2012 to 2021 is presented as a percentage. |
| | Provincial Minimum Wage (UMP) | The minimum monthly wage that employers must pay to workers. Data on the provincial minimum wage in Bali from 2012 to 2021 is presented in billions of rupiah. |
| | Labor Force Participation Rate (TPAK) | The percentage of the working-age population in the labor force. Data on the Labor Force Participation Rate in Bali Province from 2012 to 2021 is presented to thousands of individuals. |

### C. Data Analysis

In this study, panel data regression analysis is employed to examine the influence of independent variables on the dependent variable. Panel data, a combination of time series and cross-sectional data, is chosen to understand the impact of independent variables on the

dependent variable during the same period in various regions. The primary objective is to analyze the effects of the Human Development Index (IPM), Minimum Wage (UMP), Labor Force Participation Rate (TPAK), and Unemployment Rate (TPT) on Economic Growth (PDRB) in Bali Province during the period 2012-2021, with the following equation:

$$PDRB_{it} = \beta 0 + \beta_1 IPM_{it} + \beta_2 UMP_{it} + \beta_3 TPAK_{it} + \beta_4 TPT_{it} + \varepsilon it \quad .....................(1)$$

Where:

| | |
|---|---|
| PDRB | : Economic Growth t (Percent) |
| $\beta 0$ | : Constant |
| $\beta 1, \beta 2, \beta 3, \beta 4$ | : Koefisien regresi |
| IPM | : HDI in period t (Percent) |
| UMP | : Provincial Minimum Wage in period t (Million Rupiah) |
| TPAK | : Labor Force Participation Rate t (Thousand People) |
| TPT | : Open Unemployment Rate in period t (Percent) |
| i | : Bali Province |
| T | : 2012-2021 |

## D. Estimation Methods in Panel Data Regression

The panel data regression equation can be estimated using three approaches: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

1. Common Effect Model (CEM): The CEM is the simplest model in panel data regression, combining time series and cross-sectional data without considering individual and time differences. The CEM equation takes the form:

$$yit = \beta + \beta'XitXnit + \varepsilon it .........................................................................(2)$$

2. Fixed Effect Model (FEM): The FEM uses dummy variables, assuming that there are individual differences in the model and intercept variations account for these differences. Also known as Last Square Dummy Variable (LSDV). The FEM equation in panel data regression takes the form:

$$yit = \beta i + \beta'Xit + \varepsilon it .........................................................................(3)$$

3. Random Effect Model (REM): The REM incorporates variations in the size of areas and, over time, into the disturbance term. It utilizes degrees of freedom more efficiently without reducing the count [12]. The REM equation in panel data regression takes the form:

$$yit = \beta t + \beta'Xit + \varepsilon it .........................................................................(4)$$

In summary, each model (CEM, FEM, and REM) has its assumptions and characteristics. The choice between them depends on the nature of the data and the underlying assumptions about the individual and time effects in the panel data. Researchers typically select the model that best fits their study context and hypotheses.

## E. Model Estimation Selection

1. Chow Test

The Chow Test, as described by (Sari et al., 2020), aims to compare whether Common Effect (CEM) or Fixed Effect Model (FEM) is more suitable for estimating panel data regression. Hypotheses for the Chow Test:

H0: Using the Common Effect Model (CEM)

H1: Using the Fixed Effect Model (FEM)

The selection of the most appropriate model is based on the p-value. If H0 is accepted, with the p-value above a significance level 0.05, then the Common Effect Model is deemed the most suitable. Conversely, if H0 is rejected, with the p-value below 0.05, then the Fixed Effect Model is considered the best.

2. Hausman Test

The Hausman Test is employed to determine whether the Fixed Effect (FEM) or Random Effect Model (REM) is more appropriate for estimating panel data regression. Hypotheses for the Hausman Test:

H0        : Using the Random Effect Model (REM)

H1        : Using the Fixed Effect Model (FEM)

The model selection is based on the p-value. If H0 is accepted, with the p-value above a = 0.05, the Random Effect Model is considered the best conversely, if H1 is rejected, with the p-value below 0.05, then the Fixed Effect Model is deemed more suitable [12].

In summary, the choice between Common Effect Model, Fixed Effect Model, or Random Effect Model depends on the Chow Test and Hausman Test outcomes. Researchers typically use these tests to determine the most appropriate model based on the characteristics and assumptions of their panel data.

## F. Statistical Criteria Testing

F-Test (Simultaneous): The F-Test aims to determine whether all independent variables collectively influence the dependent variable in the model (Ghozali, 2006) as cited in (Debby Ch et al., 2014). Hypotheses in the F-Test:

H0: Independent variables do not collectively influence dependent variables.

H1: Independent variables collectively influence dependent variables.

H0 is accepted if the p-value is above 0.05, and rejected if the p-value is below 0.05.

The F-statistic is calculated using the formula:

$F = (R^2/(K-1))/((1-R^2)-(N-K))$

Where:

K = Number of estimated measures

N= Number of observations

If the calculated F-value is greater than the critical F-value, the independent variables collectively influence the dependent variable.

R-Squared ($R^2$) measures the contribution of independent variables to the dependent variable in the model. A higher $R^2$ indicates a better ability of independent variables to explain the dependent variable. Evaluation is often recommended using the adjusted $R^2$ to account for potential biases introduced using many variables in the estimation model.

Apriori Test aims to evaluate whether the test results align with the initial hypotheses of the study. The comparison is made by examining the conformity of the signs of the regression coefficient with economic theory. The model is successful if the test results align with the research hypotheses.

t-Test (Partial) assesses the individual influence of each independent variable on the dependent variable. Hypotheses for the t-Test:

H0: The individual independent variable has no significant effect on the dependent variable.

H1: The individual independent variable significantly affects the dependent variable.

H0 is rejected if the t-value is less than 0.05, indicating a significant partial effect. If the t-value is more excellent than 0.005, the variable is considered not to have a significant partial effect [13].

## Results

### A. Model Estimation

Table 3 shows the result of chow test and hausman test including the objective, hypothesis, results, and conclusion.

**Table 3.** Operational Defnition

| Model | Objective | Hypothesis | Results | Conclusion |
|---|---|---|---|---|
| Chow Test | The objective of this test is to choose between the Common Effect (CEM) or Fixed Effect Model (FEM) in panel data regression. | H0: Common Effect Model is used. H1: Fixed Effect Model is used. | Cross-section F-Statistic: 7.544236, Prob.: 0.0000 Cross-section Chi-square: 52.087978, Prob.: 0.0000 | Reject H0, Fixed Effect Model is chosen. |
| Hausman Test | To decide between the Fixed and Random Effect Models. | H0: Random Effect Model is used. H1: Fixed Effect Model is used. | Chi-Sq. Statistic: 4.804000, Prob.: 0.3090 | Fail to reject H0, Random Effect Model is chosen. |

According to the test results in the selection of the estimation model, the results of the Random model effect are obtained as the most suitable estimation model to use. From the results of regression estimation using the Random Effect model can be illustrated in Table 4 below, the results of the regression equation obtained are as follows:

PDRBit= 34.19087+0.046673IPMit+-2.016220TPTit+1.387378LOG_TPAKit

$\qquad$ -3.198159LOG_UMPit+εit..................................................................................(4)

Where:
Log         : logarithma
PDRBPit   : Economic Growth of districts/cities i year t
IPMit       : Human Development Index in the district/city period i year t
UMPit      : Provincial Minimum Wage in the regency/city period i year t
TPAKit     : District / City Labor Force Participation Rate i year t
TPTit       : Open Unemployment Rate in districts/cities i year t
I             : 9 Regencies / Cities in Bali Province t = 2012-2021
εit           : error term

**Table 4.** Regression Test Results of Random Effect Model (REM)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 34.19087 | 9.211441 | 3.711783 | 0.0004 |
| IPM | 0.046673 | 0.056464 | 0.826600 | 0.4108 |
| TPT | -2.016220 | 0.137149 | -14.70094 | 0.0000 |
| LOG_TPAK | 1.387378 | 0.628210 | 2.208461 | 0.0299 |
| LOG_UMP | -3.198159 | 0.562795 | -5.682639 | 0.0000 |
| Effects Specification | | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.000000 | 0.0000 |
| Idiosyncratic random | | | 2.090588 | 1.0000 |
| Weighted Statistics | | | | |
| R-squared | 0.688956 | Mean dependent var | | 3.993889 |
| Adjusted R-squared | 0.674319 | S.D. dependent var | | 4.656754 |
| S.E. of regression | 2.657539 | Sum squared resid | | 600.3134 |
| F-statistic | 47.06835 | Durbin-Watson stat | | 1.474789 |
| Prob(F-statistic) | 0.000000 | | | |
| Unweighted Statistics | | | | |
| R-squared | 0.688956 | Mean dependent var | | 3.993889 |
| Sum squared resid | 600.3134 | Durbin-Watson stat | | 1.474789 |

Source: Eviews 10, data processed

In accordance with the results obtained in the regression of panel data with the Random Effect model in the table above, TPT, TPAK and UMP have a significant influence on changes in the value of economic growth. IPM variable does not have a significant influence on changes in the value of economic growth. UMP has a negative and influential coefficient value, which means that if there is an increase in the minimum wage of 1%, it will cause the economic growth rate to increase by -3.198159%. and the TPT variable has a negative and influential coefficient value, which means that every 1% increase in TPT will cause the economic growth rate to decrease by -2.016220%. Meanwhile, TPAK has a positive and significant effect on the value of economic growth, which means that every 1% increase in the variable will affect the value of economic growth of 1.387378%. However, in contrast to IPM variable, it has no influence on changes in the value of economic growth because the p-value probability value of the variable is above the 5% alpha value, which is 0.4108.

## B. Statistical Tests

Apriori test is to check the conformity of results with initial hypotheses. The results is shown by Table 5. Simultaneous Test (F-Test) was used to to assess the joint impact of independent variables on the dependent variable. The results showed that F-statistic= 47.06835 with Prob(F-stat)=0.000000. The conclusion is reject H0, indicating that independent variables collectively significantly impact Economic Growth.

**Table 5.** Conformity of results with initial hypotheses

| Variable | Hypothesis | Result | Conclusion |
|----------|-----------|--------|-----------|
| IPM | Positive | Positive | Matched |
| TPT | Negative | Negative | Matched |
| Log UMP | Negative | Negative | Matched |
| Log TPAK | Positive | Positive | Matched |

Coefficient of Determination (R-squared) was used to to measure the contribution of independent variables to the dependent variable. The results is that $R^2$=0.688956 and Adjusted $R^2$=0.674319. It means adjusted $R^2$ is 67.43%, indicating that IPM, TPAK, UMP, and TPT collectively explain 68.88% of the variation in Economic Growth.

Partial Test (t-Test) used to o evaluate the individual impact of each independent variable on Economic Growth. Table 6 shows the results.

**Table 6.** Partial Test (t-Test)

| Variable | T-Stat | T-Table | Prob. | Conclusion |
|----------|--------|---------|-------|-----------|
| IPM | 0.826600 | 1.992 | 0.4108 | Insignificant |
| TPT | -14.70094 | 1.992 | 0.0000 | Significant |
| Log TPAK | 2.208461 | 1.992 | 0.0299 | Significant |
| Log UMP | -5.682639 | 1.992 | 0.0000 | Significant |

These results provide a comprehensive understanding of the individual and collective impacts of the independent variables on Economic Growth in the specified model.

## Discussion

After conducting various tests, it can be concluded that only three independent variables significantly influenced Economic Growth in the Bali Province from 2012 to 2021. These variables are the Open Unemployment Rate (TPT), Provincial Minimum Wage (UMP), and Labor Force Participation Rate (TPAK). Meanwhile, one independent variable, the Human Development Index (IPM), does not have a significant impact on Economic Growth.

### A. Impact of the Human Development Index (IPM) on Economic Growth

The analysis indicates that the IPM variable does not significantly impact Economic Growth. It means that changes in the IPM variable do not significantly affect economic growth. This

finding contradicts the initial hypothesis, suggesting that the IPM level has a non-significant and positive relationship with economic growth. This aligns with a study Ref. [14] found the IPM variable did not significantly affect economic growth but had a positive coefficient on Gross Regional Domestic Product (PDRB) in Banten Province.

**B. Impact of the Open Unemployment Rate (TPT) on Economic Growth**

The analysis shows that the Open Unemployment Rate variable significantly negatively impacts Economic Growth, with a coefficient of -2.016220. Therefore, a 1% decrease in TPT would lead to a growth in economic growth by -2.016220%. This aligns with research by Ref. [15], indicating that an increase in open unemployment will negatively impact economic growth due to a decrease in people's purchasing power. The results also support the initial hypothesis that TPT significantly negatively impacts economic growth. In conclusion, an increase in the open unemployment rate can harm economic growth. As the unemployment rate rises, the population's purchasing power decreases, resulting in reduced demand for goods and services.

**C. Impact of Provincial Minimum Wage (UMP) on Economic Growth**

The results indicate that the Provincial Minimum Wage variable significantly negatively impacts economic growth changes. It implies that a 1% increase in the Provincial Minimum Wage would decrease economic growth by -3.198159%. This finding is consistent with the study by Ref. [16] which found that the minimum wage had a negative and significant impact on economic growth. Increasing the Provincial Minimum Wage can negatively impact economic growth. Higher wages or increased income can boost demand and purchasing power for goods and services, affecting economic growth.

**D. Impact of Labor Force Participation Rate (TPAK) on Economic Growth**

The analysis shows that the Labor Force Participation Rate significantly impacts economic growth, with a coefficient of 1.387378. Therefore, a 1% increase in the TPAK variable would increase economic growth by 1.387378%. This aligns with studies by Ref. [17]-[19] indicating that the workforce positively and significantly impacts economic growth. An increase in the number of working populations contributes to increased output of goods and services, meeting economic demand. In conclusion, a 1% increase in the Labor Force Participation Rate (TPAK) leads to a 1.387378% increase in economic growth. A higher level of workforce participation positively influences economic growth [20].

**Conclusion**

Among the examined variables, only three have a significant impact on Economic Growth, Open Unemployment Rate, Provincial Minimum Wage, and Labor Force Participation Rate. The Human Development Index does not significantly influence Economic Growth during the specified period. The Human Development Index does not significantly affect Economic

Growth, contradicting the initial hypothesis. It implies that changes in Human Development Index levels have little impact on economic growth. Open Unemployment Rate exhibits a significant negative impact on Economic Growth, suggesting that a decrease in unemployment positively influences economic growth. It aligns with the expectation that lower unemployment rates contribute to a healthier economy. UMP demonstrates a significant negative impact on Economic Growth, indicating that an increase in the minimum wage negatively affects economic growth. Higher wages impact demand and purchasing power, influencing economic growth. Labor Force Participation Rate has a significant positive impact on Economic Growth. An increase in the workforce participation rate positively influences economic growth. It aligns with the understanding that an active and engaged workforce contributes to economic development. Policymakers should consider the specific impacts of each variable on economic growth. Addressing unemployment rates, minimum wage policies, and strategies to enhance workforce participation can contribute to a more robust and sustainable economic development strategy. Future research can delve deeper into the intricate relationships between economic variables in Bali Province. Investigating additional factors and their dynamic interactions can provide a more comprehensive understanding of the economic landscape.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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## Authors

**Toni Irawan** is a distinguished alumna of the Department of Development Economics at Ahmad Dahlan University, stands as a testament to the university's commitment to nurturing bright minds. Throughout his academic journey, he not only excelled in his studies but also actively engaged in various student organizations, demonstrating leadership skills and a passion for making a positive impact on campus life. (email: toni18000010157@webmail.uad.ac.id).

**Rifki Khoirudin** is a lecturer in the Department of Development Economics at Ahmad Dahlan University. He specializes in Valuation & Finance and has contributed to various national and international journals. (email: rifki.khoirudin@ep.uad.ac.id).