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ORIGINAL RESEARCH ARTICLE

Panel data regression approach on Inclusive green growth

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ABSTRACT

BACKGROUND AND OBJECTIVES: This study is investigated on endogenous variables inclusive of green growth by developing the concept of inclusive green growth in Indonesia. The objective of the current study was to describe the conditions of inclusive green development in each province in Indonesia, which is due to the unavailability of data describing the conditions of inclusive green development.
METHODS: This study used time series data from 2011-2019, and cross section data of 34 provinces, which were analyzed using panel data regression research methods. The novelty of this study is the use of environmental quality variables to replace environmental degradation in calculating the composite variable of inclusive green growth. The determinants of inclusive green growth used in this study were inclusive human development, regional independence, infrastructure, crime, industrialization and natural disasters.
FINDINGS: The important study findings were inclusive human development, regional financial performance, infrastructure and natural disasters have a significant positive effect on inclusive green growth in Indonesia. On the other hand, industrialization had a significant negative effect on inclusive green growth in Indonesia, while crime did not have a significant effect on inclusive green growth in Indonesia. Simultaneously, inclusive human development, regional independence, infrastructure, crime, industrialization and natural disasters had a significant impact on inclusive green growth in Indonesia.
CONCLUSION: The second hypothesis in this study proved to be accepted. Meanwhile, the first hypothesis is not entirely accepted. Therefore, it is highly recommended for the provincial government in Indonesia to intervene on the variables of inclusive human development, regional financial performance, infrastructure, industrialization and natural disasters to increase inclusive green growth. Meanwhile, for future researchers, it is recommended to find other variables that contribute in achieving inclusive green growth.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
41	3	3

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INTRODUCTION

The World Bank defines inclusive green growth as "sustainable economic development" (Albagory, 2016; Jha *et al.,* 2018; Sun *et al.,* 2020). Inclusive green growth is a function of economic (i.e. economic growth), social (i.e. poverty, inequality, employment) and environmental (i.e. emissions and environmental pollution) (Sun, *et al.,* 2020). Luukanen *et al.* (2019) explained that inclusive green growth (IGG) is an organic combination of two development concepts, namely green growth (GG) and inclusive growth (IG). Meanwhile, in this study, inclusive green growth is a composite of economic growth, poverty, income inequality, unemployment and environmental quality consisted of water quality, air quality and forest cover. Shcherbak *et al*., (2020) explained that forestry and household income should be a concern in increasing the economic growth of a region. In the perspective of inclusive growth, it is built through three pillars, namely economic growth and development, income distribution and poverty reduction, and expansion of access and opportunities, while from an environmental perspective, it is built from three aspects, namely air quality, water quality and the resulting area of forest cover. Therefore, inclusive green growth referred to in this study is inclusive growth that takes into account the ecological balance seen from the quality of the environment itself. Thus, the IGG is a function of inclusive growth (which refers to economic growth, income distribution and poverty reduction and expansion of access to and job opportunities) and green growth (which refers to environmental quality). Indonesia as a developing country has also adopted the concept of sustainable growth to ensure an increase in economic output and preserve the environment. However, currently, the calculation of inclusive green growth in Indonesia is still very minimal, so data describing the IGG phenomenon is still difficult to obtain. For this reason, the phenomenon that describes the IGG is a composite calculated from the inclusive growth index published by Central bureau of statistic (CBS) of Indonesia, national development planning agency (NDPA) of Indonesia and the environmental quality index published by the ministry of environment and forestry (MEF) of Indonesia. The result from range of 2011-2018 is shown in Fig. 1.

Based on Fig. 1, it can be seen that in aggregate, the IGG phenomenon that occurs is getting more satisfactory (good) every year in the 2011-2018 period, although from 2011 to 2013 and 2015 to 2016 there was a slight fluctuation of 0.01. Furthermore, the satisfying IGG certainly provided an illustration of the increase in economic output to meet human needs that has occurred along with improvements in environmental quality such as water quality, air quality and forest conditions in the satisfactory category, thus, in aggregate, the IGG was in the satisfactory category. However, when comparing the IGG rate with the conventional economic growth (CEG) rate, in aggregate, the IGG rate was smaller than CEG rate. This indicates that Indonesia's economic growth is still focused on increasing the production output of each sector, thus ignoring environmental issues such as water quality, air quality and forest sustainability, while also not focusing on poverty, income inequality and employment expansion. For more details, it can be seen in Fig. 2.

Based on Fig. 2, it can be seen that during the comparison period, although in 2014 the IGG rate

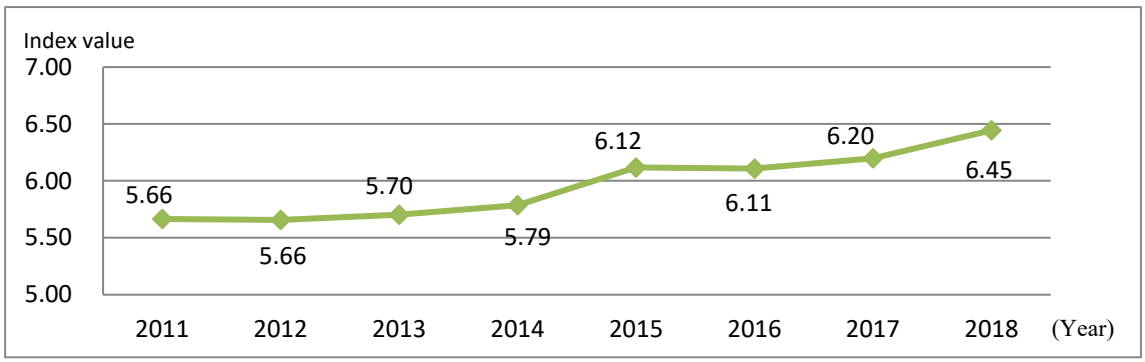

Fig. 1: Indonesia's inclusive green growth (in the index) (CBS, 2020; NDPA, 2020; MEF, 2020)

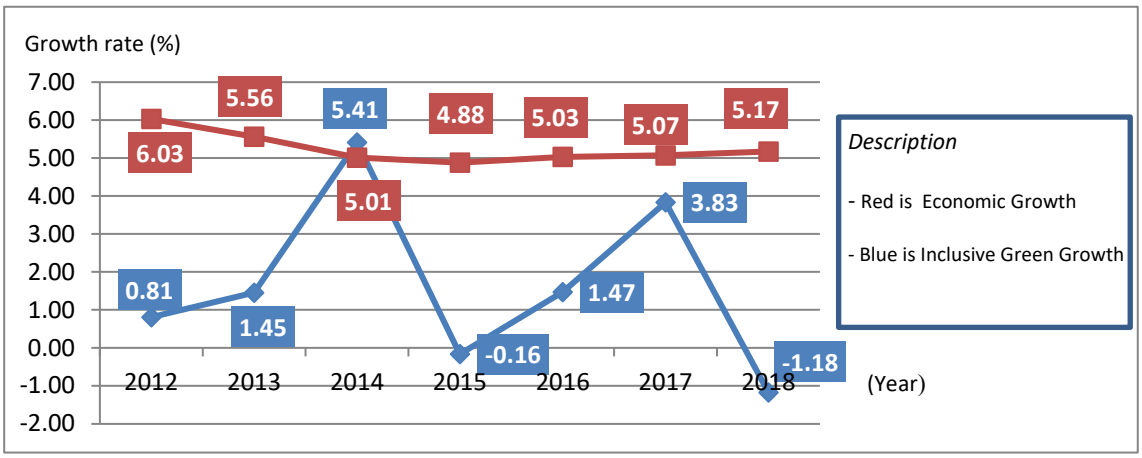

Fig. 2: Comparison of inclusive green growth with conventional economic growth in Indonesia (in percent) (CBS, 2020; NDPA, 2020; MEF, 2020)

increased significantly during that period and was higher than CEG, this occurred when CEG experienced a growth of minus 0.55%. In general, this growth pattern is repeated every year during the observation period, i.e. if the CEG decreased, the IGG tent to increase. The phenomenon in Fig. 2 certainly reflects that the economic growth occurred in Indonesia has not been in accordance with the goals of sustainable development, environmentally friendly development. In addition, the phenomenon of IGG raises a question whether the development carried out has reached IGG in each province in Indonesia. Therefore, it is important to calculate the IGG in each province, considering that the IGG in each province is an integral part of the IGG in Indonesia. To achieve sustainable development in Indonesia as stated in the sustainable development goals (SDGs), every country must focus on inclusive green growth. Thus, Based on the phenomena described, it is necessary to analyze inclusive green growth in Indonesia. The IGG condition is derived from the derivative of the concept of inclusive green growth conducted by Luukkanen *et al.* (2019) and concept change studied by Sun *et al.* (2020) towards inclusive green growth (IGG). Sun *et al.* (2020) stated that IGG is a function of economic growth, social, emission and environmental pollution, while in this study IGG is expressed as a function of inclusive growth variables (which consist of economic growth and social growth as measured by poverty reduction, unemployment rate reduction and income distribution), and environmental quality variables (consisting of air quality, water quality and forest cover area). The use of these two variables is because the relationship between economic growth, social growth and environmental quality is linear. The reason for substituting the emission and environmental pollution variables in the research of Sun *et al.* (2020) with environmental quality variables is because the environmental quality variable describes a wider impact of pollution than emissions. The environmental quality is the impact of environmental pollution consisting of water quality as a result of water pollution, air quality as a result of air pollution and forest cover area as a result of forest damage. The aims of the current study is to describe the conditions of inclusive green development in each province in Indonesia, which is due to the unavailability of data describing the conditions of inclusive green development. The study is also expected to tackle the lack of the previous research. This study has been carried out in Padang, Indonesia, in 2020 and 2021.

MATERIALS AND METHODS

Research method

The method used in this research was descriptive quantitative. Descriptive method was used to determine the value of variable independently, either one or more variables, without making comparisons or connecting one variable to another.

Types of data, data collection techniques and research variables

This study used secondary data. The objects

of research were 34 provinces in Indonesia. The observation year ranged from 2011-2019. The data collection technique used in this research was documentation, by collecting reports, documents, or records issued by relevant agencies such as publications from the Indonesian Central Bureau of Statistics, Ministry of Environment and Forestry, National Development Planning Agency Republic of Indonesia, National Disaster Management Agency, Indonesian Police.The determinants of inclusive green growth used in this study were inclusive human development, regional independence, infrastructure, crime, industrialization and natural disasters.

Variable operational definition

Inclusive green growth (Y)

IGG is economic growth that is in line with reducing poverty, unemployment and inequality as well as improving the quality of the environment. IGG is a composite of the Inclusive Growth Index (IGI) and the Environmental Quality Index (EQI) divided by two. IGG parameters in this study can be seen from 3 categories as follows, a value of 0 ≤ IGG < 40 means "not satisfactory", a value of 40 ≤ IGG < 80 means "satisfactory", and a value of 80 ≤ IGG ≤ 100 means "very satisfactory".

Inclusive human development (IHD) (X1)

IHD is human development aligned with gender equality. This IHD is expressed by the Gender Development Index (GDI). The GDI in this study was obtained from the GDI published by Indonesian Central Bureau of Statistics. IHD parameter can be explained by the value of IHD. If the IHD value almost reached 100, the IHD is getting better.

Regional financial performance (RFP) (X2)

RFP is the average of the components of budget solvency (BS), financial independence (FI) and service solvency (SS). BS is total regional income divided by total expenditure, FI is total local revenue divided by total expenditure, SS is total expenditure divided by population. RFP parameter can be explained by the value of RFP. If the RFP value almost reached 100, the RFP is getting better.

Infrastructure (X3)

Infrastructure is the average component of economic infrastructure with social infrastructure. The components of economic infrastructure consist of proxies of the economic situation of the community in the use of infrastructure, especially in public utilities such as the percentage of households that have a source of lighting from electricity, the percentage of households that have access to proper sanitation, the percentage of households with a source of proper drinking water. Meanwhile, the components of social infrastructure consist of the number of primary schools and the number of health facilities at the public health centre. Infrastructure parameter can be explained by the value of infrastructure. If the infrastructure value almost reached 100, the infrastructure development is getting more quality.

Crime (X4)

Crime is a form of government response to security in the community, so the government must resolve every reported case or what is known as crime clearance. Thus, crime clearance is the number of resolved cases divided by the number of reported cases. Crime parameter can be explained by the value of crime. If the crime value almost reached 100, government's response to crime in Indonesia is getting better.

Industrialization (X5)

Industrialization is gross regional domestic product (GRDP) in the industrial sector. Data obtained from the Indonesian central bureau of statistics. The higher industrialization value means the high industrial growth in Indonesia.

Natural disaster (X6)

Natural disasters are the number of natural disasters occur every month. The higher percentage value of natural disasters showed the more frequent of the occurrence of natural disasters in Indonesia.

Model specification

The relationships between these variables are summarized in Fig. 3.

Based on Fig. 3, the mathematical equation for the simultaneous equation using the econometric approach for the inclusive green growth equation can be written using Eq. 1.

$$Y_{1it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \mu_{it} \quad (1)$$

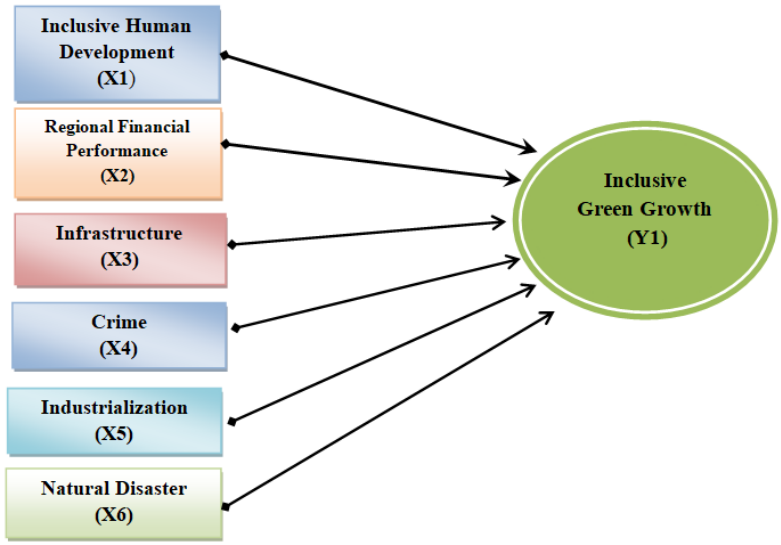

Fig. 3: The conceptual framework of study

Data analysis technique

Panel Data Regression

In this study, panel data regression was used because the purpose of this study was to analyze what factors influence inclusive green growth between provinces (cross section) and across time (time series). Ghozali (2013) explained that there are several methods commonly used to estimate regression models with panel data, including:

a. Common effect model (CEM)
b. Fixed effect model (FEM)
c. Random effect model (REM)

Classical assumption test

In this research, the classical assumption test used normality test, multicollinearity test, and heteroscedasticity test to see the correlation between independent variables. Normality test used Jarque-Bera (JB).The regression equation model is said to be good if the data is normally distributed or close to normal, the calculated JB probability value is greater than 0.05. A good regression model should not have a correlation between independent variables (Ghozali, 2013) where the correlation coefficient (R2) is < 0.80. Heteroscedasticity test used the Glejser method, a good regression model is homoscedasticity or there is no heteroscedasticity where the probability value is > 0.05 (Ghozali, 2013).

Statistical test

In this research, statistical test using t- test to find out whether the exogenous variable (X) has a significant effect on the endogenous variable (Y) partially, where the probability value of the exogenous variable is small than α= 0.05 (tcount ttable or – tcount <- ttable) on endogenous variables, then H0 is rejected and Ha is accepted, indicated that there is a significant effect between exogenous variables on endogenous variables. On the other hand, if the probability value of the exogenous variable is greater than α= 0.05 (tcount < ttable or – tcount - ttable) on the endogenous variable, then H0 is accepted and Ha is rejected, indicated that there is no significant effect between the exogenous variables on the endogenous variables. Furthermore, using the f- test to find out whether the exogenous variables silmutaneously (X1, X2,….Xn) have a significant effect on the endogenous variable (Y), where the probability value of Fcount < 0.05, the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted, indicated that the exogenous variables silmutaneously have a significant effect on the endogenous variables. This study also used t test (partial) called as probability test. If the probability value of the exogenous variable is smaller than α = 0.05 to the endogenous variable, then H0 is rejected and Ha is accepted, indicated that there is a significant effect between the exogenous variables on the endogenous variable partially.

Research hypothesis

1. Partially, inclusive human development, regional financial performance, infrastructure, crime, industrialization and natural disasters towards inclusive green development in Indonesia.

Ho : $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = 0$

Ha : $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq 0$

2. Silmutaneously, inclusive human development, regional financial performance, infrastructure, crime, industrialization and natural disasters towards inclusive green development in Indonesia.

Ho : $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = 0$

Ha : $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq 0$

RESULTS AND DISCUSSIONS

Classical assumption test results

The results of the normality test on the inclusive green growth equation model indicated by the JB Probability Value of 0.056786 or the value is greater than 0.05, thus the residuals are normally distributed in the equation or the classical assumption of normality is achieved. The results of the multicollinearity test in the inclusive green growth equation model show that all correlation values between independent variables are less than 0.8, thus both models of this equation do not contain multicollinearity problems. The results of the estimation of heteroscedasticity through the Glejser Test on the inclusive green growth equation showed that the Probability values of X1, X2, X3, X4, X5 and X6 are greater than 0.05. Thus, it can be concluded that the equation model does not contain heteroscedasticity problems

Panel data regression results

Chow test

From the results of the Chow test in Table 1, it can be seen that the probability value of the cross section f is 0.0000 or less than 0.05. Therefore, the best model in this study is the fixed effect. To determine which model is selected for the fixed effect or random effect, the Hausman test is conducted.

Hausman test

From the results of the Hausman test in Table 2, it can be seen that the probability value of a random cross-section is 0.0000 or less than 0.05. Therefore, the best model in this study is the fixed effect. Thus, according to Ghozali (2013), it is no longer necessary to perform the Lagrange multiplier test.

Results of fixed effect

The results of panel data analysis are shown in Table 3.

From the results of the analysis, the inclusive green growth equation model is obtained using Eq. 2.

$$Y1 = 69.63627 + 0.391629\,X1 + 0.029884\,X2 + 0.053866\,X3 - 0.014244\,X4 - 0.020618\,X5 - 0.145195\,X6 \quad (2)$$

Based on the results of the analysis of the inclusive green growth equation, it can be seen that if the inclusive human development, social inclusion, regional financial performance, infrastructure, crime,

Table 1: Results of chow test

Redundant fixed effects tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	19.403104	(32,248)	0.0000
Cross-section Chi-square	359.840174	32	0.0000

Table 2: Results of hausman test

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	74.760331	6	0.0000

Table 3: Results of analysis of inclusive green growth variables (Y)

Variable	Coefficient	SE[1]	t-Statistics	Prob.[2]
C	69.63627	5.799432	12.00743	0.0000
Inclusive Human Development (X1)	0.391629	0.065486	5.980310	0.0000
Regional Financial Performance (X2)	0.029884	0.013076	2.285404	0.0230
Infrastructure (X3)	0.053866	0.012542	4.294886	0.0000
Crime (X4)	-0.014244	0.008744	-1.629002	0.1046
Industrialization (X5)	-0.020618	0.002664	-7.740095	0.0000
Natural Disaster (X6)	-0.145195	0.033424	-4.344078	0.0000
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.851776	Mean dependent var[3]		35.85704
Adjusted R-squared	0.829064	SD dependent var		5.049856
SE of regression	2.087832	Akaike info criterion		4.435853
Sum squared resid	1081.042	Schwarz criterion		4.933134
Likelihood logs	-597.5449	Hannan-Quinn Criterion		4.635156
F-statistics	37.50376	Durbin-Watson statistics		1.786219
Prob(F-statistic)	0.000000			

[1.] Standard Error
[2.] Probabitity
[3.] Variable

industrialization and natural disasters were fixed (constant), then the value of the inclusive green growth index was 69,63627 . The R-squared value of the IGG equation was 0.851776. This showed that the contribution of exogenous variables (Inclusive Human Development, Regional Financial Performance, Infrastructure, Crime, Industrialization and Natural Disasters) to endogenous variables (IGG) was 85.18% while 14.82% was influenced by other variables not included in this IGG equation model.

Statistical t test results

The probability value of each variable can be seen in Table 3. The results of Table 3 showed that the Inclusive Human Development variable had a significant effect on the Inclusive Green Growth variable. This is indicated by the probability value of Inclusive Human Development was 0.0000or less than 0.05. Therefore, Inclusive Human Development partially had a significant effect on Inclusive Green Growth in Indonesia. On the other hand, the Regional Financial Performance variable had a positive and significant effect on the Inclusive Green Growth variable. This is because the probability value of Regional Financial Performance was 0.0230 or less than 0.05. Therefore, Regional Financial Performance partially had a significant effect on Inclusive Green Growth in Indonesia. Furthermore, the Infrastructure variable had a significant effect on the Inclusive Green Growth variable. This is because the probability value of the Infrastructure was 0.0000 or less than 0.05. Therefore, infrastructure partially had a significant effect on Inclusive Green Growth in Indonesia. In addition, the crime variable did not have a significant effect on the inclusive green growth variable. This is because the crime probability value was 0.1046 or greater than 0.05. Therefore, partially, crime had a significant effect on inclusive green growth in Indonesia. Furthermore, the Industrialization variable had a significant effect on the Inclusive Green Growth variable. This is because the probability value of Industrialization was 0.0000 or less than 0.05. Therefore, partially Industrialization had a significant effect on Inclusive Green Growth in Indonesia. Then, the Natural Disaster variable also had a significant effect on the Inclusive Green Growth variable. This is because the probability value of Natural Disaster was 0.0000 or less than 0.05. Therefore, partially, Natural Disasters had a significant effect on Inclusive Green Growth in Indonesia.

F test results

The results of the analysis on the inclusive green development equation explain the probability value

of F statistic was 0.000000. By using level 95 percent confidence or = 0.05, then value probability in equation inclusive green development with F statistic 0.000000 was less than 0.05. Therefore, in the inclusive green development equation, Ho is rejected and Ha is accepted. Thus, the variables of X1, X2, X3, X4, X5 and X6 silmutaneously had a positive and significant effect on the Inclusive Green Growth variable (Y). Partially, inclusive human development had a positive and significant impact on inclusive green growth in Indonesia. If inclusive human development (in this study using gender development data) is improved, it will encourage an increase in inclusive green growth. On the other hand, if inclusive human development decreases or does not increase, then inclusive green growth also decreases or does not increase. The decline in inclusive human development will make it difficult for all levels of society to enjoy equitable growth that is environmentally friendly or inclusive green growth (Koziuk *et al*., 2019). The above conditions are in accordance with the endogenous growth theory pioneered by Romer, (1986) and Lucas, (1988), which in its development state that human resources are the main key to increasing economic productivity through learning-by-doing behavior that can provide an introduction to new things in the economy as a driver in increasing economic productivity, as well as new discoveries that continue to be made will be the main source for increasing economic productivity (Arsyad, 2006). In general, it is stated that human development has a positive effect on economic growth, inclusive growth and environmental sustainability so that Human development is important to encourage future economic growth that continues to grow and leads to inclusiveness or equity and is environmentally friendly (Li *et al.*, 2021; Aimon *et al*., 2020; Tran *et al.*, 2019). In addition, the regional financial performance generated by local governments partially also has a positive and significant influence on inclusive green growth in Indonesia. If the regional financial performance, such as, fiscal decentralization ratio, regional financial independence ratio, government expenditure or expenditure, which are produced by local governments in Indonesia are effective, then inclusive green growth can be achieved. On the other hand, if the regional financial performance produced by the regional government is not effective in supporting development, then inclusive green growth is difficult to realize. This finding is also in line with previous findings which stated that good financial management can affect regional progress both economically, effectively and efficiently, thereby encouraging economic growth, equitable economic growth, access to employment and reducing poverty so that it has an impact on the community to control the use of natural resources available in the environment (Faridi *et al*., 2019; Kolawole, 2016; Oyinlola 2013). Infrastructure provides a large multiplier effect in creating jobs and creating sustainable growth so that it can create inclusive green growth and have a partially positive and significant impact on inclusive green growth in Indonesia. The absence of infrastructure will certainly slow down the realization of inclusive green growth. This phenomenon is in accordance with Harrod-Domar's Theory of Economic Growth, which stated that to grow the economy, new investments are needed in addition to the capital stock. The relationship between infrastructure and economic growth shows positive and significant results (Kodongo *et al*., 2016; Daido *et al.*, 2013; Sahoo *et al.,* 2012). However, in other forming variables, infrastructure has a significant negative relationship with poverty (Asian Development Bank, 2012). In terms of infrastructure development, care is needed so that it does not have a negative impact on this growth because infrastructure is less useful for the community while the level of costs incurred for development is very high (Shi *et al*., 2017). Partially, crime does not have a significant effect on inclusive green growth in Indonesia. This means that if the crime rate increases or decreases in Indonesia, then it does not have a significant impact on increasing inclusive green growth in Indonesia. This phenomenon is relevant to previous researches which stated that if the government has a high concern for reducing crime rates, other government programs can be implemented, so that people can ignore crime to continue their activities (Kumar *et al.,* 2020; Siwach, 2018; Iyer *et al.*, 2015). This finding is not relevant to previous research which stated that crime is a major impediment to economic growth and development and crime rates substantially increase income inequality (Anser *et al*., 2020; Hipp *et al.*, 2019; Athukorala *et al.*, 2015). However, further analysis is needed for the findings. Lorenc *et al.* (2012) who found crime and fear had a large impact on well-being, but the relationship was often highly indirect, but was mediated by environmental factors. On the other hand, reduced industrial activity is followed

by reduced exploitation of natural resources so as to preserve the environment. However, inclusive green growth which is a composite of inclusive growth and green growth is negatively affected by industrial growth. This phenomenon clarifies the hypothesis *Environmental Kuznets Curve (EKC)* which illustrates the contribution of economic growth to higher emissions but at the time of further economic growth can reduce environmental degradation due to technological advances and the shift of the industrial sector to the service sector (Usenata, 2018). Thus, an increase in the role of the industrial sector in the economy of a country will lead to an increase in pollution in that country, thereby reducing the quality of the environment. This result contradicts the previous finding which stated that an increase in industrial output will increase economic growth, which means that industrialization is positively and significantly related to economic growth (Ndiaya *et al.*, 2018). In addition, research on industrial growth is also relevant to previous research that industrial growth has a negative effect on green growth (Appiah *et al.*, 2019; Bhuyar *et al.*, 2020; Cherniwchan, 2012). Natural disasters that often occur in Indonesia partially have a negative and significant impact on inclusive green growth in Indonesia. If the incidence of natural disasters decreases, it will have an impact on increasing inclusive green growth. On the other hand, if the incidence of natural disasters increases, it will also be followed by a decrease in inclusive green growth.Thus, an increase in the incidence of natural disasters will increase environmental degradation and have an impact on environmental damage that provides resources for production activities so that it can inhibit the rate of output growth, thereby causing an increase in unemployment, an increase in poverty and income inequality. This finding is relevant to the findings in previous studies which stated that is natural disasters that occur have a negative and significant relationship to the variables forming green inclusive growth (Goebel *et al.*, 2015; Felbermayr *et al*., 2014; Rodriguez-Oreggia *et al.*, 2013). The most consistent response of economic growth to disasters has been a decline in local productivity and labor demand (Boustan *et al*., 2020), natural disasters widen income inequality in the short term for 5 years, but this effect disappears in the long term for 10 years (Yamamura, 2015).

CONCLUSION

The second hypothesis in this study proved to be accepted. Thus inclusive human development, regional financial performance, infrastructure, crime, industrialization and natural disasters had a significant effect on inclusive green growth in Indonesia. Meanwhile, the first hypothesis is not entirely accepted, thus, partially, inclusive human development, regional financial performance, infrastructure and natural disasters had a positive and significant impact on inclusive green growth in Indonesia. On the other hand, industrialization had a significant negative effect on inclusive green growth in Indonesia. Then, partially, crime did not have a significant effect on the inclusive green growth variable in Indonesia. To realize inclusive green growth in Indonesia, it is recommended to stakeholders, especially the government or policy makers to be able to continue to increase the distribution of human development for men and women, increase social inclusion by providing access to women to participate in various fields of life, especially in the political and economic fields. Furthermore, the government needs to improve regional financial performance by increasing income in order to be able to finance equitable and environmentally friendly growth programs, addition or improvement of economic infrastructure such as additional provision of proper environmental sanitation, clean drinking water and electricity installations for people who have not been able to receive it. Providing technology that supports environmentally friendly industries to support green industry programs as well as social infrastructure such as increasing the capacity of schools towards technology-friendly schools, increasing the capacity of health centers and adding additional health centers in areas not yet reached by health facilities. Furthermore, the government must strive to encourage the growth of environmentally friendly industries and can also create jobs to reduce the rate of growth of poverty and income inequality. Then the government must be able to mitigate natural disasters to avoid environmental damage and losses as a result of these natural disasters. The author understands that there are many other variables that also have a contribution to increase inclusive green growth, not only limited to exogenous variables in this study. Therefore, future researchers can observe these

other variables, thereby enriching the references for variables that encourage inclusive green growth in their research areas.

AUTHOR CONTRIBUTIONS

E. Juniardi conducted the literature review, research design, developed the model, collected and analyzed the data, and prepared the manuscript text. S. Amar reviewed the manuscript and guided the study. H. Aimon reviewed the manuscript.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

%	Percent
α	Alpha
β	Beta
λ	Lambda
μ	Micro
=	Equal sign
≠	Not equal sign
+	Plus sign
-	Minus sign
≥	Inequality (greater than or equal to)
≤	Inequality (less than or equal to)
>	Strict inequality (greater than)
<	Strict inequality (less than)
BS	Budget solvency
CBS	Central bureau of statistic
CEG	Conventional economic growth
CEM	Common effect model
Chi-sq.	Chi square
D.f.	Degree of freedom
Eq.	Equation
EQI	Environmental quality index
et al.	Et alia
FEM	Fixed effect model
FI	Financial independence
Fig.	Figure
GDI	Gender development index
GG	Green growth
GRDP	Gross regional domestic product
Ha	Alternative hypothesis
Ho	Null hypothesis
i.e.	Id est
IG	Inclusive growth
IGG	Inclusive green growth
IGI	Inclusive growth index
IHD	Inclusive human development
JB	Jarque-Bera
MEF	Ministry of environment and forestry

NDPA	National development planning agency
Prob	Probability
R2	Correlation coefficient
REM	Random effect model
RFP	Regional financial performance
R-Square	Determination coefficient
SD	Standar deviation
SDGs	Sustainable development goals
SE	Standard error
SS	Service solvency
T-statistics	Hypothesis test statistic
Var	Variable
X1	Inclusive human development
X2	Regional financial performance
X3	Infrastructure
X4	Crime
X5	Industrialization
X6	Natural disaster
Y	Inclusive green growth

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