

The Effect of Foreign Investment, Energy Consumption Pattern, and Gross Domestic Product Growth on Air Pollution in Indonesia

AA Ary Anila Kusuma Wardani¹, I Gusti Bagus Indrajaya²

¹ Department of Economics, Udayana University, Denpasar, Bali, Indonesia

² Department of Economics, Udayana University, Denpasar, Bali, Indonesia

Abstract

Air quality is an important component in an ecosystem. So it is necessary to identify what factors can affect air quality in Indonesia as measured by the Air Quality Index (AQI). This study aims to determine and analyze the effect of foreign investment, energy consumption patterns, and GDP growth simultaneously and partially on air pollution in Indonesia. The data analysis technique used in this study was panel data regression. The results of the study found that simultaneously the variables of foreign investment, energy consumption, and GDP growth affect the value of the air quality index in Indonesia, and partially foreign investment has an effect on the value of the air quality index in Indonesia, in contrast to the pattern of energy consumption and product growth. The GDP which part does not effect on the value of the air quality index in Indonesia.

Keywords: *Air Quality, Foreign Investment, Energy Consumption, and GDP Growth.*

1. Introduction

Air is vital for the survival of living things. In line with technological developments and human civilization, air quality has also decreased due to air pollution. Some of the pollutants that become air pollutants include Carbon Monoxide (CO), Hydro Carbon (HC), Sulfur Oxide (SOx), Lead (Pb), Nitrogen Oxide (NOx), and particulates (PMx) [1]. Direct or indirect exposure to these pollutants can have negative effects on human health and living things in general [2].

Foreign investment greatly assists the industrialization process in capital formation and creates greater employment opportunities. As part of the responsibility of foreign investors in investing their capital in Indonesia, they are obliged to comply with and follow the investment regulations and implement them.

Consumption of the energy sector includes energy consumption by producers and energy transformation for installation operations [3]. Environmental quality degradation can occur due to emissions from industry, domestic transportation, and forest fires in the dry season which have exceeded the environmental carrying capacity which can no longer be neutralized [4]. Most developing countries have started to shift from countries that focus on the agricultural sector to the industrial sector, of course for one purpose, namely to increase the Gross Domestic Product (GDP) of the industrial sector to GDP per capita [5].

2. Literature Review

Neo-Classical Economic Theory argues that Foreign Direct Investment (FDI) has a positive contribution to the economic development of the host country [6]. Energy consumption (petroleum, gas, coal) affects CO₂ emissions in the short and long term (Sari, 2014). The relationship between industrial sector GDP growth and transportation sector GDP to CO₂ gas emissions can be described by the Kuznetz environmental curve theory (environmental Kuznetz curve), which connects economic growth with environmental pollution (CO₂ gas emissions) [7]. Air pollution is the entry or entry of substances, energy, and other components into the air by human activities, so that air quality drops to a certain level that causes or affects human health [8].

3. Problem Formulation

The hypothesis of this project is:

- i. Foreign investment, energy consumption patterns, and GDP growth in the transportation and industrial sectors simultaneously influence air pollution in Indonesia.

- ii. Foreign investment, energy consumption patterns, and GDP growth in the transportation and industrial sectors partially have a positive and significant effect on air pollution in Indonesia.

4. Research Methodology

- Annual secondary data on Air Quality Index, Foreign Direct Investment, Energy Consumption Pattern, and GDP Growth of Indonesia, in the 2010—2020 range
- F-test analysis to fit the model
- Analysis of the classical assumption test with 4 stages: multicollinearity test and heteroscedasticity test
- Partial testing using the t-test
- The test was carried out using the EViews version 9 for windows application

5. Analysis Result

The f-test result shows the R^2 value of 0.729 which shows that the variables of foreign investment, energy consumption patterns, and independent GDP growth, have a strong influence on the Indonesian air quality index. This means that 72.9% of the Indonesian air quality index variation is influenced by foreign investment, energy consumption patterns, and independent GDP growth, while the remaining 27.1% is influenced by other factors not included in the model. The f test result shows that the sig 0.00 is less than 5%, which means that simultaneously the variables of foreign investment, energy consumption patterns, and independent GDP growth are significant to the Indonesian air quality index.

Multicollinearity test using a variant inflation factor (vif). The test results show that the calculated value in the VIF column is lower than 0.80, it can be concluded that there is no multicollinearity between the independent variables in the regression model. Heteroscedasticity test performed using the Breusch-Pagan-Godfrey method. The test results show that the significance probability value is above 7.81, so it can be concluded that the regression model does not contain heteroscedasticity. The results of regression testing using the t-test show that partially the variable foreign investment has a positive effect and significant on the Indonesian air quality index. Meanwhile, the energy consumption patterns have a negative effect but significant on the Indonesian air quality index, also the gross domestic product growth has a negative effect and insignificant on the Indonesian air quality index.

6. Conclusion

Based on the results of the analysis and discussion, it can be concluded:

- 1) Simultaneously variable foreign investment, patterns of energy consumption, and gross domestic product growth affects the air quality index value in Indonesia.
- 2) Foreign investment partially influences on the value of the air quality index in Indonesia. It is different from the pattern of energy consumption and gross domestic product growth which part does not affect the value of the air quality index in Indonesia.

7. References

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