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The Effect of Human Development Index (IPM), Gini Ratio, and Gross Domestic Products on the Number of Stunting in Indonesia

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Abstract:- Indonesia, trailing Cambodia, ranks fifth with the highest stunting rate in the Asian region. Especially in Indonesia, there are many factors that cause stunting. There are two kinds of factors: economic and noneconomic. The researchers evaluated economic factors using sub-factors that were also used as independent variables, such as the Human Growth Index, Gini Ratio, GDP at constant prices, and GDP at present prices, in this analysis. This research uses a quantitative methodology from 34 provinces in Indonesia for two consecutive years, 2018 and 2019, with the panel data regression process. Results of the data review indicate that only the GDP component has a major influence on the extent of stunting in Indonesia at current prices. This is because, in Indonesia, the extent of stunting continues to be caused by non-economic causes.

Keywords:- *Human Growth Index; Gini Ratio; GDP; Stunting.*

I. INTRODUCTION

Stunted growth in early childhood is a type of malnutrition that is now affecting a number of countries, especially developed countries. This dilemma has never been taken seriously and even overlooked after years ago, the case of stunting is occurring at this moment. It is a serious problem in the majority of toddlers and has a negative effect on a country's economy, especially in developed countries. Now, editing has been a top priority problem that needs to be addressed worldwide. From 2010 to 2025, the World Health Organisation plans to minimize stunting by 40 percent. Between 1990 and 2010, Asia's stunting prevalence fell from 49 percent to 28 percent.

Indonesia, a developing nation on the Asian continent, has a comparatively high incidence of stunting for children under the age of five. Indonesia follows Cambodia as the Asian country with the highest stunting rate, according to WHO data. In Indonesia, the percentage of stunting increased to 29.6 percent from the previous 28.9 percent based on the findings of tracking nutritional status (PSG) in 2018. With this statistic in mind, the Indonesian government has launched a national stunting reduction policy in an attempt to minimize the number of stunted infants.

There are several factors, particularly in Indonesia, that cause stunting. One of the causes of stunting in babies is the issue of poverty in rural areas. In children under five, stunting is a state of inability to develop due to persistent malnutrition which making the body height of the infant too small relative to other children of his generation. To resolve this issue, the PPDT's Ministry of Villages (Ministry of Villages, Creation of Deprived Areas, and Transmigration) divides the target of operation execution in 1000 villages into three parts. This is one form of efforts by the Indonesian government to minimize Indonesia's stunting rates.

However, the impact of economic and non-economic influences is also a point of contention. In Indonesia, there are also many sub-factors of the economy that cause stunting. The Human Development Index (HDI), Gini Ratio, New Price GRDP, and Constant Price GRDP are the economic sub-factors. The four sub-factors are a measuring tool for an area or region's level of welfare or poverty. Poverty is the predominant cause of economic conditions that cause stunting of children under the age of five.

Poverty is one of the most significant challenges facing developed nations like Indonesia. According to the BPS (Central Statistics Agency), the idea of poverty is an economic failure, calculated in terms of spending, to fulfill basic needs such as food and non-food goods. Poverty, according to Branca and Ferrari, is one of the causes of stunting.

The purpose of this research is to evaluate the influence of economic factors contributing to pregnancy loss in Indonesia, including HDI, HK GDP, HB GDP, and Indonesia's Gini Stunting Incidence Ratio in 2018 and 2019. The data for this analysis was compiled using the Eviews 10 program and analyzed using a descriptive quantitative methodology with data regression methods tables.

II. LITERATURE REVIEW

A polemical debate was created on the topic of economic factors influencing the number of stunting cases in an area. There are many researchers who note that, especially in Indonesia, the amount of stunting is not controlled by economic factors. Other causes have a greater effect on the occurrence of stunting. As study by Nasrun & Rahmania, (2018) and Ibrahim & Faramita (2015) shows, the prevalence

of the number of stations in Indonesia is not impacted by economic factors such as the human development index, the Gini ratio and the Gross Domestic Product (GRDP).

In comparison to the case of Utami & Mubasyiroh (2019) and Basbeth (2020) studies, which state that there is a near correlation between economic factors and Indonesia's amount of stunting. There are disputes and study findings on the impact of economic conditions on the amount of stunting in Indonesia, based on these reports. This is also a subject that needs to be investigated further in order to yield valuable results. This research would therefore investigate the effect on the amount of stunting instances in Indonesia in the period 2018-2019 of economic factors such as the Human Development Index, Gini Ratio, and Gross Domestic Product.

III. RESEARCH METHODS

This analysis was carried out in Indonesia's 34 provinces. One dependent variable, the sum of stunting, and four independent variables, HDI, Gini Ratio, Constant Price GDP, and Current Price GDP, are included in this analysis. The data used in this analysis is secondary panel data collected from each province's Central Bureau of Statistics over a two-year period, from 2018 to 2019. The population in this sample is drawn from 34 Indonesian provinces, ranging from Aceh to Papua, all at the same time. be the topic of this study's sample.

Panel data regression analysis using the Eviews software was used as the analysis tool. This research approach was selected because it helps the analysis to solve a broader continuum problem that cannot be solved using only cross-sectional data or time series. In general, it increases the reliability of analysis estimates by increasing degrees of freedom and reducing collinearity between explanatory variables. This research explores the effects of economic factors (HDI, Gini Ratio, Constant Price GDP, and Present Price GDP) on Indonesia's stunting rate in 2018 and 2019.

This is a predictive analysis that is used to assess the degree to which the independent variables have an effect on the dependent variable. Multiple linear regression is a test used in this analysis to assess the influence of four independent variables on the dependent variable. The panel data regression model can be defined mathematically as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Information :
Y : Stunting rate
X1 : Human Development Index
X2 : Gini Ratio
X3 : Constant Price GRDP
X4 : Current Price PDRB
α : Constant coefficient
β : Regression coefficient X
ε : Error

There are three types of methods to panel data regression analysis: typical effect models, fixed effects models, and random effects models (Brooks, 2008). One of the most suitable models will be chosen from the three to forecast the study's outcomes. The F test, also known as the Chow Test, and the Hausman Test are two of the phases that were carried out in this analysis.

In comparison, this study used a conventional inference test to see if the data are appropriate for regression analysis. The normality test, autocorrelation, multicollinearity, and heterocedasticity are all predictions that the regression model must pass. The hypothesis testing was then conducted to assess the importance of the relationship between the independent and dependent variables. The partial test (t test) and the coefficient of determination (R2) were used to test the hypothesis.

IV. RESULT AND DISCUSSION

A. Hypothesis Test Results

1. F Test or Chow Test

The F test, also known as the chow test, decides whether a fixed effect model or a general effect model is better for estimating panel data in this analysis. In this analysis, the chow test hypothesis is:
H_0 :*Random Effect Model*
H_1 :*Fixed Effect Model*

The results of the f-statistical equation with the f-table will be used to evaluate the F test or chow test. If the F-count approaches the F-table, H_0 is rejected, and the fixed effect model is the best model to use in this analysis, and vice versa. The F test, also known as the chow test, shows the following results:

Table 1. Chow Test Output Results

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	158.164718	(33,30)	0.0000
Cross-section Chi-square	351.198137	33	0.0000

Source: Processed data

The chi-square chance cross-section value is 0.0000, which is less than the value used in this analysis (0.05), suggesting that the fixed effect model is more fitting for this study than the typical effect model.

2. The Hausman Test

The Hausman test is a mathematical test that is used to assess if this analysis is using the right fixed effect model or random effect model. The following are the Hausman test's hypotheses in this study:
H_0 :*Random Effect Model*
H_1 :*Fixed Effect Model*

Since the findings of the Chow test suggest that the fixed effect model is the most appropriate for this analysis, the Hausman test is used to decide whether the fixed effect model or the random effect model is the most appropriate for this study.

Table 2. Hausman Test Output Results

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	27.605221	4	0.0000

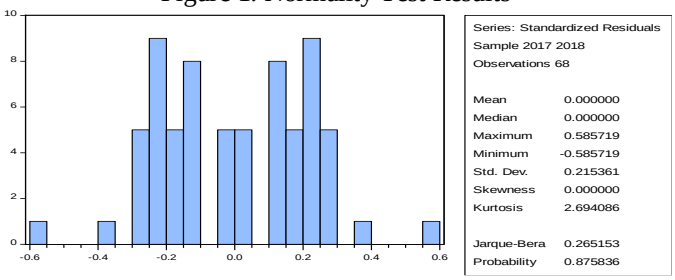
Source: Processed data

According to the performance findings above, the random cross-section value is higher than the α value (0.05), which is 27.605221, and the chi-square likelihood cross-section value is 0.0000, which is smaller than the value (0.05) used in this analysis, suggesting that the fixed effect model is more fitting for this study than the random effect model. In addition, the standard inference evaluation will be done.

a) Normality Test

The aim of the normality test is to determine whether or not the data in this sample is naturally distributed. This can be calculated by looking at the jarque-bera coefficient and its likelihood (Gujarati, 2012). The consequence of the normality test is as follows:

Figure 1. Normality Test Results



Source: Processed data

The probability value of 0.27525> 0.05, as calculated by the Jarque-Bera measure, implies that the data from this variable is usually distributed or free of anomalies from the classical expectations of normality.

b) Multicollinearity Test

Table 3. Multicollinearity Test Results

	X1	X2	X3	X4
X1	1	0.05853960...	0.49306335...	0.24361548...
X2	0.05853960...	1	0.01504553...	-0.0966850...
X3	0.49306335...	0.01504553...	1	0.34561015...
X4	0.24361548...	-0.0966850...	0.34561015...	1

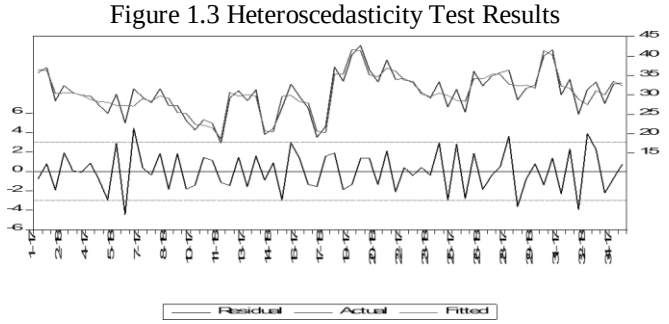
Source: Processed data

Based on this statistic, the coefficient values between the independent variables in this analysis are less than 0.8, suggesting that the independent variables used in this study are not correlated, indicating that they are free of multicollinearity concerns.

c) Heteroscedasticity Test

Then the third classical assumption test is the heteroscedasticity test. The following are the results of the heteroscedasticity test:

Figure 1.3 Heteroscedasticity Test Results



With the above results we suspect that heteroscedasticity does not occur, because the residuals do not form a certain pattern, in other words the residual tends to be constant.

d) Autocorrelation Test

Based on the calculations of Durbin Watson tables and Durbin Watson calculations, it can be seen that d> dU is 1.7798> 1.5353, so there is no autocorrelation in this study.

3. Hypothesis Testing

a) t test (partial)

From the output above, it can be seen that the t-statistic value of x1 x2 x3 and x4. The t value shows the effect of the partial variable predictor on the response variable in the panel data regression model in this study. While the Prob value in the output result above is the p value or the significance level of the partial t in the t-statistics column. This p value indicates the significance level of t partial in order to answer the partial test hypothesis. If the p value is less than the critical limit, 0.05 then the answer to the hypothesis is that the predictor variable has a statistically significant effect on the response variable. And conversely, if the p value is more than the critical limit, then receiving H0 or which means the predictor variable in question does not have a statistically significant effect on the response variable.

The panel regression coefficient on vector X1 Human Development Index (HDI) is -0.122052, according to the findings of mathematical analysis using panel data regression. The HDI vector coefficient is -0.2079, with a probability value of 0.9037, which is higher than the study's critical value. As a result, in 2018 and 2019, HDI has a negative and negligible impact on the stunting rate in Indonesia.

The panel regression coefficient on the X2 Gini Ratio component is also considered to be -0.4966. The Gini Ratio indicator has a coefficient of -21.186 and a probability value of 0.6230, which is higher than the critical value in this analysis. As a result, in 2018 and 2019, the Gini Ratio had no major effects on the stunting rate in Indonesia. Similarly, the HK GDP X3 indicator had no major effect on Indonesia's stunting rate in 2018 and 2019.

However, in Indonesia in 2018 and 2019, variable X4, namely PDRB HB, has a major impact on stunting rates. The t-statistic value of vector PDRB HB is -0.0296 with a probability value of 0.00976 below a critical value of 0.05 and a coefficient value of 1.30E.

b) F Test (Simultaneous)

The results of the F test in the Random Effect Model can be seen from the output F-stats. Based on the results of the F-statistic output, it is shown that Fcount is 5.0881 with a significance level of 0.000008 and Ftable value is 2.28, which means that the value of F-count is greater than F-table and the significance value is smaller than $\alpha = 0.05$, so it can be It is concluded that the variables X1, X2, X3, and X4 simultaneously or together have a significant effect on variable Y.

c) R2 Adjusted R Square

Based on the results of the FEM output, it can be seen that the Adjusted R-squared value is 0.6930, which means that 69.52 percent of the stunting rate in Indonesia in 2017-2018 is influenced by the HBG PDRB variable, while the remaining 30.48 percent is influenced by other variables that are not exist in this study. The closer to number 1, the stronger the influence of the independent variable on the dependent variable.

- *The Effect of Human Development Index (Ipm), Gini Ratio, and Gross Domestic Products on the Number of Stunting in Indonesia*

As far as we know, Indonesia is the Asian nation with the fifth highest stunting incidence. The Human Growth Index, Gini Ratio, and Gross Regional Domestic Product using Constant Prices do not influence the degree of stunting in Indonesia in 2018 and 2019, according to analysis using a descriptive quantitative method. Gross Regional Domestic Product with Applicable Rates, on the other hand, has a substantial effect. Indonesian stunting rates in 2018 and 2019. Stunting rates in Indonesia are affected by non-economic factors such as heredity, maternal genes, as well as mother's level of knowledge and education. Economic factors such as HDI, Gini Ratio, and GRDP at Constant Prices have little effect on stunting rates because stunting rates are influenced by non-economic factors such as heredity, maternal genes, and mother's level of knowledge and education. Stunting events in Indonesia are also highly affected by dietary conditions at a young age.

V. CONCLUTION

Economic factors such as the Human Growth Index, Gini Ratio, and Gross Regional Domestic Product at Constant Prices have no impact on the Stunting Rate in Indonesia, according to the findings of the report. This is because non-economic causes such as hunger at a young age, genetic factors, and the climate have a larger effect on stunting in Indonesia. This is because non-economic causes such as hunger at a young age, genetic factors, and a mother's level of schooling have a larger effect on stunting in Indonesia.

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