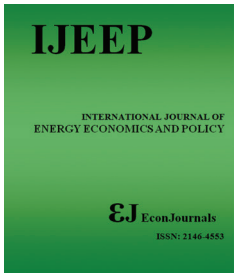

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Unveiling the Role of Business Freedom to Determine Environmental Degradation in Developing Countries

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ABSTRACT

Presently, environmental degradation is the prime concern of the world economies as a whole. Following this concern, Sustainable Development Goals designed by the UNDP raise the slogan "Clear Environment for All." This paper has analyzed the impact of business freedom on environmental degradation in the case of 110 developing countries from 2000 to 2020. Panel least squares and generalized moments methods have been applied to check the impact of explanatory variables on dependent variables. The results show that business freedom and renewable energy consumption have a negative and significant impact on environmental degradation in selected developing countries. The results explain that financial development has a positive and significant impact on environmental degradation in developing countries. Whereas urbanization has a positive and significant impact on environmental degradation. Thus, for the reduction of environmental degradation business freedom and renewable energy consumption should be promoted, whereas negative linkages of urbanization and financial development should be reduced.

Keywords: Renewable Energy Consumption, Business Freedom, Environmental Degradation
JEL Classifications: Q30, F41, Q56

1. INTRODUCTION

Environmental degradation can be interpreted as the depletion of natural resources such as land, water, and air. This is a change in the ecosystem that is undesirable for environmental health. Environment degradation is linked to the ineffective and poor quality of institutes which are caused by the weak implementation process of these regulations (Dinulovic et al., 2020). Environmental degradation is commonly caused by both human activities and natural disasters. When these occur, the underdeveloped areas which are often dominated by the poor sects within the society are unable to desire out of such challenges easily.

Environmental degradation may also be defined as any change or disturbance to the environment perceived to be deleterious or undesirable. Environmental degradation is one of the Ten Threats officially advised by the High-Level Threat Panel of the United Nations. United Nations International Strategy for Disaster Reduction defines environmental degradation as "The reduction of the capacity of the environment to meet social and ecological objectives and needs." Human disturbance is a primary cause of environmental degradation. The degree of the environmental impact varies with the cause, the habitat, and the plants and animals that inhabit it. Humans and their activities are a major source of environmental degradation (Tyagi et al., 2014).

Empirics show that with every passing day, the world is experiencing higher environmental issues e.g. air and water pollution, climate change, disasters, and drought. There are different national, regional, and international institutions that struggle to control environmental degradation i.e. Vienna Convention for the Protection of the Ozone Layer (1985), the

Kyoto Protocol (1997), and the Paris Agreement (2015). With all national and international efforts to control environmental degradation, CO_2 emissions have increased to 4.5 in 2018 from 3.8 in 2000. There is a substantial difference between developing and developed countries in the production of CO_2 emissions (the World Bank, 2022). Although there are numerous sources of environmental degradation among them only consumption of fossil fuels reached 36.3 billion tons in 2021, which is the highest ever level in the world (IEA, 2022). The environmental indicators show that environmental degradation has continued to be a serious threat to the world.

Business freedom can influence environmental quality through diverse channels. One view suggests that a larger government size probably decreases the environmental quality through inefficient operations by government and state-owned enterprises (Islam and López, 2013). Another view suggests that governments are crucial actors in the design and application of environmental regulations, clean energy, and green products and, in turn, can positively influence environmental quality. Furthermore, higher business freedom can decrease the environmental quality due to the use of more energy and natural resources, considering its positive growth effect depends on the economic development levels of the countries in the context of the environmental Kuznets curve hypothesis (Chen, 2022). However, many efficient resources can also be used to control the environment in countries with higher business freedom and, in turn, developments in energy-efficient technologies and renewable energy production can raise the environmental quality (Baloch et al., 2019). Lastly, countries with higher business freedom levels can efficiently use market-based instruments such as environmental taxes and tradable permit systems to improve environmental quality. As a consequence, the impact of business freedom and government size on the environment varies based on which channels are dominant. Consequentially, business freedom and its components of government size and freedom to international freedom are expected to affect environmental sustainability. So, it is very vital to explore the link between business freedom and environmental degradation in developing countries. There is hardly any study that links business freedom in determining environmental degradation. The remaining article is comprised of the literature review, the theoretical model, results, discussions, and conclusions.

2. LITERATURE REVIEW

This section of the paper is comprised of the literature review and various empirical and theoretical studies that present a link between business freedom and environmental degradation. But the most relevant and recent studies have been selected as a review of the literature. Presently, environmental degradation has become a common cause in both developed and underdeveloped countries. The quality of the environment has a direct impact on human health. Thus, it is very important to study the level and determinants of environmental degradation. When we explain environmental degradation, it doesn't occur or happen by itself. Some economic activities cause environmental degradation. Grossman and Krueger (1995) demonstrate the link between economic growth and the environment. Historical overview and trends of environmental degradation show that it has a very close link to business freedom. Business freedom enables everyone to start business activities for profit, irrespective of environmental effects. Zhang et al., (2017) investigate how trade openness affects CO2 emissions. The study recommends that policymakers should encourage and expand trade openness in these countries, not only to restrain CO_2 emissions but also to increase their growth. Bakirtas and Akpolat (2018) explore the relationship between energy consumption, economic growth, and urbanization in the case of new emerging market countries. The result shows a negative and significant relationship. Bashir et al., (2022) highlight the main challenge for policymakers to achieve a sustainable environment while ignoring environmental degradation. The results show that there is an association between the emission of carbon and globalization. The higher GDP and coal energy both increase the emission of carbon and these findings help make the policies for the trends of globalization.

For the last two decades, a clean environment has got much importance among countries the human being. Environmental degradation has a direct impact on human health (Gwangndi et al., 2016) and causes different diseases i.e., skin cancer, lung cancer, hepatitis, and eye infection. There are several studies (Alam and Paramati, 2015) that examine the factors affecting environmental degradation e.g., carbon emission, economic growth, urbanization are economic activities. The government allows investors and entrepreneurs to set the roots of economic activities. Thus, it is important to study the relationship between business freedom and environmental degradation. Although, determinants of environmental degradation are an extensively studied area of research (Tyagi et al., 2014).

Altinay and Karagol (2004) investigated the causality between the consumption of energy and GDP in the case of Turkey. The results of the Hsiao Granger Causality show that there is no causality between GDP and consumption of energy in the case of Turkey. Kahuthu (2006) demonstrates the link between economic growth and environmental degradation in a global context. The analysis is based upon the Environmental Kuznets Curve (EKC) model, which posits an inverted-U relationship between incomes per capita and environmental quality. There is a significant relationship between levels of income per capita and CO_2 emissions across countries. Li and Reuveny (2006) explore the impact of democracy on environmental degradation. The focus on the impact of political government has a direct impact on human activities that damaged the environment. The study finds that democracy reduces environmental degradation. Halicioglu (2009) investigates the causal relationship between income, CO_2 emissions, consumption of energy, and foreign trade in Turkey from 1960 to 2005. The estimated results show that GDP is highly significant among other variables of the model in explaining CO_2 emissions in the case of Turkey.

Gao et al. (2011) investigate the relationship between economic growth, CO_2 emissions, and consumption of energy by using the Bayesian procedure. According to the results, the EKC hypothesis presents an inverted U-shape curve in the case of all developed countries but not for many developing countries,

the results show that EKC exists in the case of Turkey. Kaplan and Kaplan (2011) investigate the causal relationship between economic growth and consumption of energy in the case of Turkey for the period 1971-2006. The results of the granger causality show that there is bidirectional causality between economic growth and consumption of energy. This shows that for achieving a high level of economic growth more energy is needed and more energy further enhances economic growth. Hossain (2011) study the determinants of environmental degradation in industrialized countries. The Granger causality test results from sustenance that there is no evidence of a long-run causal relationship, but there is a unidirectional short-run causal relationship from economic growth and trade openness to carbon dioxide emissions, from economic growth to energy consumption, from trade openness to economic growth, from urbanization to economic growth and from trade openness to urbanization. Hoek et al. (2013) explore the effect of business freedom and environmental degradation.

Shahbaz (2013) examines that financial instability increases environmental degradation with fresh evidence from Pakistan. The results confirmed the long-run relationship between financial instability, economic growth, energy consumption, trade openness, and CO_2 emissions. The Environmental Kuznets curve (EKC) exists and the dominant role is played by energy consumption to contributes to CO_2 emissions. Finally, trade openness is inversely linked with CO_2 emissions. Shahbaz et al. (2013) explore the relationships between output, energy, trade, and carbon dioxide emissions in Indonesia. The empirical results reveal causal linkages between energy use and emissions, and the output and emissions. Karimzadeh et al. (2014) examine the relationship between business freedom and environmental degradation. The result shows that financial estimation and financial development lead to CO_2 emissions devaluation, and consequently, it helps to improve the quality of the environment. Tyagi et al. (2014) explore the cause and consequences of environmental degradation. The study found that activities by the rich and powerful were the primary contributing factors forcing groups living at the margins into environmental degradation. Environmental degradation poses a significant threat to human health worldwide.

Alam and Paramati (2015) explore that oil consumption and economic growth intensify environmental degradation evidence from developing economies. The empirical results of three-panel cointegration models suggest that a significant long-run equilibrium relationship exists between economic growth, financial development, industrialization, oil consumption, trade openness, and CO_2 emissions. This evidence indicates that all of these variables share a common trend in the long run. Al-Mulali and Ozturk (2015) explore the determinants of environmental degradation. The outcomes of granger causality revealed that the variables have short-run and long-run causal relationships with the ecological footprint. Moreover, different directions of causal relationships were found between the variables. Gwangndi et al. (2016) demonstrate the impact of environmental degradation on human health under international law. The result of environmental degradation from factors is urbanization, population growth, intensification of agriculture, rising energy use, and transportation, climate change, and pollution arising from many sources such as technological activities.

Shahzad et al. (2017) study the cointegrating relationship between carbon emissions, energy consumption, trade openness, and financial development in Pakistan. The Granger causality results show a unidirectional causality from energy consumption, trade openness, and financial development to carbon emission; and a bi-directional causality between energy consumption and financial development.

3. THE MODEL

Business activities are very vital not only for an economy but also for individual survival (Ali and Zulfiqar, 2018), but these business activities are attached to some environmental degradation. The relationship between business activities and environmental degradation is attached to Ricardian rent theory, as the prices of resources decide the business and environmental conditions of an economy (Ricardo, 1891). The lower level of environmental degradation is attached to a higher living standard, so every nation is trying to improve environmental conditions with lesser greenhouse gases. Theoretically, the impact of business freedom on environmental degradation can be shown by three effects known as the scale effect, composition effect, and technological effect. When there is more business freedom, there are more economic activities and inputs in the production of goods that are required which cause greater emissions in the environment called the scale effect. As economic activity increases it raises serious concerns about environmental degradation thus, leads to a reduction in anthropogenic emissions. This is promoted by the use of an environmentally friendly technique known as the technical effect proposed by (Grossman and Krueger, 1995). The composition effect justifies that rising income leads to an increase in demand for the cleaner good. Because of this, the firms use an alternative method of production which lowers the pollution. The scale effect dominates the composition effect at the lower level of income but as income rises and reached the critical or turning point composition effects dominates the scale effect (Halkos and Tzeremes, 2013).

This study is going to examine the effect of business freedom on environmental degradation in the case of some selected developed and developing countries. Based on a detailed literature review, this study follows Grossman and Krueger (1995), Shahbaz et al. (2013), Karimzadeh et al. (2014), Ali and Audi (2016), Audi and Ali (2017), Audi and Ali (2018), Audi et al. (2020), and Ali et al. (2022). The functional form of the model becomes as:

$$END_{it} = F(BFR_{it}, FIN_{it}, ENCON_{it}, RENCON_{it}, URB_{it}) \quad (1)$$

where
END = environmental degradation
BFR = business freedom
FIN= financial development
ENCON= energy consumption
RENCON= renewable energy consumption

URB= urbanization
i= set of panel countries (110 developing countries)
t= time period (2000-2020)

For examining the relationship between the explanatory variables and explained variables, the mathematical model can be converted into the econometric model. The model can be written as:

$$END_{iT} = \alpha + \beta_1 BFR_{iT} + \beta_2 FIN_{iT} + \beta_3 ENCON_{iT} + \beta_4 RENCONMP_{iT} + \beta_5 URB_{iT} + \mu_1 \quad (2)$$

where
α = intercept
β_i = slope coefficient
μ = white noise error term

Environmental degradation is taken as dependent whereas business freedom, financial development, energy consumption, renewable energy consumption, and urbanization are independent variables selected in the case of developed and developing countries from 2000 to 2020.

3.1. Measurements and Definitions of Variables

END = environmental degradation (Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during the consumption of solid, liquid, and gas fuels and gas flaring).

BFR = business freedom (Business freedom is an overall indicator of the efficiency of government regulation of business. The quantitative score is derived from an array of measurements of the difficulty of starting, operating, and closing a business. The business freedom score for each country is a number between 0 and 100, with 100 equaling the freest business environment. The score is based on 10 factors, all weighted equally, using data from the World Bank's Doing Business study: Starting a business—procedures [number]; Starting a business—time [days]; Starting a business—cost [% of income per capita]; Starting a business—minimum capital [% of income per capita]; Obtaining a license—procedures [number]; Obtaining a license—time [days]; Obtaining a license—cost [% of income per capita]; Closing a business—time [years]; Closing a business—cost [% of estate]; and Closing a business—recovery rate [cents on the dollar])

FIN= financial development (Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, except credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available [including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits]. Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies).

ENCON= energy consumption (Fossil fuel comprises coal, oil, petroleum, and natural gas products).

RENCON= renewable energy consumption (Renewable energy consumption is the share of renewable energy in total final energy consumption).

URB= urbanization (Urban population refers to people living in urban areas as defined by national statistical offices. The data are collected and smoothed by United Nations Population Division). The data on selected environmental degradation, financial development, energy consumption, renewable energy consumption, and urbanization have been taken from World Development Indicators a database maintained by the World Bank. The data on business freedom has been taken from The Heritage Foundation.

4. EMPIRICAL RESULTS AND DISCUSSION

This section of the article is comprised of estimated results and discussion. This study examines the impact of business freedom on environmental degradation in the case of developing countries from 2000 to 2020. The estimations are comprised of descriptive statistics, correlation matrix, unit tests, panel least square, and generalized moment method.

The estimated results of the descriptive statistic have been presented in Table 1. The descriptive statistics provide information related to Kurtosis, Skewness, Standard deviation, minimum, maximum, median, and mean values of the variables. The results in Table 1 describe that fewer variations existed between the maximum and minimum values of the selected variables. This reveals that our selected data is normally distributed. The estimated results show that business freedom, environmental degradation, financial development, energy consumption, renewable energy consumption, and urbanization are positively skewed and kurtosis. Based on Jarque-Bera, we also find that our data series are normally distributed as the panel consists of 110 developing countries that have some type of variabilities in the case of selected variables. Thereby, this data is suitable for empirical analysis.

Correlation can be used to examine the degree of relationship among the selected variables. The results of the correlation matrix have been given in Table 2. The results explain that business freedom, financial development, and urbanization are positively and significantly correlated with environmental degradation. The results show that renewable energy consumption and energy consumption are negatively and significantly correlated with environmental degradation. The results reveal that financial development and urbanization are positively and significantly correlated with business freedom. Whereas, renewable energy consumption and energy are negatively and significantly correlated with business freedom for the selected countries. The estimated results show that renewable consumption and energy consumption are negatively and significantly correlated with financial development. Urbanization is positively and significantly correlated with financial development. There is a positive significant correlation between renewable energy consumption and energy consumption. But urbanization is negatively and significantly correlated with energy consumption. The results reveal that urbanization is negatively and significantly correlated

Table 1: Descriptive statistics

	END	BFR	FIN	ENCON	RENCON	URB
Mean	9.733673	60.24384	36.01949	6.138745	40.44242	52.12401
Median	9.416541	58.70000	27.63901	4.976767	32.91680	50.71300
Maximum	16.14896	100.0000	157.8091	33.05451	96.04110	100.0000
Minimum	5.010635	23.40000	0.000000	1.491862	0.000000	8.246000
SD	2.134019	12.84177	28.49965	4.143837	32.26205	23.52389
Skewness	0.305013	0.106875	1.288795	2.568859	0.293285	0.161592
Kurtosis	2.684800	3.321102	4.454683	11.81535	1.603600	2.028584
Jarque-Bera	27.99431	8.834738	520.1296	6181.328	136.2062	62.23078
Sum	13870.48	85847.47	51327.78	8747.711	57630.44	74276.71
Sum Sq. Dev.	6484.949	234833.5	1156616.	24452.05	1482156.	788004.0

Table 2: Correlation matrix

Variables	END	BFR	FIN	ENCON	RENCON	URB
END	1.0000					
BFR	0.30413***	1.0000				
FIN	0.47318***	0.45828***	1.0000			
ENCON	−0.2608***	−0.28802***	−0.2034***	1.0000		
RENCON	−0.6239***	−0.52975***	−0.5290***	0.40625***	1.0000	
URB	0.50457***	0.41813***	0.4473***	−0.3618***	−0.6682***	1.0000

Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% levels, respectively

with renewable energy consumption in the case of developing countries. The overall correlation outcomes reveal that most explanatory variables for the regression model are significantly correlated to each other, but there is no such higher correlation which creates the issue of multicollinearity among the selected independent variables in the case of developing countries analysis. Thus, we can easily move to further empirical analysis.

This study has covered the time period from 2000 to 2020 for 110 developing countries, thus for such data, we must have to check the unit root issue. This study has used PP - Fisher Chi-square (PP-FC), ADF - Fisher Chi-square (ADF-FC), Im, Pesaran, and Shin W-stat (IP&S), and Levin, Lin and Chu t*(LLC) unit root tests to check the stationarity of the variables. The estimated outcomes of panel unit root tests are presented in Table 3. The estimated results of PP-FC, ADF-FC, IP&S, and LLC reveal that environmental degradation, business freedom, financial development, energy consumption, renewable energy consumption, and urbanization are stationary at I(0). The overall estimated results show that there is the same order of integration among the selected variables of the model. This situation is best for using panel least squares.

The estimated results of panel least square outcomes and generalized moment method outcomes have been given in Table 4. This study has examined the impact of business freedom on environmental degradation in the case of 110 developing countries from 2000 to 2020. Environmental degradation has been used as the dependent variable, and business freedom, financial development, energy consumption, renewable energy consumption, and urbanization have been selected as independent variables.

The concept of business freedom refers to the liberty of individuals to control the benefits of their labour efforts and every individual is empowered to choose the profession that he/she likes (Dale and Hyslop-Margison, 2010). Among the

Table 3: Outcomes of panel unit root

Variables	LLC	IP&S W-stat	ADF-Fisher	PP-Fisher
END	−5.35116***	3.81824*	117.482*	243.534***
BFR	−2.22322**	−1.53002*	157.724**	201.794***
FIN	−4.39001*	3.21345*	111.348*	77.6088***
ENCON	−3.83183***	4.82597***	150.917*	301.588***
RENCON	−2.56974*	3.90169***	141.240***	174.799*
URB	−9.56735***	7.89222***	554.354***	1482.93***

Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% levels, respectively

market-based free economies, every individual succeeds or fails based on effort and ability (Amin, 1999). When each individual is free to opt for economic activities of their choice to attain higher profits, this will also raise the environmental concerns of society. Our results explain that business freedom has a negative and significant impact on environmental degradation for both tests. These estimated outcomes reveal that a 1% increase in business freedom decreases environmental degradation by (−0.016660) percent. Our results are consistent with the findings of (Adesina and Mwamba, 2019), and our results are inconsistent with the findings of (Golubovic, 2019). This shows that the harmonization among business freedom or free-market principles, regulatory frameworks, and climate change policies has reduced environmental degradation among countries.

Existing literature highlight different environmental implications of financial development. First, a well-developed financial system provides an opportunity to access capital and facilitates investment activities. This fosters economic activities and energy usage triggers environmental degradation. Second, a sound and well-functioning financial system can provide funds for the purchase of advanced technologies and facilitate the adoption of energy-saving production processes, which in turn abate environmental degradation. Thus, a vibrant financial sector is very vital for economic development, as better financial services raise the size

Table 4: Estimated outcomes

Dependent variable: END				
Variable	Panel least square outcomes		Generalized moments method outcomes	
	Coefficient	SE	Coefficient	SE
BFR	−0.016660***	0.004068	−0.016660***	0.004092
FIN	0.015435***	0.001838	0.015435***	0.001849
ENCON	−0.003028	0.011421	−0.003028	0.011488
RENCON	−0.031487***	0.002019	−0.031487***	0.002031
URB	0.012161***	0.002492	0.012161***	0.002506
C	10.83947***	0.327751	10.83947***	0.329670
R-squared	0.433221		0.433221	
Adj. R-squared	0.431224		0.431224	
S.E. regression	1.609418		1.609418	

Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% levels, respectively

of economic activities. Our results show that financial development has a positive and significant impact on environmental degradation. This explains that a 1% increase in financial development raises environmental degradation by (0.015435) percent. Our results are consistent with the findings (Shahbaz et al., 2018; Saud et al., 2020). Whereas, financial development has a negative and significant impact on environmental degradation in the case of developed countries. These findings are consistent with the outcomes of (Ozturk and Acaravci, 2013).

In few last few decades, a massive upsurge in human activities and the high pace of industrialization raises the demand for energy consumption. A rise in industrial energy consumption has adverse impacts on the environment. A vast amount of empirical and theoretical literature has investigated the association between environmental degradation and energy consumption. Numerous studies find a positive and significant relationship between energy consumption and environmental degradation (Ali et al., 2021). In the case of our estimated results, energy consumption has a negative but insignificant impact on environmental degradation. These results are consistent with the findings of (Zhang and Gao, 2016).

Presently, green growth, green job, and a green economy have become a hot cake among policymakers across all disciplines. The process through which the green economy works is the use of renewable energy resources rather than the use of depletable and mineral resources for energy. Literature (Ali et al., 2021; Adekoya et al., 2022) has highlighted that the use of renewable energy resources is one of the main indicators of lower degradation of the natural environment. Empirics (Ali et al., 2021; Ali et al., 2021; Ali et al., 2021; Audi et al., 2021; Ali et al., 2022) show that the development and advancement in renewable energy resources are considered environmentally friendly, with fewer costs, and long-lasting. Our outcomes show that renewable energy consumption has a negative and significant impact on environmental degradation. These results explain that a 1% rise in renewable energy consumption decreases environmental degradation by (−0.031487) percent. These results are consistent with the findings (Adebayo et al., 2021).

The end of the 20th Century is attached with higher urbanization throughout the world, although, this higher rate of urbanization is very across the regions and countries e.g. Asia has almost half of the megacities of the world. But all agree that it has deep-rooted environmental implications across the globe. It is urbanization that is also responsible for all types of demographic changes in the world. This demographic change is attached to higher development and higher development has environmental implications. Literature (Ahmad et al., 2021) has highlighted that the origins of most environmental issues (e.g., air and water pollution) are related to big cities. This show how urbanization and pollution are linked to each other (Rashid et al., 2018). Our estimated results show that urbanization has a positive and significant impact on environmental degradation. A 1% increase in urbanization raises environmental degradation by (0.012161) percent in the case of developing countries over the selected time. These results are consistent with the findings (Adebayo et al., 2021).

The overall results explain that financial development and urbanization have encouraged environmental degradation whereas business freedom, energy consumption, and renewable energy consumption have discouraged environmental degradation in the case of developing countries.

5. CONCLUSIONS AND SUGGESTIONS

This part of the article is comprised of conclusions and policy suggestions. Based on estimated results, business freedom is negatively and significantly impacting environmental degradation. The new rules and regulations related to business activities are strictly attached to the environment friendly, moreover, business freedom urges new technology with fewer carbon emissions. Thus, countries of the world should promote business freedom to reduce environmental degradation. The governments should stress the inhibitory impact of finance, e.g., the financial sectors should promote clean technology or provide loans to high-tech businesses to increase energy efficiency. The results explain that financial development has a positive and significant impact on environmental degradation in developing countries. The financial development in developing countries has not achieved such a level which depresses environmental degradation, therefore, developing countries should promote financial development which reduces CO_2 emissions. energy consumption has a negative and insignificant impact on environmental degradation in the case of developing countries. The results explain that renewable

energy consumption has a negative and significant impact on environmental degradation in the case of developing countries. For carbon emissions and energy consumption, this study found that feedback effects exist. Therefore, this study suggests that policymakers should focus on energy conservation policies using the efficient and effective utilization of energy means. Furthermore, fossil fuel consumption boosts economic growth and positively impacts environmental degradation. In addition to this, we further suggest that every country should use renewable energy sources to achieve the aforementioned goals (e.g., reduce carbon emission, enhance growth, and reduce fossil fuel consumption). The results reveal that urbanization has a positive and significant impact on environmental degradation in the case of developing countries' analysis. Higher urbanization is associated with higher economic activity. Higher economic activity generates higher wealth and wealthier residents often demand more energy-intensive products (e.g. automobiles, air conditioning, etc.) which can increase carbon dioxide emissions. Wealthier residents are also likely to care more about the environment. Increased urbanization also helps to facilitate economies of scale for public infrastructure and these economies of scale lead to lower environmental damage.

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