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The Influence of Urbanization, Foreign Direct Investment, and Economic Growth on Environmental Degradation in the OIC Countries

Pengaruh Urbanisasi, *Foreign Direct Invesment,* dan Pertumbuhan Ekonomi terhadap Degradasi Lingkungan di Negara OKI

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ABSTRACT

This research aimed to determine the influence of Urbanization, FDI, and Economic Growth on environmental degradation within the OIC member countries. The CO2 Emission variable was used as an indicator of environmental degradation. The analytical method used in this study was multiple regression analysis with the EVIEWS 9 application. The sample of this study was OIC member countries in 1995-2018 with 288 observational data. The results of this study indicate that there is a significant positive influence on the variables Urbanization and Economic Growth on CO2 Emissions. While the FDI variable has an insignificant positive effect on CO2 emissions. The scope of this research is limited by the availability of data which is only in the form of 12 countries out of 57 member countries of the Organization of Islamic Cooperation.

Keyword : Urbanization, Foreign Direct Investment, Economic Growth, CO2 Emissions, OIC, Pollution, Environmental Degradation.

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ABSTRAK

Peneltian ini memiliki tujuan untuk mengetahui pengaruh Urbanisasi, FDI, dan Pertumbuhan Ekonomi terhadap degradasi lingkungan di lingkup negara Anggota OKI. Variabel Emisi CO2 digunakan sebagai gambaran indikator degradasi lingkungan. Metode analisis yang digunakan dalam penelitian ini menggunakan analisis regresi berganda dengan aplikasi EVIEWS 9. Sampel dari penelitian ini menggunakan negara Anggota OKI pada tahun 1995-2018 dengan 288 data observasi. Hasil dari penelitian ini menunjukkan adanya pengaruh signifikan positif pada variabel Urbanisasi dan Pertumbuhan Ekonomi terhadap Emisi CO2. Sedangkan variabel FDI memiliki pengaruh positif tidak signifikan terhadap Emisi CO2. Lingkup penelitian ini terbatasi dengan ketersediaan data yang hanya berupa 12 Negara dari 57 Negara Anggota Organisasi Kerjasama Islam.

Kata Kunci : Urbanisasi, Foreign Direct Investment (FDI), Pertumbuhan Ekonomi, Emisi CO2, OKI, Polusi Udara, Degradasi Lingkungan.

I. INTRODUCTION

The world in the 21st century faces challenges from various sectors ranging from economic, social, and political, to environmental degradation which is also caused by human behavior. The phenomenon of the greenhouse gas effect is one of the main environmental degradations. During the 20th century, the earth's surface warmed by about 0,6ºC which was caused directly by the greenhouse effect. CO_2 emissions have the largest contribution, reaching 50% of the greenhouse effect compared to other sources (Pratama, 2019). Many things become the background of greenhouse gas contamination, especially CO_2 gas in the earth's atmosphere such as deforestation, fires, burning of fossil fuels, and many other variables that do not directly affect CO_2 emissions but have a great opportunity to cause increased CO_2 emissions. Various forms of phenomena of damage on this earth are none other than the result of human hands themselves. In the Al-Qur'an there is a warning for human behavior that destroys nature, the word of Allah SWT:

ظَهَرَ الْفَسَادُ فِى الْبَ ر وَالْبَحْرِ بِمَا كَسَبَتْ اَيْدِى النَّاسِ لِيُذِيْقَهُمْ بَعْضَ الَّذِيْ عَمِلُوْا لَعَلَّهُمْ يَرْجِعُوْنَ

"*Corruption has spread on land and sea as a result of what people's hands have done so that Allah may cause them to taste ˹the consequences of˺ some of their deeds and perhaps they might return ˹to the Right Path˺.*" Q.S Ar-Ruum: 41

Economic growth as an illustration of a country's economic performance contributes to environmental degradation. Simon Kuznetz in the mid-50s introduced the Environmental Kuznets Curve (EKC) which provided an overview of the relationship between economic growth and environmental degradation. The curve is depicted with an inverted U, where the Y axis is environmental degradation and the X axis is the income per capita which describes economic growth. The initial phase of a country's economic growth marked by industrialization has a negative impact on environmental quality. Before the publication of the Kuznetz curve, the prevailing understanding was that rich countries destroy environmental quality more quickly than poor countries. The turning point phase of economic growth will have a good impact on environmental quality. This can be seen in people who are more aware of a healthy environment and invest their income in better environmental quality (Agarwal, 2019).

The phenomenon of urbanization in the 21st century has also contributed to the decline in environmental quality. This phenomenon creates new problems in cities such as sanitation, public transportation, and water catchment problems. The main reasons for urbanization are higher employment opportunities in cities than in villages, besides that better education and health facilities provide reasons to move from villages to cities. The industry is one of the largest sectors in urban labor absorption (Ali et al, 2019). The unpreparedness of the government in designing city governance in the face of urbanization can be the cause of the problems that occur, including environmental degradation.

The next challenge is from the financial sector, one of which is Foreign Direct Investment (FDI) as a means of raising capital and increasing production. At the end of the 20th century, two justifications emerged regarding FDI and environmental degradation, namely the Pollution Haven Hypothesis and the Pollution Halo Hypothesis, each of which had a different impact on environmental degradation. Looking at the facts on the ground today with the rampant expansion of multinational companies into developing countries which of course has a positive effect by opening up new jobs, it is also worth paying attention to the environmental impact caused by these activities in the host country.

The Islamic Cooperation Organization (OIC) in the 2025 Program of Action includes one of its goals, namely protecting and preserving the environment. The OIC, which has 57 members, is the second-largest intergovernmental organization after the United Nations (UN). OIC members have a passion for protecting Muslim interests and contributing to the challenge of environmental degradation issues in the world.

This study intended to determine the effect of urbanization, FDI, and economic growth on environmental degradation by proxy for CO_2 emissions in OIC member countries. To the best of the researcher's knowledge, there has been no research that has analyzed the effect of urbanization, FDI, and economic growth on CO_2 emissions in OIC member countries.

II. LITERATURE REVIEW

The Relationship between Urbanization and CO_2 Emissions

The uncontrolled population growth rate in urban areas nowadays is undeniably having a negative impact on various sectors. Massive urbanization in urban areas is a problem that needs to be taken seriously both by the community and stakeholders. The increase in population in urban areas is of course accompanied by an increase in demand for the fulfillment of needs, both primary needs such as housing and supporting needs such as public and private transportation infrastructure. In line with the increasing demand for the fulfillment of the above needs, it has a negative impact on the environment, for example, due to increased exhaust gases from vehicles and industry and a decrease in environmental quality due to poor sanitation. According to Ali et al (2019), a massive increase in the number of urban residents has resulted in various problems such as poor water quality due to inadequate sanitation, increased demand for housing resulting in reduced green areas as water catchments, and activity in industrial areas which has increased the spread of exhaust gases which toxic to the air.

On the other hand, the goal of an individual to move from a rural area to an urban area is for economic reasons in the hope of getting a better job, because he believes that cities are more promising for wide employment opportunities. Liu et al (2018) in their research stated that urbanization increases economic growth by increasing industrial output and increasing consumption and has a negative impact on the environment. This is because more than 60% of the workforce in the industrial sector is absorbed by the urban population, which of course has a positive effect on the economy, but also poses a threat if the effects that occur are not taken seriously. Ali, Rahim, and Ribadu's (2017) research conducted in Singapore suggests that urbanization does not result in a decrease in environmental quality but improves environmental quality. This can be achieved with the readiness of policies used to overcome the negative impacts caused by urbanization. Therefore, the hypothesis offered is,

H1: Urbanization has a significant positive effect on CO2 emissions in Member Countries of the Islamic Cooperation Organization.

FDI Relationship with CO_2 Emissions

Investment is important in development for the growth of a country. Private financing, especially foreign investment, is a source of funding, in addition to the government budget. Foreign investment in development is expected to be able to provide employment and in this case make it a means of alleviating poverty (Kuncoro, 2004). In its development, foreign investment or hereinafter referred to as FDI has had an impact on the environment. Research by Sapkota and Bastola (2017) found that FDI has an effect on increasing pollution, this validates that there is a Pollution Haven Hypothesis which means there are no guidelines for foreign investment in a country that regulates the prevention and prevention of environmental degradation as a result. On the other hand, the Pollution Halo Hypothesis emerges, namely the existence of FDI that supports the development and growth of a country that has a positive impact on the environment. Lorente et al (2019) in their research revealed that FDI can reduce environmental degradation by focusing more on advanced technology which has implications for efficiency and the use of environmentally friendly energy. Therefore, the hypothesis offered is,

H2: FDI has a significant positive effect on CO_2 emissions in Member Countries of the Islamic Cooperation Organization.

The Relationship between Economic Growth and CO_2 Emissions

The use of CO_2 emissions is often used as a proxy in the problem of environmental degradation. CO_2 emissions which were previously considered as a by-product of combustion, are now believed to be the main factor in the problem of global warming with the greenhouse effect (IPCC, 2007). Research by Kuznet (1955) suggested that there is a relationship between economic growth and CO2 emissions, hereinafter this relationship is known as the Environment Kuznets Curve (EKC), with an inverted U-shaped curve so that in the early day's economic growth is directly proportional to CO2 emission pollution until it reaches one point economy, both variables will be negative. Countries with high economic growth rates will usually tend to be more aware of the environment and direct consumption that has a good impact on the environment (Agarwal, 2019).

Research by Asici (2013) examined the relationship between economic growth and environmental degradation by classifying low, middle, and high-income countries. The results of the study stated that the positive influence between economic growth and environmental degradation was strongest in middle-income countries. Therefore, the hypothesis offered is,

H3: Economic Growth has a significant positive effect on CO2 emissions in Member Countries of the Islamic Cooperation Organization.

III. RESEARCH METHOD

This study used a quantitative approach with the aim of identifying relationships between variables and testing hypotheses, and the data used must be measurable and can produce findings that can be generalized (Anshori & Iswati, 2009). According to Dharma (2008), conducting research using quantitative methods has the aim of getting answers that are exposed in the formulation of the problem about the variables studied and concluding the results of the research. This research used the panel data regression method to examine the effect of the independent variables of urbanization, FDI, and economic growth on the dependent variable of CO_2 emissions. The test uses a statistical tool in the form of EVIEWS 9.

Dependent Variable

CO_2 emission data is also a proxy for environmental degradation. Based on standard CO_2 emission factors for Combustion in the Intergovernmental Panel on Climate Change (IPCC). The CO_2 emission data used was in the form of units of million tons of carbon dioxide which is the result of the consumption of burning fossil fuels. The CO_2 emission variable in this study was simplified using the natural log.

Independent Variable

1. Urbanization
   The urbanization data used was the total population that occupies urban areas. Urbanization is generally defined as the movement of people from villages to cities, this movement is driven by factors between the two regions. The transfer from the two regions was due to differences in the values of each region where the general perception was due to wider employment opportunities. In its operation, the Urbanization variable was simplified by using natural logs.
2. Foreign Direct Investment
   FDI is a net inflow (net amount) of the flow of funds originating from abroad that is used to expand or expand the operations of a multinational company to a destination country in order to increase prosperity in the economy (Escaleras, 2011: 352). In its operation, the FDI variable is simplified by using the natural log.
3. Economic Growth

$$\boldsymbol{G} = \frac{PDB_t}{\boldsymbol{N}\text{t}}$$

The GDP per capita indicator is used as a proxy for Economic Growth to see in real terms. GDP per capita is calculated by dividing GDP by the total population. Currency aggregates are based on the constant 2010 United States dollar currency. The Economic Growth Variable in this study is simplified using the natural log.

The GDP per capita indicator is used as a proxy for Economic Growth to see in real terms. GDP per capita is calculated by dividing GDP by the total population. Currency aggregates are based on the constant 2010 United States dollar currency. The Economic Growth Variable in this study is simplified using the natural log (Gujarati & Porter, 2008).

The population in this study was member countries of the Organization of Islamic Cooperation (OIC), a total of 12 countries out of 57 total member countries. The time period used covers 1995 to 2018. In this study, a purposive sampling method was used to determine sample selection. According to Sugiyono (2010), purposive sampling is a sampling technique with certain considerations that indicate that each subject is taken based on certain objectives and considerations. The determination of the sample in this study was the OIC member countries which requires efforts to examine the problems in the research and the availability of data from each country, both independent and dependent variable data. Based on this explanation, this study analyzed environmental degradation in 12 member countries of the Islamic Cooperation Organization (OIC) for the 1995-2018 period with a total of 288-panel data observations.

IV. RESULTS AND DISCUSSION

Statistical Descriptive Analysis

Table 1. Result of Descriptive statistics

Variable	LN_CO2	LN_URB	LN_FDI	LN_GDP
Mean	18.70972	16.41608	23.16792	8.707257
Median	18.68500	16.62000	23.00500	8.490000
Maximum	20.21000	18.81000	24.58000	11.35000
Minimum	16.82000	13.10000	21.96000	5.950000
Std. Dev.	0.770120	1.248311	0.415337	1.349632
Observations	288	288	288	288

The average value of the LN CO_2 variable is 18,70972 and the maximum minimum value was 16,82000 and 20,21000 respectively. The mean value of the LN URB variable was 16,41608 with minimum and maximum values of 13,10000 and 18,81000 respectively. The mean value of the LN FDI variable was 23,16792 with a minimum and maximum value of 21,96000 and 24,58000 respectively. The mean value of the LN GDP variable was 8,707257 with a minimum and maximum value of 5,950000 and 11,35000 respectively.

Table 2. Fixed Effect Model Panel Data Regression Results

Variable	Coefficient	t-statistic	Sig.	Conclusion
C	4,250908	6,549887	0,0000	
LN URB	0,742752	24,21578	0,0000	Significant Positive
LN GDP	0,166164	8,371957	0,0000	Significant Positive
LN FDI	0,035347	1,378500	0,1692	Positive not Significant
R2	0,975669			
Prob F	0,000000			

The constant coefficient value was LN 4,250908 and after being anti-log it became 70,1691 indicating that when all the independent variables in the form of Urbanization, FDI, and Economic Growth were zero, the value of CO_2 emissions in 12 OIC member countries increased by 70,1691. The urbanization variable coefficient value was LN 0,742752 which after being anti-log became 2.1017, it explains that every one-unit increase in urbanization in OKI member countries will increase CO2 emissions by 2,1017 units. The coefficient value of the variable Economic Growth was LN 0,166164 which after anti-log became 1,1807, indicating that every one unit increase in Economic Growth in OIC member countries increased CO_2 emissions by 1,1807 units. The FDI variable coefficient value was LN 0,035347 which after anti-log became 1,0359, indicating that every increase of one unit of FDI in OIC member countries results in an increase in CO_2 emissions of 1,0359 units.

Based on the regression results in table 2 using the Fixed Effect Model, it can be seen that the value of the F-statistic test results showed a probability number of F-statistic of 0,0000 which was smaller than $\alpha = 0,05$, so it can be said that H0 is rejected and H1 is accepted. By accepting H1, it can be concluded from the F test that the variables Urbanization, FDI, and Economic Growth simultaneously influence CO_2 emissions in OIC member countries. Meanwhile, the t-statistic test yields that the urbanization variable had

a t-statistic of 24,2157 and a significance value of 0,0000 which means it was smaller than the significance of $\alpha = 0,05$, urbanization has a positive and significant relationship to CO_2 emissions in OIC member countries. The Economic Growth Variable had a t-statistic of 8,3719 and a significance value of 0,0000 which means it was smaller than the significance of $\alpha = 0,05$, so the Economic Growth variable has a positive and significant relationship to CO2 emissions in OIC member countries. The FDI variable has a t-statistic of 1,3785 and a significance value of 0,1692 which means it is greater than $\alpha = 0,05$, so the FDI variable has a positive and insignificant relationship to CO_2 emissions in OIC member countries.

Effect of Urbanization on CO_2 Emissions

The results of the panel data regression study conducted stated that the urbanization variable has a significant and positive effect on CO_2 emissions. This indicates that when urbanization increases, it will be followed by an increase in environmental degradation, which in this case is proxied by CO_2 emissions. The results of this study are in line with Ali et al (2019) who stated that urbanization has a positive and significant effect on environmental degradation. Furthermore, Ali (2019) stated that massive urbanization is not accompanied by readiness in urban areas, lack of public transportation infrastructure and inadequate sanitation are only two of the many problems in urban settlements both in terms of social, economic, and environmental aspects. The tendency of the industrial sector to absorb urban labor has an increasingly massive impact on the industrial sector's contribution to increasing CO_2 emissions (Liu dan Bae, 2018). In contrast to the results of Ali, research (2017) was conducted in Singapore, where urbanization variables statistically have a negative effect and increased urbanization will reduce environmental degradation. The difference in the results of these studies can be explained that Singapore as a developed country in terms of its economy does not rely on the industrial sector which is one of the biggest contributors to CO_2 emissions, besides that progress in public transportation infrastructure helps tackle individual CO_2 emissions.

From an Islamic perspective, Allah SWT has reminded humans not to destroy nature, in the Qur'an Surah Ar-Ruum verse 41 which means "*Corruption has spread on land and sea as a result of what people's hands have done so that Allah may cause them to taste ˹the consequences of˺ some of their deeds and perhaps they might return ˹to the Right Path˺*". Many human activities are the cause of the destruction of environmental quality. Some of them are the burning of fossil fuels both individually and in groups, deforestation, and others. This is then turned into greenhouse gases in the earth's atmosphere.

Effect of Economic Growth on CO_2 Emissions

From the results of the conducted research, it was obtained that the variable Economic Growth had a positive and significant influence on CO_2 emissions in OIC member countries, this proves that when Economic Growth increases, CO_2 Emissions will also increase. This finding is in line with research by Asici (2013) where middle-income countries feel the most impact from environmental degradation based on economic growth. In countries with low incomes, although they only make a small contribution to environmental degradation, researchers believe these countries will also feel the impact that is not much different from countries with middle incomes. On the other hand, countries with high incomes tend to still provide air pollution in the form of massive CO_2 emissions, but with awareness from people who are starting to understand the dangers that threaten environmental degradation, they can minimize future impacts with appropriate countermeasures.

Research by Kaika & Zervas (2013) identified that there is a relationship between CO_2 emissions and economic growth that does not reduce emissions over time, but is actually related to energy consumption. The Kuznets Curve Theory described that the positive relationship between CO_2 emissions and economic growth will reach a point where the effect will be reversed, middle and small-income countries tend to be industry oriented in their development, this cannot be denied will increase in CO_2 emissions that occur from industrial activities. In countries with high incomes that have shifted to technological advances and the development of environmentally friendly energy, economic activities that do not rely too much on industry provide opportunities for service products that are not too harmful to environmental quality.

OIC through the 2025 Program of Action carries a mission to protect and preserve the environment. The OIC's economic growth in 2018 was at an average rate of 3,1%, which means that OIC's growth has decreased below the world average growth and is expected to continue to decline to 2,4% in 2019 (OIC SESRIC,2019).

Effect of Foreign Domestic Investment on CO_2 Emissions

In this study, FDI had a positive and insignificant effect on CO_2 emissions. This shows the interpretation that when FDI increases, environmental degradation increases and quality decreases. Conversely, when FDI decreases, environmental degradation will decrease and environmental quality will improve. This finding is in accordance with the presentation of Sapkota and Bastola (2017) which revealed that FDI contributes to environmental pollution in Latin countries and confirms the existence of the Pollution Haven Hypothesis. This indicates that there is no awareness among stakeholders that

foreign investment has a negative impact on environmental quality, from investors who ignore environmental factors in their investment activities to policies that regulate investments that is not in favor of the environment.

Another study by Al-Mulali and Tang (2013) explained that FDI has a negative effect on CO_2 emissions, FDI provides efficiency and with advanced technology, it makes fewer CO_2 emissions exposed to the environment. This means that in this case, FDI plays a role in confirming the Pollution Halo Hypothesis. The efficient use of renewable energy and advanced technology reveals the role of foreign investment in improving environmental quality. Al-Mulali and Tang (2013), it was also found that 59% of FDI flows to the service sector, while 22% goes to the manufacturing sector, and 14% goes to the industrial sector in GCC countries (World Investment Report, 2012). In 2030, Indonesia through the Ministry of Environment and Forestry is targeting to reduce emissions by 29% with its own efforts and can increase to 41% with international support (KLHK, 2021). The involvement of international parties indicates the role of FDI in reducing CO_2 emissions, then strategic policies regarding the environment and business are needed to achieve emission reductions.

V. CONCLUSION

This study used panel data regression analysis with the Hausman test as a means of determining the estimation model and the results of the Hausman Fixed Effect Model test became the estimation model in this study. In order to find out the influence between the dependent and independent variables simultaneously, an F-statistic test and a t-statistic test were carried out to test the effect partially. The results showed that there was a significant influence simultaneously between the independent and dependent variables, where the dependent variables were CO_2 emissions as a proxy for environmental degradation and urbanization, FDI, and economic growth as independent variables. Partially, the urbanization and economic growth variables have a significant influence and are positively related to environmental degradation in OIC member countries, while on the other hand, the FDI variable has an insignificant effect and is positively related to OIC member countries.

For future researchers, it is hoped that there will be a grouping of data such as based on state income which will later provide more comprehensive research results. In addition, it is hoped that more sample data will be used which will be able to better describe OIC member countries because this research is limited to 12 countries from 1995 to 2018. The governments of each OIC member country and stakeholders are expected to be able to formulate and implement policies that can lead to better FDI, Economic Growth, and Urbanization which will bring benefits by reducing environmental degradation.

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