Environmental degradation in Asian countries with the impact of
economic growth, energy consumption, financial development and
Institutional quality.

Discovering Knowledge

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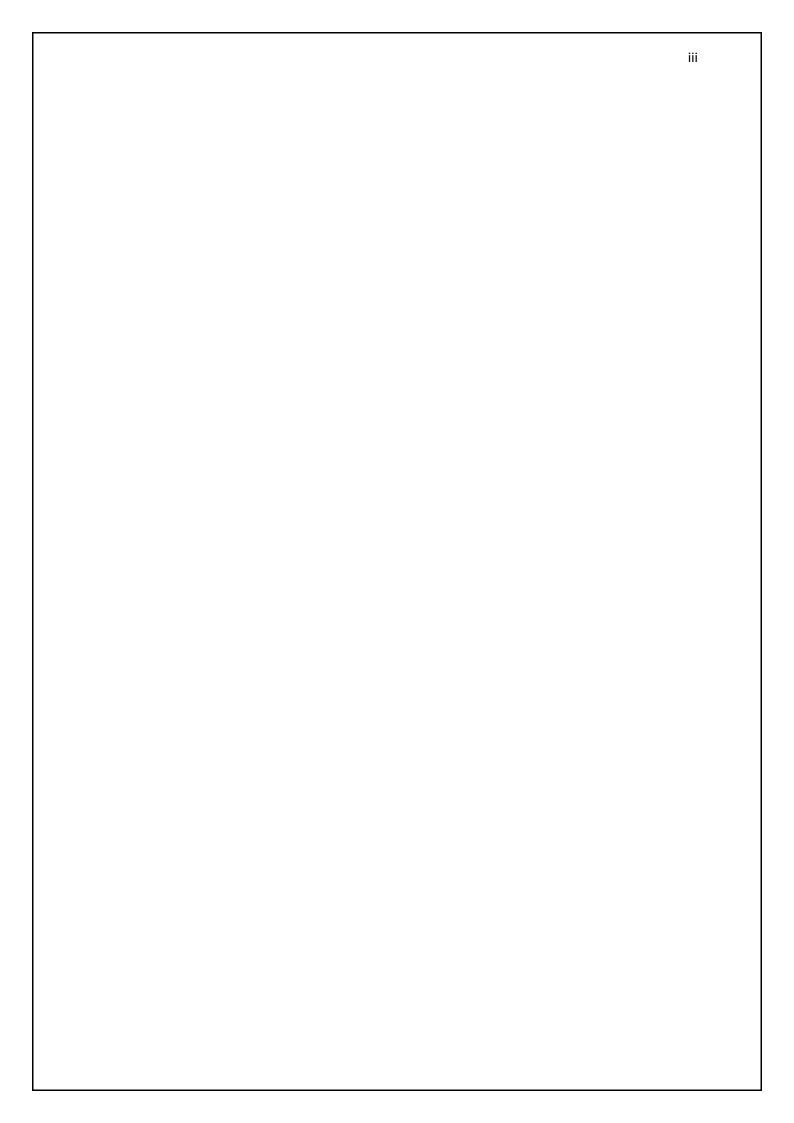Dr. Samreen Fahim Babar

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CERTIFICATE

We accept the work contained in report titled "Environmental Degradation in Asian Countries with the Impact of Economic Growth, Energy Consumption, Financial Development and Institutional Quality" written by Muhammad Ali Jan, Samman Mushtaq, Ansar Malik as a confirmation to the required standard for the partial fulfillment of the Degree of bachelors of Accounting and Finance.

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DEDICATION

We dedicate this project to GOD ALMIGHTY, our creator, our rock, our source of inspiration, Wit, Knowledge, and wisdom. He has been a tremendous source of strength for us throughout whole program, and we have now reached our goals, second we dedicate this to our parents and our instructors, since we here because of there prayers.

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First and for most, we are grateful to ALLAH ALMIGHTY for allowing all of us finish our assignments and reports successfully. Second, I'd want to express my heartfelt gratitude to everyone who offered me opportunity to complete our report. I extended my heartfelt gratitude to Sir Kamran Khan our final year project supervisor, Who's dedication to energizing ideas and providing assistance aided me in arranging my enterprise, notably in producing this report.

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Environmental degradation in Asian countries with the impact of economic growth, energy consumption, financial development and Institutional quality

Total 38 Asian nations were studied from 1985 to 2018 for their institutional quality, use of renewable energy sources, increase in GDP, use of electric power, and environmental deterioration. Using a combined middle group evaluator, researchers may examine the connection between factors. The variables in question can be employed in stationary and I (1) at the ARDL panel level, as shown by the Harris-Tzavalis and Levin-Lin-Chu tests. Using the Kao and Pedroni cointegration tests, we may conclude that the variables under discussion are interdependent. Examined were long-term findings of the Pool Mean Group. The long-term pool means group estimator found that energy use had a positive and substantial impact on environmental deterioration in the nations studied. An increase in energy usage of 1% translates in an annual rise in environmental deterioration of 0.821% in industrialized countries, according to the report. Economic development has a favorable and large impact on environmental deterioration in the nations studied by the ARDL long-term panel. Economic growth statistics show that a 1% rise in economic development generates an additional 1.592 billion us dollars in environmental damage per year in the sample nations. In the long term, economic expansion has a favorable and significant effect on environmental deterioration, while in the near term, this influence is non-significant and beneficial. A 0.0052 percent annual deterioration of an environment in the experimental economies is shown by the long-term PMG data, indicating a very little positive impact from an economy increases of 1 percent. A similar conclusion may be drawn from the latest economic growth studies. The ARDL technique was used by Khan et al. (2020a) to examine the impact of energy use and economic development on environmental deterioration in Pakistan. Pakistan's economic activities have a favorable impact on environmental deterioration, according to the conclusions of the study. Khan et al. (2019a, b) show that economic development has a favorable impact on environmental deterioration in Pakistan using the dynamic ARDL modelling

approach. They argued that EKC held true in the nations they studied because the favorable impact of increased economic development on environmental deterioration.

Economic growth has a favorable and considerable impact on environmental deterioration, according to the findings of the Autoregressive long-term panel. According to research on financial development, a one percent rise in financial growth results in environmental damage of around 0.4266 billion dollars annually in the nations examined. The PMG is better than the MG in terms of Hausman chi2 P value analysis. There is a statistically significant negative influence on environmental deterioration over time, but a good and non-significant effect of environmental degradation over time, according to the findings of the study Flow of fid into the nations studied minimize environmental deterioration by around 0.0049 % through time, according to the research. The findings of studies on the connection between FDI and environmental deterioration indicate to the need of taking action right once. Tax subsidies for sustainable energy projects are being advocated as a way for host nations to encourage international investment and combat environmental damage at the same time. An increase in environmental deterioration may be countered by FDI, say the authors.

According to IQ, the nations under examination have severe and unfavorable environmental deterioration. A 1% increase in IQ has been shown to reduce environmental deterioration by -1.761 percentage points in the nations investigated. Research on institutional quality shows that although it has a favorable and moderate effect on environmental deterioration in the panel nations' short term, it has a big and positive impact on the environmental deterioration in the long term. In the long term, a 1% increase in institutional quality leads the ecosystem to degrade by 0.0526 % each year. According to the findings of institutional quality, environmental laws are ineffective in the economies under study.

The short-term outcomes of the Pool mean group (PMG). As a result, short-term dynamics in the system may be explained by regressors and regressors' features, which show that divergence from equilibrium has an impact just on error correction model. According to the ECT findings, the nations under examination are experiencing unfavorable and significant environmental damage. The research also

shows that in the nations studied, a rise of 1 percent in the ECT decreases environmental deterioration by -0.498 each year. It is clear from the ARDL short-run panel data that energy use has a positive and considerable impact on environmental deterioration in the nations studied. According to energy usage data, a one percent increase in energy use generates 0.343 billion us dollars in environmental damage per year to nations in the sample. When it comes to environmental deterioration, the ARDL short-term panel found that growing economies had a major influence. According to Economic growth, a 1% rise in economic development harms the environment by $0.887 billion per annum in the nations examined. Economic growth has a positive and considerable impact on environmental deterioration in the nations evaluated by the ARDL short-run panel. A rise of 1 percent in a country's financial growth, according to the research, causes the environment to degrade by 1.948 years in the nations studied. The findings of Institutional Quality reveal that the nations under examination have been subjected to considerable environmental deterioration.

Keywords: Economic Growth, Financial Development, Environmental degradation, Institutional Quality.

CHAPTER 1

1. Introduction

Global warming threatens human development and survival by reducing food supplies, wiping out whole species, and intensifying already-existing extreme weather events. As a result of rapid economic growth and industrialization, climate change has become more catastrophic. The biosphere of the world, as well as the atmosphere, is under stress and in danger. 2.77 world hectares of ecological footprint per person was the worldwide average in 2017. (GFN, 2020). 1.73 square miles are required to sustain human's footprint if every person in that area lived as an ordinary person of that nation or region. Temperatures throughout the world are rising as a result of human-caused global warming. Global warming is being caused by an increase in the quantity of carbon dioxide (CO_2) released into the atmosphere. Carbon dioxide (CO_2) emissions have a negative impact on the natural world. To put it simply, carbon dioxide emissions account for 76.6 % of all developing nations' greenhouse emissions (IPCC 2014). It is the quality of institutions and financial development that define environmental quality. More efficient technology, research, and green money all contribute to environmental stability via policies aimed at attaining sustainable development Environmental quality may be improved by policies that focus on globalization and financial growth because of this. Globalization and financial growth in South Asia are examined in this research to enhance environmental quality in the long run. Increased industry and urbanization have resulted in an increase in energy consumption and transportation as a result of waste and pollution. One of the most serious concerns being debated in various political circles throughout the globe is the state of the environment. Carbon dioxide emissions are widely considered to be a significant human-caused contributor to the deterioration of the environment. Growth in both population and economy is strongly reliant on increased CO_2 emissions as per the Intergovernmental Panel on Climate Change (IPCC). More than three-quarters of global GHG emissions occurred between 1985 and 2020, mostly as a result of industrialization and the burning of waste fuels. Environmental economists suggested the environmental Kuznets curve, which is an inverted U-shaped relationship between environmental deterioration and economic advancement (ECC). Unsustainable industrial practices cause environmental deterioration in the early phases of economic growth, but this

degradation decreases as the country's wealth increases. The third stage of the ECC is characterized using cleaner production technologies, as well as a bigger transfer from industry to the service sector. International commerce, financial development, industrialization, and foreign direct investment are just a few of the economic factors that have been examined in depth considering the ECC hypothesis as a potential driver of both economic growth and environmental conservation (FDI). We can't, for example, ignore the importance of FDI in helping emerging nations succeed economically. Economic development can only be achieved via globalization (trade and FDI) if countries also industrialize and urbanise. Increasing industrialization and urbanization have a knock-on effect on energy and transportation costs. According to these research, financial growth has a negative impact on the environment for the following reasons. In the beginning, they emphasized the environmental effect of multilateral banks. Because of the World Bank's financial support process, they claimed, environmental issues might arise from borrowing money.

The flow of green technology and the stimulation of new research and development are two ways that financial development (FD) helps to enhance environmental quality (R&D). Investing in environmentally friendly technology has never been simpler because to financial progress. It is the goal of this research to examine the environmental effect of economic growth and globalization in South Asian countries. As far as we know, no prior research has looked at the combined effects of financial development and globalization on the example of Southeast Asian nations. "National loan by the finance industry, national loan to the private industry, and national loan to the private industry by banks" was utilized in this research instead of "private sector lending" in earlier studies. The following contributions to the body of knowledge are made as a result of this study.

The environmental requirement required for human survival has dropped as a result of IDP emissions. But this is taken to calculate the worth of economic expansion. Growth in the economy has a direct impact on environmental deterioration. In the last two decades, scholars have sought to develop models to analyses the relationship between economic advancement and environmental performance. Environment Kuznets curve (ECC) theory was first presented by Grossman and Krueger in their initial research to explain the connection among income and pollutants (1991, 1995). This hypothesis was proven to be valid.

1.1 Problem statement:

More research on the relationship between environment has been done in the last several decades, with the most recent of these studies concluding that financial deepening has progressed. Environmental quality is harmed as a result of increased financial activity, say this research. Multilateral banks' environmental impact was the first point of focus they made. Those in charge said the World Bank's financial support system often fails to consider the environmental consequences of the borrowed monies, resulting in major environmental issues. Renewable energy capital financing has exacerbated soil erosion in India, the Great Bereby rubber project has degraded tropical forest land, and the loss of micro-financed cotton growing area has made agricultural land unpredictable. As a second example, financial organizations may drive short-term aims while neglecting environmental risks, leading to a rise in natural resource extractions (Majeed and Mazhar 2019b). It's also worth noting that financial organizations give money to people who buy cars and other polluting devices that endure a long time (electrical and mechanical). As a result, loans might be used for activity that save money but raise emissions, which is why financial firms provide loan irrespective of how they are utilized. This encourages a rise in energy consumption and the usage of outmoded technology, which have a negative impact on the environment. the flow of green technology and the stimulation of new research and development are two ways that financial development (FD) helps to enhance environmental quality (R&D). Investing in environmentally friendly technology has never been simpler because to financial progress. While traditional energy sources like coal and oil are being phased out, renewables are being invested in more heavily. FD, on the other hand, may minimize capital risk and financial expenditures by increasing economic efficiency. Through increased banking, FDI inflows, and stock markets, FD provides cleaner technology and fosters R&D investment (Zhang 2011). There are several ways in which FD may benefit the environment, including the use of cutting-edge and environmentally friendly technology. Consumers will be encouraged to participate in environmentally friendly activities as a result of these energy-saving solutions. Moreover, as per Majeed (2016), the ultimate objective of any economy is to achieve the sustainable development goals, and financial deepening plays an important part here.) In order to reduce environmental stress, financial institutions fund energy-efficient technology and green activities as part of a concept known as "green financing." Other financial

instruments' interest rates A similar approach is used by financial organizations, which invest in the development of new energy sources with an eye toward sustainable agriculture. encourages the employment of environmental protection measures.

1.2 Research Objectives

In emerging countries, environmental degradation is an issue. However, environmental degradation should not be ignored when it comes to promoting economic growth via the usage of energy.

1.3 Research Significance

We find out that how energy correlates with growth in the economy, financial development, and the institutions quality. Ecological deterioration in wealthy nations has been linked to the use of non-renewable energy, the quality of the institutions that govern them, and economic growth. Energy usage, economic expansion, financial sector development, and an institutional quality model will all be assessed in this project to assist close the knowledge gap.

1.4 Questions related to the research

1) How does quantitative research method help you know more of about your environment?

2) How economic growth, energy consumption, financial development, and institutional quality effect on environment?

3) Role of CO2 emission on environmental degradation?

CHAPTER 2

2. Literature Review

In today's contemporary society, a natural healthy environment is essential for enhancing human well-being. Protecting environments is a top priority for governments and environmental authorities. Essential for economic growth, particularly in the case of mineral resources and residual fuels, natural resources are essential. Carbon dioxide (CO_2), a gas which absorbs radiant heat and is the principal contributor to the so-called "greenhouse effect," rises when fossil fuels are burned. Global CO_2 emissions have been a key contributor to environmental deterioration and climate change during the preceding four decades. There are now fewer than 10 percent of global CO_2 emissions coming from South Asian nations, but this figure is predicted to rise dramatically as these economies expand. Since climate change offers a substantial danger to human life, scientists are discovering more about CO_2 emissions. environmental deterioration and economic growth Growing industrial activity exacerbates pollution, and this is directly related to financial growth. But in the other hand, the air is cleaner in countries where the financial markets are well-developed.

Institutional quality - legal system, alienating risks, corruption, and organization and generally - is seldom recognized as a factor in environmental deterioration. When environmental regulations and laws are effectively implemented by government agencies, the standard of living increases.

Human and economic progress, as well as the influence of FD on the environment, depend on the financial sector's role in the economy. Some studies have produced mixed findings about the link among FD and environmental quality. The major indicators of FD are the amount of money invested as a percentage of GDP, the amount of liquid liabilities, and the amount of national lending to the private industry. Research reveals that FD contributes to environmental sustainability by minimizing waste and pollution. Global warming has been examined as part of BRICS efforts to reduce carbon emissions. They found that FD reduces carbon dioxide emissions, which is one way it helps the environment. FD and ecological deterioration were also shown to have a positive correlation. Carbon dioxide emissions in China are being moderated, according to FD. Studying the link among FD & ecological quality in 38 nations, Dogan and Sugar (2016) compiled their

findings. Because it minimizes environmental deterioration, they found that FD improves environmental quality using FMOLS and DOLS techniques. Recent decades have seen a flurry of research on the link between rising per capita income and environmental degradation. Several academics have used time series and panel data to investigate ECC's magnitude, composition, and technical effects. The scale impact shows that increased output in the beginning of the ECC curve reduces environment quality by increasing emissions of carbon and other greenhouse gases. The transition from manufacture to heavy industries, which happens in the second stage of development, causes severe environmental harm. Sector transformation promotes the subsequent use of cleaner technology to generate products and services, reducing pollution and loss. When evaluating ECC, it is possible to use a number of economic variables such as power usage and trade openness as well as financial sector development or total fixed capital creation. The environmental effect of foreign direct investment has been investigated by a number of scholars. FDI is polluting the environment, say these studies, as a result of environmental quality-degrading technologies. The dirty paradise theory describes this situation (PHH). As a result of foreign direct investment's "pollution halo hypothesis," a number of experts believe that clean technologies can be imported into the host country, thereby improving the environmental quality of the host country (Tamazian et al. 2009; Al-Mulali and Tang 2013, Hao and Liu 2015; Mert and Bölük 2016). Additional research, like Aliyu (2005) and Shaari et al. (2014), found conflicting findings. Trade liberalization, monetary growth, urbanisation, and energy usage are all factors that have a negative impact on the environment. On the other hand, the environmental footprint of South Asia has been positively impacted by globalization. In addition, South Asia's per-capita GDP and natural resources are among the highest in the world. As a result, political institutions' influence on environmental quality was understated in the prior research. In terms of environmental quality, there has been minimal research done on the role of institutions. The GDP-CO2 link and political institutions were examined in the most current research. FDI and institutional institutions in South Asian nations have not been studied in relation to environmental deterioration. These findings add to our understanding of how institutions and foreign direct investment (FDI) are contributing to environmental deterioration in South Asia.

2.1   Economic growth and environmental degradation

OECD nations' CO2 emissions converged when multiple energy sources were used, according to Acar and Lindmark (2017), a study (oil and coal). The research era was divided into two sub-periods by the authors. Energy security and Cold War strategic concerns dominated OECD oil policy at the beginning of this period. After that comes the implementation of policies to combat climate change in various OECD nations. Oil and coal act differently in the two subperiods of economic growth as a result of these contextual alterations. There are long-term equilibrium linkages between environmental deterioration, electricity consumption, economic development, and industrialization, according to Asumadu-Sarkodie & Owusu (2017a, 2017b). Electrical consumption and economic development both contribute 7-20 percent to environmental damage, as shown by the variance breakdown information. They hypothesized that Sierra Leone may avoid environmental damage in the future by using sustainable energy sources. Renewable biomass energy-consuming nations have a favorable effect on economic growth because of their use of nonrenewable biomass (2017). Using time series data and econometric analysis, Fan and Lei (2017) studied the links between environmental deterioration, transportation, and economic growth in Beijing from 1995 to 2014. Economic growth benefits from transportation and CO2 emissions, according to current estimates. Research variables were examined using Autoregressive Distributed Delay (ARDL) model, which was developed by b. According to estimates, Greece's CO2 emissions have decreased as a result of economic success, banking system expansion, international commerce, and tourist expenditure. A major part of Greek economic growth has long-term detrimental environmental impacts, they said in a statement. Since Greece's economy is heavily reliant on tourists, they urged it to take tourism's danger to the country's stability more seriously.

2.2   Energy consumption and environmental degradation

For economic advancement, energy cannot be understated. Renewable sources are the best long-term development option. For decades, researchers have studied the link between renewable energy and the energy environment. Earlier studies have established a connection between the use of renewable energy and reductions in carbon dioxide emissions (Sadorsky 2014). The author looked at data from 1994 to 2003 for 18 developing nations in a panel analysis. Long-term growth in the GDP

enhances the use of renewable energy sources, according to the researchers' findings. For OECD nations, Apergis and Payne (2014) studied the relationship among renewable power and CO2 emissions by analysing the data. The research found a long-term link between emissions of CO2 and the use of renewable energy. Renewable energy, economic development, and CO2 emissions in the Middle East and North Africa (MENA) area were studied by Sadorsky and Perry (2009) during a period from 1975 to 2008. Renewable energy, according to the findings of this panel study, is essential for both economic development and environmental protection. From 1971 to 2010, the BRICS countries' trade, GDP, renewables, and CO2 emissions were linked, according to Sebri and Ben-Salha (2014). Renewable and non - renewable energy use has been demonstrated to improve GDP in India and South Africa using the ARDL technique Furthermore, researchers have discovered a correlation between CO2 emissions and the use of renewable and non-renewable energy. CO2 emissions have been exacerbated using renewable energy. An investigation on the impact of poverty, environmental assets, GDP, and renewables in SAARC countries was conducted by Zeb and colleagues in 2014. In order to assess the long-term associations between calculated variables, cointegration tests were used.

2.3   Financial development and environmental degradation

Theory abounds about the relationship between financial progress and environmental indices. In order to keep manufacturing costs low and their goods more competitive, companies, according to researchers, must keep up with advances in technology and equipment. This can only be done if there is sufficient financial development to cover the costs. The government is encouraging environmentally friendly initiatives, renewable energy consumption, and industry-wide improvements in order to keep the environment from deteriorating. A very well financial sector may allow businesses to swiftly alleviate their financial limitations. Improved energy infrastructure and more funding for such projects are two ways governments may reduce pollution. Companies listed on a stock exchange are subject to regulatory oversight and are required to submit a range of information, particularly environmental data, on a regular basis. For a company to be considered trustworthy, it must first create and maintain a positive image or reputation. Ecological technology that reduces pollutants might assist accomplish this goal.

Environmental quality has a capitalization impact that is aided by financial development, and small businesses are aided by financial development in four main ways: capitalisation, technological advancement, revenue, and regulatory repercussions. Two advantages are pollutant reductions and economies of scale. Small-scale industrial growth is supported by the capital influence of technology, which requires both financial development and environmental advantages like pollution reduction and the promotion of scale economies. It is vital to promote ecologically friendly efforts by promoting more efficient industrial processes, which in turn minimise pollution via the influence of technology. In contrast, the provision of low-cost finance for technologically sophisticated enterprises may have a detrimental influence on environmental quality by increasing the consumption of natural resources. More efficient production methods minimise pollution, but financial development of technologically sophisticated enterprises that use more resources is likely to promote long-term growth in the economy, which may have a positive or negative influence. long-term effects negative implications on the natural environment Environmental standards allow companies to safeguard the environment while still obtaining external bank financing based on an environmental evaluation. That's what Adam and other people believe. It has a detrimental influence on the environment since it has a smaller scale impact but greater technical repercussions at the macro scale. As Saidi and Mbarek point out, economic growth has had a detrimental effect on pollution.

2.4   Institutional quality and environmental degradation

Institutional quality is becoming more important in maintaining the country's long-term survival, according to a growing body of studies. On the other hand, there is a lack of clarity in the empirical evidence about the connection between institutional excellence and environmental quality. According to Hassan et al. (2020) and Yamineva and Liu (2019), institutional quality has an impact on environmental degradation, although other research suggests that some aspects of institutional quality, including control of corruption and democracy, improve quality of the environment. The influence of institutional quality on CO2 emissions in 24 transition nations was researched by Tamazian and Bhaskara (2010), for example. They concluded that pollution reduced as a result of institutional quality. Institutional quality in Sub-Saharan Africa has been linked to environmental deterioration,

according to Abid (2016). CO_2 emissions in 38 African nations were lowered greatly by democracy and bureaucratic quality, as per Adams and Klobodu (2017) Dasgupta and De Cian, on the other side, blame institutions and management for environmental deterioration (2020). According to Hassan et al. (2020), environmental deterioration in Pakistan is caused by poor institutional quality.

CHAPTER 3

3. Research Methodology

3.1   Research Methodology and Data Source

Economic expansion, power consumption, financial sector development, and quality of institutions in 36 OECD nations from 1985 to 2020 will be examined in this research. The factors employed in this study were drawn from prior research. Using carbon dioxide emissions, Muhammad et al. (2021), Khan et al. (2019a, b), Khan et al. (2020a, b) and Destek and Aslan (2019) explored the impact of renewable energy consumption on the environmental degradation; as resulting from this investigation, the following simple equation is generated and launched.

$$Carbon\ Dioxide\ Emission_{it} =$$
$$\beta_0 + \beta_1 Financial\ devolpment_{it} + \beta_2 Electricity\ Consumption_{it} +$$
$$\beta_3 Economic\ Growth_{it} + \beta_4 Institutional\ Quality_{it} + \varepsilon_{it}$$

The letters t and I in the table below denote the years 1985 to 2020 and the 36 OECD countries. The stock market, renewable energy consumption, electricity consumption, economic growth, and institutional quality are considered dependent variables, while the stock market, renewable energy consumption, electricity consumption, economic growth, and institutional quality are considered independent variables.

Table 1   Variables Description

Variables	Description	Data Source
Carbon Dioxide Emission	Metric tons/Capita	OECD
Institutional Quality	Government stability, Democratic accountability, Bureaucratic quality, Corruption and finally law and order	ICRG
Financial Development	Domestic credit to private sector by banks (% of GDP)	WDI

Energy Consumption	Primary energy	WDI
	consumption per capita	
Economic Growth	GDP growth Annual %	WDI

3.2 Panel ARDL

This study's conclusions were examined utilizing balanced panel data for thirty-four years (t=1,2,3,4, ...34) and groupings of thirty-six countries (I=1,2,3,4, ...36). The Panel ARDL model's basic form (P, Q, Q....., Q1) is computed.

$$Carbon\ Dioxide\ Emission_{it}$$
$$= \sum_{j=1}^{P} \lambda_{ij} Carbon\ Dioxide\ Emission_{it-j} + \sum_{j=0}^{Q} \delta'_{ij} X_{it-j} + \mu_i$$
$$+ \varepsilon_{it}$$

2

There are four variables that make up the X vector in the above equation 2: (kx1). This section includes the control variables, the coefficient of the lagged regressor, which is carbon dioxide emissions, the scalars, and the (kx1) coefficients vector. If the dependent and independent variables are cointegrated, the error correction term is used. Based on cointegration properties of the variables utilized, a response to the long-term equilibrium deviation. Short-term fluctuations in independent and independent variables in the equation are identified by this feature's variables, which form an error correction model. Equation 2 may be used to obtain the following error-correction equation.

$$\Delta Carbon\ Dioxide\ Emission_{it}$$
$$= \emptyset_i(Carbon\ Dioxide\ Emission_{it-1} - \theta'_i X_{it})$$
$$+ \sum_{j=1}^{P-1} \lambda^*_{ij} \Delta Carbon\ Dioxide\ Emission_{it-1} + \sum_{j=0}^{Q-1} \delta'^*_{ij} \Delta X_{it-j} + \mu_i$$
$$+ \varepsilon_{it} \qquad\qquad (3)$$

In equation 3 $\emptyset_i = -\left(1 - \sum_{j=1}^{P} \lambda_{ij}\right), \theta_i = \sum_{j=0}^{Q} \frac{\delta_{ij}}{(1-\sum_k \lambda_{ik})}, \lambda^*_{ij} = -\sum_{m=j+1}^{P} \lambda_{im}$ $j = 1,2,3, ..., P-1, and\ \delta^*_{ij} = -\sum_{m=j+1}^{Q} \delta_{im}$ $j = 1,2,3, ..., Q-1$. $\emptyset_i$ Let us know

how quickly things are changing in Equation 3. Examining the _I=0 findings from the error correction period shows that there is no long-term link between both the dependent and independent variables. For long-run equilibrium variables in equation 3, error correction is important and negative, while equation 3's term' I reflect the long-run connection between dependents and independents, respectively.

$$\Delta Carbon\ Dioxide\ Emission_{it}$$
$$= \beta_0$$
$$+ \emptyset_{1,i}\big[Carbon\ Dioxide\ Emission_{it-1} - \theta'_{2,i}(Institutional\ Quality_{it}$$
$$+ Economic\ growth_{it} + Financial\ Development_{it} + Energy\ consumption_{it})\big]$$
$$+ \sum_{j=1}^{P-1} \lambda^*{}_{ij}\Delta Carbon\ Dioxide\ Emission_{it-1} + \sum_{j=0}^{Q-1} \delta'^*{}_{ij}\Delta Institutional\ Quality_{it-j}$$
$$+ \sum_{j=0}^{Q-1} \delta'^*{}_{ij}\Delta Financial\ Development_{it-j} \sum_{j=0}^{Q-1} \delta'^*{}_{ij}\Delta Economic\ growth_{it-j} \sum_{j=0}^{Q-1} \delta'^*{}_{ij}\Delta Energy\ con$$
$$+ \mu_i + \varepsilon_{it}\ (4)$$

The mean group (MG) estimator was developed by Pesaran and Smith (1995), in which all of the employed intercepted communications, slopes of the confidences of the variables, and, lastly, error variation are different across nations. The pooled mean group (PMG) estimator was developed by Pesaran et al. (1997, 1999) and connected the mean and pool characteristics together. Because of these differences, the long-run estimates are comparable across nations when using the Pooled Mean Group estimator. Study used the Pesaran CD test to look for cross-sectional dependencies (2004). As a result, the Harris–Tzavalis tests were used to verify stationarity. The Westerlund, Kao, and Pedroni cointegration tests, as suggested by Westerlund (2005), Kao (1999), and Pedroni (1999), were used to explore cointegration (1999). (Between 1999 and 2004) To select between the pooled mean group and Hausman's estimator of the mean group, the Hausman test is utilized (1978).

CHAPTER 4

4. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Carbon dioxide emission	798	689.228	1834.028	3.077	10667.890
Energy consumption	798	176.923	204.302	9.189	934.023
Economic growth	798	25.904	99.349	-36.658	671.631
Financial Development	798	171.633	3310.118	0.000	93021.000
Institutional Quality	798	3.050	1.696	0.000	6.000

Distinguishing statistical data may be found in Table 4. The mean, standard deviation, minimum, and maximum values of the variables are examined using descriptive statistics. The mean CO2 emissions are 689.228 metric tonnes, the standard deviation is 1834.028, and the lowest and greatest CO2 emissions are 3.077 and 10667.890 metric tonnes, respectively, according to descriptive statistics. The descriptive data shows that the average amount of energy used is 176.923 kWh, with a standard deviation of 204.302 kWh and values as low as 9.189 kWh and as high as 934.023 kWh.

With a mean of 25.904 and a standard deviation of 99.349, the descriptive statistic shows that economic growth has a range from -36.658 to 671.63 in extreme cases. There is an average value of 171.633, a standard deviation of 3310.118, and a minimum and maximum value of 0.0000 and 98021.000, according to the descriptive statistics. To summaries, the descriptive statistic shows that Institutional Quality has an average value of 3.050, a standard deviation of 1.696, as well as a zero-out and a maximum value of 0.000 and 6.000, respectively

4.1 CORELATION MATRIX

	C02	ENERGY~N	ECOGRO	FD	IQ
C02	1				
ENERGYCON	-0.0675	1			
ECOGRO	-0.0389	0.2281	1		
FD	0.3255	0.5174	0.6765	1	

IQ	0.0471	0.1024	-0.0837	0.1693	1

It's a tool for figuring out how one variable affects another. Environmental deterioration in Pakistan is negatively correlated with energy usage, according to correlation matrix data. According to these findings, Pakistan's economic growth and institutional quality are positively linked to pollution.

4.3   Panel Unit Test Levin–Lin–Chu

Variables	At Level	At Difference
Carbon Dioxide Emission	-1.1994(0.1152)	-5.9075(0.0000)
Energy Consumption	-4.9823(0.0032)	-7.3485(0.0000)
Economic Growth	-0.9726(0.1654)	-7.0039(0.0000)
Financial Development	-1.8023(0.8473)	-5.0912(0.0000)
Institutional Quality	-4.7683(0.0000)	-12.9081(0.0000)

The Levin–Lin–Chu findings for panel unit root rest are shown in Table 4.3 (2002). An evaluation of stationary variables is made possible by using the Levin–Lin–Chu unit root test (LLCT). According to the panel unit root test findings, carbon dioxide emissions and institutional quality are both stationary at the level and first difference, whereas energy usage, economic expansion, and financial development are not. Based on the panel unit root test findings, the Panels Auto regressive model is a feasible alternative for analyzing this data.

CHAPTER 5

5.RESULT INTERPERTATION

5.1 Kao Co-Integration Test

	Statistic	p-value
Modified Dickey-Fuller t	-0.3216	0.3739
Dickey-Fuller t	-2.3372	0.0097
Augmented Dickey-Fuller t	-2.4838	0.0065
Unadjusted modified Dickey-Fuller t	1.1615	0.1227
Unadjusted Dickey-Fuller t	-1.4787	0.0696

The Kao test is used to examine the cointegration of the variables under consideration. The Kao Cointegration test results suggest that the study variables have a long-term relationship based on the analysis P-value findings.

5.2 Pool Mean Group Long Run Results

	Coeff	St. Error	Z	P Value
Energy Consumption	0.821	0.108	7.580	0.000
Economic Growth	1.592	0.239	6.662	0.000
Financial Development	0.426	0.019	22.556	0.000
Institutional Quality	-1.761	0.402	-4.377	0.000

The long-run results of the Pool mean group are shown in Table 4.5. (PMG). According to the findings of the long run pool mean group estimator, energy consumption has a positive and significant effect on environmental degradation in the analyzed countries. According to the research, a 1% increase in energy use results in an annual increase in environmental degradation of 0.821 percent in industrialized nations. The study's results are similar to those of Khan et al (2019). Khan et al. (2019) evaluated the impact of macroeconomic variables and energy usage on environmental degradation in Pakistan using a dynamic ARDL simulation model. According to the research, energy consumption has a positive and significant impact on Pakistan's environmental degradation.

Global economic development has a major impact on environmental deterioration, according to the long-term ARDL panel's conclusions. Economic growth statistics

show that a 1% rise in economic development costs an additional 1.592 billion us dollars in environmental damage per year in the sample nations. In the long term, economic expansion has a favorable and major effect on environmental deterioration, while in the near term, this influence is non-significant and positive. An increase in economic activity of one percent generates an annual worsening of the environment in the sample economies, according to long-term PMG statistics. A similar conclusion may be drawn from the latest economic growth studies. Khan et al. (2020a) used the ARDL technique to study the impact of energy consumption and economic development on Pakistan's environmental deterioration. Pakistan's economic activities have a favorable impact on environmental deterioration, according to the conclusions of the study. Khan et al. (2019a, b) use dynamic ARDL modelling to show that economic expansion in Pakistan has a favorable impact on environmental deterioration. A favorable correlation between economic growth and environmental deterioration has been found in the economies of the nations studied by Alvarado et al. (2020).

Economic growth has a favorable and considerable impact on environmental deterioration, according to the findings of the ARDL long-term panel. According to research on financial development, a one percent rise in financial growth results in environmental damage of around 0.4266 billion dollars annually in the nations examined. The PMG is superior than the MG in terms of Hausman chi2 P value analysis. There is a statistically significant and negative influence on environmental deterioration over time, but a favorable and non-significant effect of environmental degradation over time, according to the findings of the study Foreign direct investment inflows into the nations studied minimize environmental deterioration by around 0.0049 percent over time, according to the research. The findings of studies on the connection between FDI and environmental deterioration indicate to the need of taking action right once. Tax subsidies for sustainable energy projects are being advocated as a way for host nations to encourage international investment and combat environmental damage at the same time. In contrast to our findings, those of Paramati et al (2016). An increase in environmental deterioration may be countered by FDI, say the authors. According to IQ, the nations under examination have severe and unfavorable environmental deterioration. A 1% increase in IQ has been shown to reduce environmental deterioration by -1.761 percentage points in the nations

investigated. Research on institutional quality shows that although it has a favorable and moderate impact on environmental deterioration in the panel nations' short term, it has a big and positive impact on the ecological degradation in the long term. In the long term, a 1% increase in institutional quality leads the environment to decline by 0.0526 percentage points every year. According to the findings of institutional quality, environmental laws are ineffective in the economies under study. Institutional quality is directly linked to commerce, according to Ibrahim and Law (2016). Ineffective institutions have a negative impact on the environment of the countries studied. Institutions, as according to Ali et al. (2019), prevent the economies under investigation from degrading their environment. In a second study, the authors Lau et al. (2014) and Al-mulali and Ozturk (2015) found that high-quality institutions reduce environmental deterioration. Institutional quality, say Tamazian and Rao (2010), is the most important factor in reducing environmental damage. Renewable energy utilization and institutional quality were examined by Bhattacharya et al. in a study of economic progress and environmental deterioration in numerous countries throughout the globe. They said that the quality of institutions had a favorable effect on economic growth, but a negative effect on environmental deterioration.

5.3 Pool Mean Group Short Run Results

	Coeff	St. Error	Z	P Value
Error correction term	-0.498	0.023	-21.291	0.000
Energy consumption	0.343	0.034	10.094	0.000
Economic growth	0.877	0.129	6.799	0.000
Financial development	1.948	0.590	3.302	0.002
Institution quality	-1.402	0.293	-4.786	0.000
Constant	0.811	0.394	2.059	0.048

Pool mean group (PMG) short run data are shown in Table 4.6. As a result, short-term dynamics in the system may be explained by regressors and regressors' features, which show that divergence from equilibrium has an impact on the error correction model. According to the ECT findings, the nations under examination are experiencing unfavorable and significant environmental damage. The research also

shows that in the nations studied, a rise of 1 percent in the ECT decreases environmental deterioration by -0.498 each year.

It is clear from the ARDL short-run panel data that energy use has a positive and considerable influence on environmental deterioration in the nations studied. In addition, data on energy usage shows that a 1% increase in energy use generates 0.343 billion USD in environmental impact in the sample nations per year. Environmental deterioration in the nations under consideration is lessened as a result of economic progress, according to the ARDL short-term panel's conclusions. A 1% rise in economic development generates an additional $0.8 billion in environmental damage per year, according to the Economic Growth study.

According to the ARDL short-term panel's findings, economic growth has a considerable and favorable impact on environmental deterioration in the nations under consideration. A rise of 1 percent in a country's financial growth, according to the research, causes the environment to degrade by 1.948 years in the nations studied. The findings of Institutional Quality reveal that the nations under examination have been subjected to considerable environmental deterioration. The data also shows that in the nations studied, a one percent improvement in institution quality decreases environmental deterioration by -1.402 each year. Research nations and environmental deterioration benefit from constant, according to the conclusions of the short-term panel ARDL. A 1% rise in Constant has been shown to produce 0.811 years of environmental impact in the nations analyzed.

CHAPTER 6

6. Limitations, Conclusion and Recommendation:

Food shortages, animal extinctions, and severe weather events are all become more likely as a result of climate change. Industrialization has had a devastating effect on the climate. The ecology of the world, not merely the environment. Developing nations confront the difficulty of environmental degradation. There is no avoiding the use of non-sustainable sources of energy for economic expansion, yet environmental degradation should not be ignored. This research will focus on energy consumption, economic growth, financial development, and the quality model for institutions. Energy consumption, economic growth, financial development, and institutional quality are all examined in this study.

Organizational quality, renewable energy utilization, economic development, and electricity consumption in 10 OECD nations were investigated throughout the period 1985 to 2020. Using a combination middle group evaluator, researchers may examine the connection between factors. These variables may be employed at the ARDL panel level using the Harris-Tzavalis and Levin–Lin–Chu tests, respectively. Using the Kao and Pedroni co - integration test, we may conclude that the factors under discussion are interdependent. The PMG evaluator, in contrast to the MG evaluator, is chosen based on the findings of the Hausman test. While renewable energy use has a detrimental influence on environmental degradation in panel nations, other factors, like foreign direct investment, electricity usage, economic growth and institutional quality have a beneficial effect. According to PMG assessors, globalization has a long-term detrimental effect on the environment. Environmental degradation in the countries studied can be reduced by using alternative clean energy sources for energy production rather than traditional clean energy sources such as coal, oil, and gas; environmental performance can be improved when compared to traditional clean energy production, such as coal, oil, and gas. It should be supported by both politicians and administrations. When environmental deterioration is considered, the effect of foreign direct investment (FDI) is substantial. From 1984 through 2019, we tracked GDP per capita, energy consumption per capita, and GDP per capita in India, Pakistan, Sri Lanka, and Bangladesh. One-of-a-kind environmental deterioration was measured using the ecological approach in this research. In order to solve the issue of cross-sectional

dependency, Pesaran and his colleagues developed a second-generation single root test to establish the integration order of the supplied variables (2001). The ARDL panel is used to investigate the long-term links between FDI, political institutions, and environmental footprints because variables have a mixed integration rule. Short and long-term data show that an environmental Kuznets curve (ECC) exists. Cleaner energy and more energy-efficient infrastructure are adopted as income levels rise, which shows that pollutants like carbon dioxide and Sulphur oxides are emitted into the atmosphere early in an expansion's life cycle. Today, no nation can function economically without energy, which has become a fundamental human requirement. Together Developing nations with well-established economies are finding it more difficult to achieve long-term economic growth. Countries in the developing world have to deal with issues related to energy and the environment. A number of methods are being developed to increase renewable energy consumption for profit as a result. In this sense, the study's goal is to analyses, among other things, the consequences of non-renewable and renewable energy. South Asian nations' CO_2 emissions are influenced by socioeconomic variables. They are being forced to increase their dependence on conventional energy sources, and they are experiencing instability in their political systems.

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