Impact of Globalization on Environment;

An Empirical Analysis for the Case of Developed And Developing

Countries.

By

SAMMIA KOUSAR

660-FE/MS/ECO/F20

International Institute of Islamic Economics (IIIE)

International Islamic University Islamabad, Pakistan

(2022)

TH 27028. M

MS
3 / 86

Globalgal of Environmental aspects

Environmental policy-

Developing

Appraisal - International

Comparative studies Environmental

Impact of Globalization on Environment;

An Empirical Analysis for the Case of DevelopedAnd Developing Countries.

Researchers	Supervisor
Sammia Kousar	Dr. Ayesha Naz
IIE660-FE/MS/ECO/F20	Assistant Professor, IIIE

International Institute of Islamic Economics (IIIE)

International Islamic University Islamabad, Pakistan

(2022)

بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيْمِ

"And be patient; verily, ALLAH loses not the reward of the good-

doers."

(Quran 11.115)

APPROVAL SHEET

Impact of Globalization on Environment:

An Empirical Analysis for the Case of Developed And Developing Countries.

by
SAMMIA KOUSAR

660-FE/MS/ECO/F20

Accepted by the International Institute of Islamic Economics, International Islamic

University, Islamabad, as partial fulfillment of the requirements for the award of degree
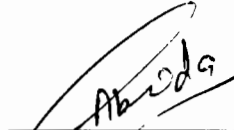
of MS in Economics and Finance.

Supervisor:

Dr. Ayesha Naz

Assistant Professor, (IIIE)

International Islamic University Islamabad
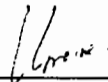
Internal Examiner:

Dr. Abida Yousaf
Lecturer, IIIE
International Islamic University, Islamabad
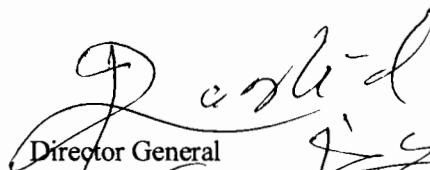
External Examiner:

Dr. Umaima Arif
Associate Professor
Quaid e Azam University, Islamabad

Incharge/ HOD
Department of Economics, Female campus
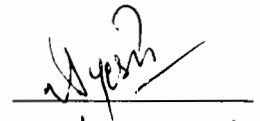International Islamic University, Islamabad

Director General
International Institute of Islamic Economics
International Islamic University, Islamabad

Certificate

The thesis entitled "**Impact of Globalization on Environment; An Empirical Analysis for the Case of Developed And Developing Countries** "submitted by Sammia Kousar is partial fulfillment for the degree of Master of Science in Economics has been completed under my guidance and supervision. It is certified that she has incorporated the necessary changes suggested by the Examiners during the Viva voice exam held on January 31,2023. Now this is ready for further process.

Dr. Ayesha Naz

Assistant. Professor, (IIIE)

A thesis submitted to Department of Economics,International Islamic University, Islamabad, as a partialfulfillmentof requirement forthe award ofthe Degreeof(MS Economics).

4
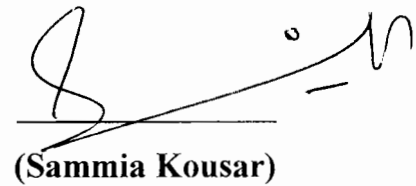
DEDICATION

For my mother (Farzana Kousar) and my son (Manraj), who taught me about

dreams and how to catch them...

DECLARATION

I hereby declare that the work present in the following thesis is my own effort,except where otherwise acknowledged and that the thesis is my own composition.Nopartofthethesishasbeenpreviouslypresentedforanyot herdegree.

Date 22/2/2023

(Sammia Kousar)

ACKNOWLEDGEMENT

Table of Contents

List of Figures

List of Tables

11

ABSTRACT

The goal of this study is to look at the impact of several aspects of globalization on the environment in 72 developing and 35 developed countries over the period from 1991 to 2021. Two models have been constructed to obtain the objectives of the study. Environment degradation is measured with the help of CO_2 emission. In model 1 overall globalization is used to determine its impact on environment.The results show that in case of full panel of 107 countries the overall globalization has adverse impact on environment degradation. In model 2 three major dimensions of globalization i.e. economic, social and political globalization is used to show the impact of each of dimensions on environment. The results of this model show in the case of full panel of 107 countries the economic and social globalization have favorable impact on environment degradation while political globalization has adverse impact on environment degradation.The results show that in case of 72 developing countries the overall globalization has favorable impact on environment while using the dimensions of globalization, economic and social globalization have favorable impact on environment degradation but political globalization has adverse impact on environment degradation.The results show that in case of 35 developed countries the overall globalization has favorable impact on environment degradation while using the dimensions of globalization, economic and political globalization has no impact on environmental quality while social globalization has favorable impact on environment degradation.

12

Chapter 1

Introduction

Globalization is the process of interaction and integration among people, companies, and governments worldwide or it is the free and frictionless flow of products, services, and people around the world. Globalization can also be defined as the effect of the openness of global economy resulting increase in cross-national trade. In other words, the world's economies become more interconnected and integrated asa result of higher international investment(Fernando, 2021).

Environment means the locality or a condition in which humans,animal or plants live andoperate. The extreme rise in environmental pollution in recent decades has been attributed to manufacturing activities due to increased energy consumption and economic expansion. As a result, several countries have begun to look for other ways to reduce pollution without jeopardizing their economic structures. Despite rising renewable energy consumption, which is the most popular choice in this direction, worldwide environmental pollution has not been decreased to the necessary levels. Therefore, determining the causes of carbon emissions is critical for both selecting key policies for achieving sustainable goals and monitoring the effectiveness of policies that have already been implemented (Timmons et al. 2016). In this study the issue of globalization has been taken to determine its impact on environment. Globalization has increased the scale of international trade; flow of goods and services has significantly increased during the last few decades. On one side globalization is stimulating higher growth through higher production, while on the other side it has negative consequences on environment (Destek, 2019).

13

The world's economies have benefited from globalization. One of its benefits is an increase in product quality due to global rivalry. It also has provided jobs in both developed and developing countries, as well as aided in the rapid and effective dissemination of knowledge to everybody. Although globalization has helped many countries to flourish economically but many individuals believe it has also negative impact on the world economies. Globalization, according to environmentalists, is bad for our mother earth. They claim that globalization raises the amount of economic activity such as production, which leads to increase in environmental degradation. The integration of economies is blamed for climate change, pollution, deforestation, and other environmental issues (Timmons et al. 2016).

It's vital to note that globalization isn't the underlying cause of environmental degradation, but the government's ineffective policies and control strategies are important in determining environmental externalities. In this regard, government fails to regulate corporations' polluting action. Moreover, property rights alone are not able to prevent the exploitation of environmentalassets. It is argued thatglobalization generates more wealth that can be used to improve the environment. Free trade generates cash for countries, which can be used to embrace new ways and technologies to address environmental issues. Globalization also facilitates the movement of environmentally friendly goods between countries. Hence, globalization is not the main cause of environmental pollution and can be used to benefit environment (Ahad et al. 2016).

Globalization began at the start of human history and is divided into three different phases. The first phase is recorded between early human history and 1600s, whereas the second phase which is also known as early modern globalization is calculated between 1600s to 1800s. The period after the 1800s is referred to as modern age of

14

globalization, which is also the fastest and the most impactful time in history of globalization. Commercial trade lines, migration, military conquest, and exploratory expeditions were the beginnings. Globalization accelerated with technical breakthroughs in transportation and communication, especially in the second half of the twentieth century. Since then, global trade has increased at such a rapid rate that the term "globalization" has become widely used. Globalization makes it easier for people from all backgrounds to come together. When people band together, they have more power. Instead of deforestation, they can assist in the establishment of nature reserves (Destek, 2019).

More communities have access to more essentials as a result of globalization. They may now obtain previously unattainable goods, medications, and other necessities, such as coffee, which is thought to have originated in Ethiopia and is now enjoyed throughout the Arab world. Despite this, it is currently renowned as a worldwide consumed commodity because of commercial traders after 11th century.

Globalization encourages large-scale industrial production, which contributes to issues such as climate change. Milder winters may result from climate change, which may reduce the number of people dying from cold-related illnesses (Solar, 2018). The transfer of raw materials and foodstuffs from one location to another has increased dramatically as a result of globalization. Because of the amount of fuel utilized in the transportation of these goods, levels of pollution in the environment, such as air and noise pollution, have increased. Transportation also puts a burden on renewable energy sources. It has depleted ozone layer as a result of the gases generated by planes and ships used for transportation. There has been a rise in waste materials as a result of rising globalization rates. These pollutants, which contain a variety of hazardous chemicals and radioactive materials are disposed off in freshwater resources and the

15

ocean. By messing with flora and fauna's genetic makeup, toxic waste has caused a huge damage (Adkar, 2015). Many undersea animals and corals have died as a result of this trash discharged into the oceans. It has also put a strain on food production and land resources. Mountains are also being carved out to make room for tunnels and motorways. New buildings have also been constructed across large areas. Last but not least, the global distribution of commodities is causing a significant waste problem because a large amount of plastic is utilized to carry these raw materials. Plastic is extremely detrimental to our environment because it is non-biodegradable (Adkar, 2015).

Therefore, it is important to study the relationship between globalization and the environment.The aim of this study is to determine the impact of globalization on the environment in 35 developed and 72 developing countries from 1991 to 2021.

1.1. Importance of Study:

Today's environmental problems are mostly the result of human actions. Pollution and resource depletion have resulted in a loss of wildness, ecological degradation, and climate change, as well as a decline in plant and animal biodiversity (Solar, 2018). Major environmental challenges are jeopardizing the planet's future as a result of this catastrophe. Technology is currently helpless to save the earth. Environmental deterioration caused by technology is a problem in practically all industrialized and emerging economies across the world. Huge amounts of money have already been spent to enhance the quality of the environment, with more to come. This study examines the dimensions of globalization that are hazardous to the environment.

16

Furthermore, it will provide policymakers with the most relevant information regarding the impact of globalization on the environment.

1.2. Literature Gap:

The empirical studies that investigate the association between globalization and the environment are continuing to occupy the literature. These studies have generated different conflicting views. Some studies suggest globalization has a positive influence on the environment, whereas some others argue that globalization has negatively associated with the environment. According to Khan et al. (2019) power consumption, financial development, foreign investment, economic globalization, social globalization, and political globalization all have a favourable effect on environment. However, Xue et al. (2021) concluded that globalization has a detrimental influence on CO_2 and nitrogen oxide emissions. Lee et al. (2021) explain that over the last few years, globalization and population expansion have placed a significant strain on the environment, and global warming has exacerbated the negative consequences.

Current study deviates from the existing literature in following ways. First, the study investigates the relationship between different types of globalization and the environment. Limited literature is available that establishes the relationship between globalization and the environment, particularly in the case of developed and developing economies. Most of the frequent literature uses the overall globalization index in the analysis. However, in the current study different dimensions have been taken into account to establish the relationship between globalization and the environment. Second, the current study adds to the existing literature by providing theoretical and empirical analysis in view of globalization and environment in

developed and developing countries. Third, this study provides policy insight related to the environment and globalization and its dimensions. Moreover, this study uses the most recent data available for 35 developed and 72 developing countries, covering the period from 1991 to 2021. Finally, this study provides empirical results related to the effects of the dimensions of globalization on the environment.

1.3. Research Objectives:

The objective of the study is to find,

1. The effect of overall globalization on environment.

2. The effect of economic, social and political globalization on environment.

3. Provide empirical evidence of globalization and its dimensions on 72 developing and 35 developed countries.

1.4. Research Questions:

1. What is the impact of overall globalization on environment?

2. What is the impact of economic globalization on environment?

3. What is the impact of social globalization on environment?

4. What is the impact of political globalization on environment?

1.5. Organization of the Study:

The study consists of 6 chapters. The first chapter briefly discusses the introduction, importance, and link between globalization and the environment. In chapter 2nd, we will discuss review of literature. In the 3rd chapter, we will discuss theoretical framework and variable construction. Chapter four is about the model specification,

empirical estimation method, and data description and in chapter 5th, we will presents

results and discussions. Last chapter presents the conclusion and policy suggestions.

Chapter 2

Literature Review

Literature Review is divided in two sections. First section is regarding Environmental Issues due to globalization and second section is Empirical Studies on the issues of globalization on environment.

2.1   Environmental Issues

There are several threats that our environment is facing today. Different aspects of the environment are being adversely affected simultaneously by population explosion, deforestation, lack of waste management, and a lot of other factors that are also adversely affecting the environment at the same time (Solar 2018).Environmental issues are affecting the entire population living on this planet. Therefore, it is important to understand the magnitude and complexity of this issue.

The environmental protection of the USA has broken down these threats into four major areas. There are distinct facets to each of these four key environmental concerns. The four major areas of environmental issues are presented in Figure 3.1.
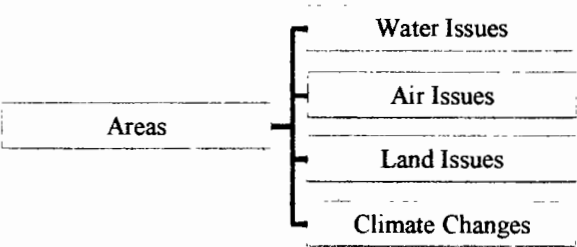
Our way of life has been significantly impacted by globalization. It has given rise some of the most cutting-edge technology and innovations.It has prospered economies and it has opened up vast avenues. Additionally, it is playing an important role in motivating employees from all countries. However, globalization has also raised several concerns, the most notable of which is the impact on the environment. Globalization has resulted in an increase in product consumption, which has an impact on the ecological cycle, as increasing consumption leads to an increase in product production. As a result, the environment is under strain. Globalization has resulted in an expansion in the transportation industry, therefore, increasing pollutants in the environment. Globalization has various environmental consequences, such as water pollution, air pollution, land pollution, climate change, noise pollution, solid waste, deforestation, global warming and acid rain (Adkar 2015).Each of the environmental issues are discussed below.

2.1.1 Water Pollution:

Water pollution occurs when pollutants are released in water, making them unfit for human consumption and disrupting aquatic ecosystem. Raw sewage, petroleum, and disease-causing bacteria are just a few of the toxins that can pollute water(Hua et al. 2015).

The water industry has been impacted by globalization trends, the most notable of which is that it has become significantly more open to strong competition as well as external influences. Since 1997, there has been an increase in the amount of activity surrounding water privatization. Even though water privatization has taken place in

every region of the world, the majority of it has taken place in the regions of Latin America, Asia, and the Pacific Basin.

The privatization of formerly public assets results in an increase in sales revenue and operational efficiency, both of which contribute to the new owners' financial success while also generating profits for the privatizers. Water is recognized by many businesses as a lucrative investment opportunity due to its status as a fundamental component of contemporary life. The public sector's historical fiscal mismanagement, which resulted in the provision of public water services by the private sector, has, in many locations, increased the attractiveness of privatization. On the other hand, those who are involved with the responsibility of huge private corporations, the requirements of the poor for basic services, and the integrity of the environment have voiced their opposition to the privatization of water services.

Free trade policies have an impact, as well, on the nation's water supply. The promotion of economic expansion in tandem with improvements in people's general levels of well-being is the stated objective of free trade. Deregulation is frequently implied as well, and the presence of environmental externalities can exacerbate existing environmental problems. Environmental issues can be made worse by environmental externalities.

The authority that free trade agreements bestow upon corporations may have an impact on the capacity of nation-states to control the quality of the environment over which they have regulatory authority. This worry is made worse by the fact that most countries around the world have environmental laws and enforcement actions that are not very strict (Frankel 2003).

According to Adkar (2015), industrial waste has destroyed and deposited various harmful substances into the water, depleting the ozone layer and increasing the greenhouse effect. The availability of water on the planet is one of our primary environmental problems. Our water is constantly being polluted, and drinking water is in short supply in many regions of the world. There are various types of water pollution. It includes point source pollution,nonpoint source pollution,surface water pollution,andground pollution. The sources and effects of water pollution are shown in Figures 2.1.2and Figure 2.1.3.
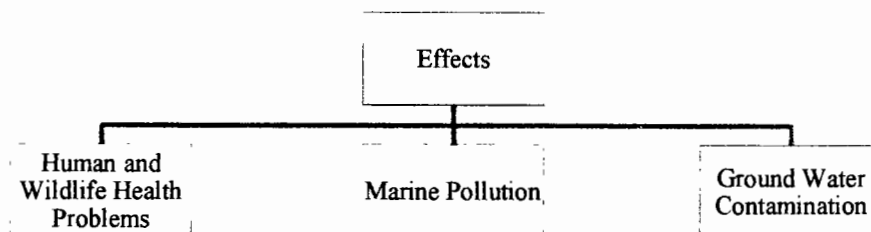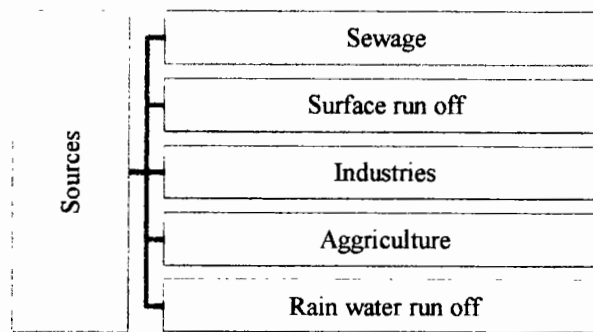
2.1.2   Acid Rain:

Chemical waste from factories is released into waterways as a way of disposing off it. This water evaporates and forms clouds; the rain that comes down contains these chemicals. This is called acid rain. It is very harmful to crops and buildings. As a

result of the growing processes of industrialization, urbanization, and globalization, global warming, water pollution, acid rain, toxic waste, smog, ozone layer depletion, species extinction, and desertification all pose long-term dangers to our human society (Gang 2018).

In today's modern and globalized world, one of the most significant environmental issues is the damaging impact of acid rain, which is considered to be among the most major problems. The effects of pollution have reached dramatic proportions, particularly in industrialized nations, and are having a negative impact on global ecology. In the vast majority of countries across the globe, it has developed into a significant regional ecological issue. Recently, there has been an increase in the level of concern on a global scale regarding acid rain as a result of global ecological pollution. This pollution includes the killing of fish, the death of forests, the death of ponds and other marshes, and the destruction of monuments and other historical artefacts. In addition, acid rain can cause a variety of health issues in the human body, including irritations to the eyes, nose, and throat, as well as lung disorders like dry coughs, breathing problems, headaches, and bronchitis. These issues can be caused by acid rain. The primary contributors to acid rain are an abnormally high concentration of sulphur dioxide and nitrogen oxide in the water that falls as precipitation. Human activities, such as the combustion of coal in thermal power stations, combustible wastes, automobiles, and aeroplanes, have all contributed to an increase in the emissions of these gases into the atmosphere, which has led to a subsequent increase in the concentration of these gases in the atmosphere. Some of the more developed nations in the world have implemented policies to cut back on the emissions of carbon dioxide that are responsible for acid rain. It is needed to ascertain the causes of acid rain as well as the strategies that can be used to control it in order to reduce its

occurrence and protect the planet from its harmful effects. In the interest of protecting the environment on a global scale, measures have been taken in this area to cut down on the amount of acid rain (Mohajan, 2019).

Various studies have shown that globalization is increasing environmental degradation. Different causes and effects of acid rain are shown in Figures 2.1.4 and Figure 2.1.5.

```
                    ┌─────────────┐
                    │  Causes     │
                    └──────┬──────┘
          ┌────────────────┴────────────────┐
   ┌──────┴──────┐                    ┌──────┴──────┐
   │ Air Pollution │                  │   Carbon    │
   └─────────────┘                    └─────────────┘
```

```
                    ─────────────
                       Effects
          ┌────────────────┼────────────────┐
   ┌──────┴──────┐  ┌──────┴──────┐   ┌──────┴──────┐
   │Forest Sheets│  │  Buildings  │   │   Water     │
   │             │  │             │   │  Pollution  │
   └─────────────┘  └─────────────┘   └─────────────┘
```
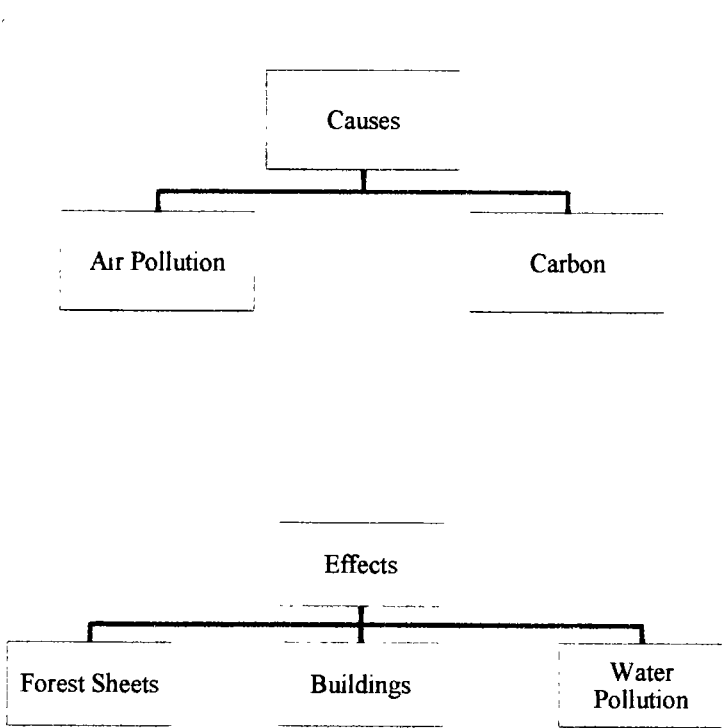
2.1.3   Air Pollution:

Air pollution is the second most serious hazard to the environment. It is a combination of gases and particles that can accumulate to dangerous levels both outside in the environment and inside in the buildings(WHO, 2021). According to the World Health Organization (2021), around 4.2 million people died every year as a result of indoor air pollution, while 3.8 million died people every year as a result of outdoor air pollution. Trade activities raise global carbon dioxide emissions, and pollution levels

have increased as a result of greater production levels, particularly in developing countries with reasonably high emission intensities(Lane 2015).

Activists have tried to point out that globalization has resulted in an increase in the use of goods, which has had an impact on the ecological cycle. An increase in consumption results in a rise in the manufacture of commodities, which in turn places additional strain on the environment. Additionally, globalization has contributed to an increase in the movement of unprocessed materials as well as food from one location to another. In the past, people consumed food that was grown in their immediate vicinity. However, as a result of globalization, people now consume products that were developed in countries outside of their own. The quantity of gas that is used to transport these products has contributed to a rise in the quantity of pollution that is present in the environment. It has also resulted in a number of additional environmental concerns, such as an increase in noise pollution and an invasion of the landscape. Gasoline is one example of a nonrenewable source of energy that has been negatively impacted as a result of the increased demand brought on by the transportation sector. In addition to contributing to the intensification of the greenhouse effect, the gases that are released into the atmosphere as a result of the operation of aircraft have been found to be responsible for the destruction of the ozone layer. Ships have been loaded with the manufacturing waste that is produced as a byproduct of production, and then those ships have dumped the waste in the ocean. This has resulted in the deaths of a great number of marine organisms and the introduction of a great number of chemicals that are hazardous to marine life. The damage done to the ecosystem by the oil that splashed from one of the leakage cartons of British Petroleum in 2010 is just one example of the threat that globalization poses

to the environment. Globalization can also lead to the loss of different kinds of life, which is another example (Mehmod et al. 2020).

Air pollution is really not considered a primary environmental concernbecause it does not pose an immediate or pressing threat. However, a thorough examination reveals that air pollution causes a slew of health issues as well as disrupts the natural ecosystem. As a result, it is critical that we take prompt steps to avoid or limit air pollution. Different sources of air pollution are shown in Figure 2.1.6 and Figure 2.1.7.

Valcano Eruptions	Gases	Forest Fires	Combustion
	Exhaust from Industries	Mining Operations	

Smog	Respiratory and Heart Problems	Child Health Problems	Global Warming
	Acid Rain	Depletion of the Ozone Layer	
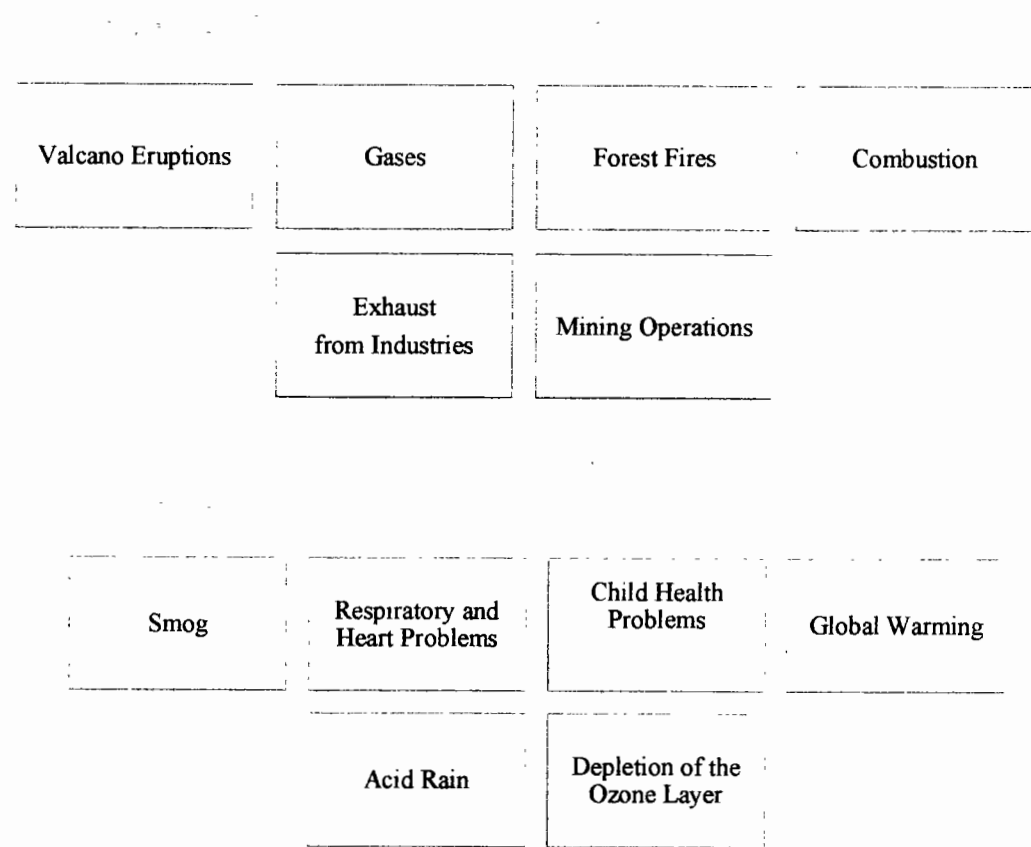
2.1.4 Land Pollution:

Land pollution is the contamination of soil (the topmost layer of the earth's crust), which lowers soil quality and makes it uninhabitable for organisms. According to Xue et al. (2021), increased human interference has led to serious environmental

27

challenges such as pollution, climate change, land degradation, and species extinction; all of which have a direct effect on the environment's sustainability and quality.

As a result of globalization and industrialization, various chemicals have been introduced into the soil, resulting in the emergence of a variety of noxious plants. This hazardous waste has caused a great deal of damage by tampering with plants genetic make-up. Toxic trash, such as electronics and hazardous substances, is disposed off in vast quantities at landfills. This will undoubtedly have an adverse effect on the environment, as it will pollute the area and take up valuable land space (Adkar 2015). Different sources and effects of land pollution are shown in Figures 2.1.8 and Figure 2.1.9.

```
                          ┌──────────────┐
                          │   Sources    │
                          └──────┬───────┘
        ┌──────────────┬─────────┴────────┬──────────────┐
┌───────────────┐ ┌──────────────┐ ┌────────────┐ ┌──────────────┐
│  Aggriculture │ │    Mining    │ │ Population │ │   Sewage     │
│ and Industrial│ │  Activities  │ │            │ │  Treatment   │
│   Activities  │ │              │ │            │ │              │
└───────────────┘ └──────────────┘ └────────────┘ └──────────────┘
```

```
                          ┌──────────────┐
                          │   Effects    │
                          └──────┬───────┘
        ┌──────────────┬─────────┴────────┬──────────────┐
┌───────────────┐ ┌──────────────┐ ┌────────────┐ ┌──────────────┐
│     Soil      │ │    Health    │ │   Damage   │ │    Water     │
│   Pollution   │ │   Problems   │ │  Wild Life │ │  Pollution   │
└───────────────┘ └──────────────┘ └────────────┘ └──────────────┘
```
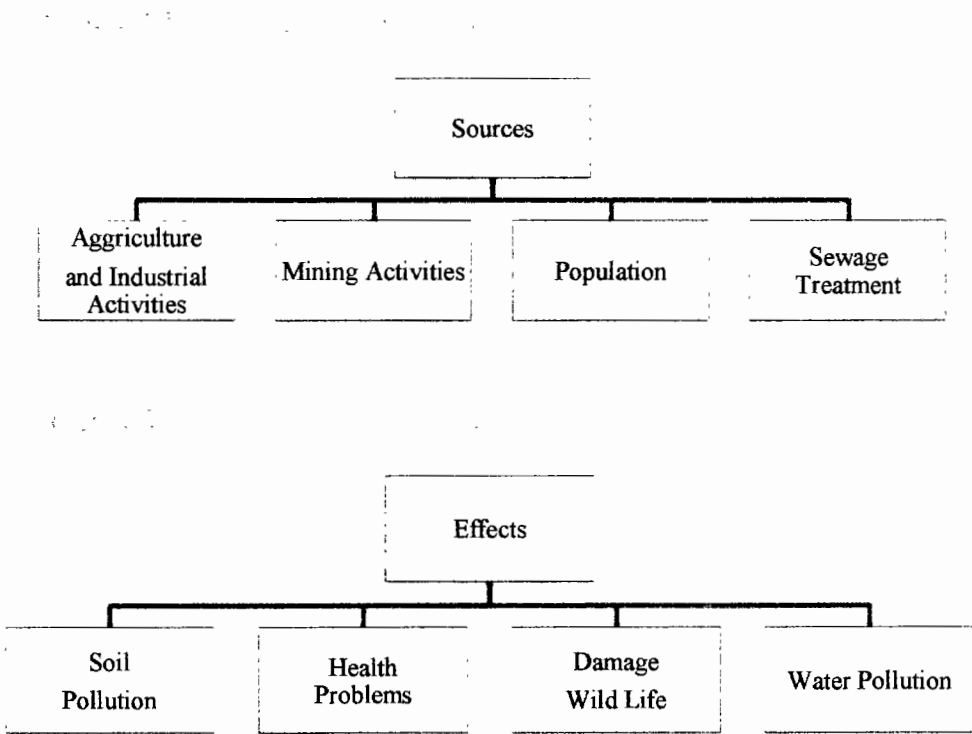
2.1.5 Climate Change:

Solar (2018) explainedclimate change is an inherent risk that could have irreversible consequences.All types of pollutions, such as, water, air and land plus the increasing

28

generation waste can lead to one of the major significant threats for environment which is climate change.

Climate change is critical because it can create havoc in different parts of the world. Climate change is causing floods and hurricanes in different parts of the world. Global warming is also a byproduct of this change in climate. If this continues in the long run, we might not see civilization in the form that we see today. The increase in carbon dioxide emissions is believed to be related to human activity. Industrialization is brought about by globalization, and as a result of industrial activities, various environmental concerns have arisen, such as deforestation and biodiversity degradation. The most common reason for climate change is the greenhouse effect. Co2 and other GHG (Green House Gases) levels in the atmosphere have risen as a result of increased transportation. GHG emission has increased by 86 percent between 1994 and 2004. During 2005 and 2007, 500 new airplanes were ordered by Indian airlines. In India, coal and oil are still extensively used to generate electricity (Adkar 2015). Different causes and effects of climate change are described in Figures 2.1.10 and Figure 2.1.11.

Greenhouse Gases	Agriulture	Human Activity	Livestock Farming	Solar Activity

Extreme Weather	Rise in Sea Temperatures	Negative Impact of Ecosystem	Shrinking of Ice Sheets	Ocean Acidification
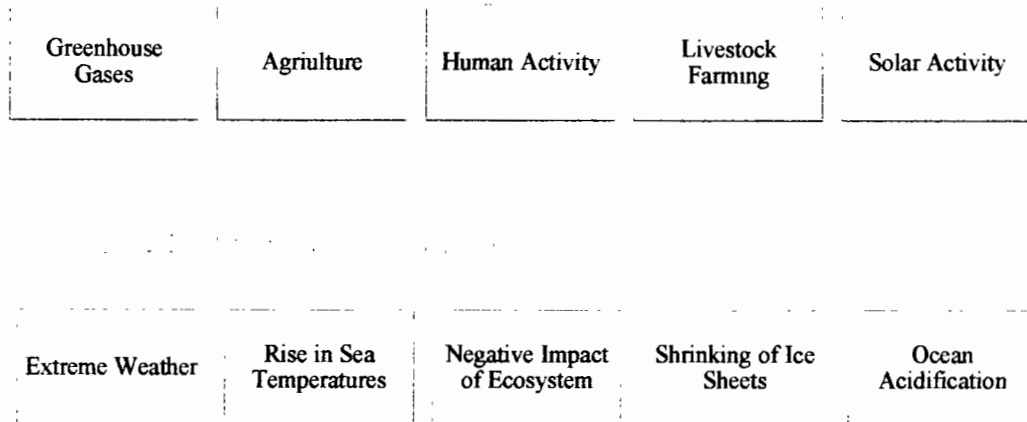
2.1.6 Global Warming:

Global warming has now become a big global issue. In recent years, we have also begun to feel its impact. Global warming refers to a rise in the earth's average temperature. Since the commencement of the industrial revolution, the earth's average temperature has been steadily rising. Every decade since 1960 has been hotter than the one before it, and the global temperature continues to rise. If greenhouse gas emissions continue to rise at their current rate, the average temperature of the Earth is expected to rise by 1.5-5.5 degrees Celsius by 2050. Even if the more conservative estimate were used, the world's average temperature would still be higher than it has been in the past 10,000 years.

The volume of water in the oceans increases as the average temperature of the Earth rises. According to current projections, a 3 degree Celsius increase in average air temperature will cause a 0.2-1.5 meter rise in global sea level within the next 50-100 years. A further elevation of the sea level can be expected as a direct result of the melting of glaciers and ice sheets in the Polar Regions brought on by warming. This

will not only disrupt several spawning areas that are commercially significant, but will also likely increase the frequency of storms that cause harm to lagoons, coastal areas, and coral reefs. The Lakshadweep Islands, which are in India and don't rise more than 4 meters above sea level, may be in a dangerous situation.

Rainfall patterns would change in many different locations as a result of global warming, which would have an effect on the transmission of vector-borne diseases like malaria, giardiasis, and elephantiasis, amongst others. It's possible that places that are free of diseases like dengue fever, schistosomiasis, and others could become breeding grounds for disease-carrying vectors. The countries of Egypt, Africa, and Indonesia are likely to be impacted as a result of this. The reproduction of disease-spreading insects, such as insect vectors, snails, and other invertebrates, would be helped along by warmer temperatures and an increase in the amount of water that is allowed to stand still. When high temperatures and high humidity come together, they will make breathing and skin problems worse, making them even harder to deal with.

On the subject of how the effects of global warming will be felt in the agricultural industry, there are many different points of view. It is unknown whether it will have a positive or negative effect on the crops grown in the various regions of the world. The tropical and subtropical areas will be more severely impacted by this phenomenon due to the fact that their average temperatures are already quite high. Even a temperature increase of just 2 degrees Celsius might be catastrophic for crops. As a result of an increase in evapotranspiration, the moisture content of the soil will decrease, which poses a significant risk to the amount of wheat and maize that can be harvested. The expansion of disease vectors and the number of insects that carry diseases will be encouraged by increases in temperature and humidity. Invasive species will be better

31

able to adjust to these shifts in the environment than crops will be. In order for plants to better adapt to the shifting environment, breeds that are more resistant to drought, heat, and various kinds of pests have been created (Huppert 2006).

Lane (2015) explained that the globalization process, which has shaped advances in human societies over the previous decades, will be replaced by the climate change process, which no country can avoid. It entails a slew of massive forces reshaping the world's environment, economy, and politics. It is thought that the process of change can be slowed down by preventing the increase in greenhouse gases, which would result in a 2 degree increase in average global temperature. This is a dangerous mirage, fuelled by numerous governments' promises to do something about energy emissions in the future. Global warming is now being driven by the most powerful forces on the planet, notably mankind's lifestyle, resulting in an ever-increasing loss of environmental capital. There is a lot of rhetoric about generating carbon-neutral economic development, but the worldwide truth is that greenhouse gas emissions are increasing day by day. Different causes and effects of global warming are described in Figures 2.1.12 and Figure 2.1.13.
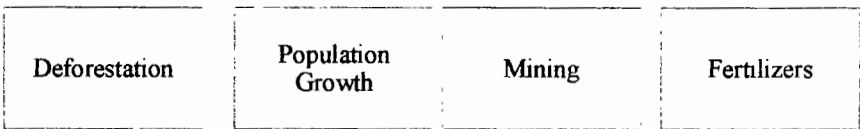
| Deforestation | Population Growth | Mining | Fertilizers |

| Carbon Increse | Seasonal Change | Skin Disease | Disasters | Sea Level Increse |
| Polar Ice Sheet Decrease | Food Chain | Wetlands Decresed | Mangrores Decresed | Coral Breaching |

2.1.7 Noise Pollution:

Sound is measured in decibel. A decibel value above 80 is considered to be noise pollution(Jain, 2016).Adkar (2015) explained that increase in fuel consumption have resulted in higher pollution.Because of the amount of gasoline used to transport these items, pollution levels have risen.It also resulted in a plethora of other environmental challenges, including noise pollution and changes in land usage.According to the findings of Adkar (2015) noise pollution in the environment, and more specifically noise from road traffic, continues to be a significant environmental issue that negatively contributes to the health and well-being of millions around the world across Europe. Twenty percent of the population of Europe is subjected to noise levels that, when experienced over the course of a long period of time, can be detrimental to their health. This equates to even more than 100 million people living in Europe as a whole. The study also shows that policy objectives regarding environmental noise have still not been achieved to this point. In point of fact, it is highly improbable that the percentage of people exposed to sounds will actually reduce in the future due to the continued growth of urban areas and the increased demand for mobility. This is based on our projections. Different causes and effects of noise pollution are shown in Figures 2.1.14 and Figure 2.1.15.

33

```
                    ┌─────────────┐
                    │   Causes    │
                    └──────┬──────┘
        ┌──────────────────┼──────────────────┐
┌───────────────┐  ┌───────────────┐  ┌───────────────┐
│Transport Noise│  │Industrial Noise│  │Domestic Noise │
└───────────────┘  └───────────────┘  └───────────────┘
```

```
                    ┌─────────────┐
                    │   Effects   │
                    └──────┬──────┘
        ┌──────────────────┼──────────────────┐
┌───────────────┐  ┌───────────────┐  ┌───────────────┐
│   Deafness    │  │   Annoying    │  │  Ill Temper   │
└───────────────┘  └───────────────┘  └───────────────┘
```
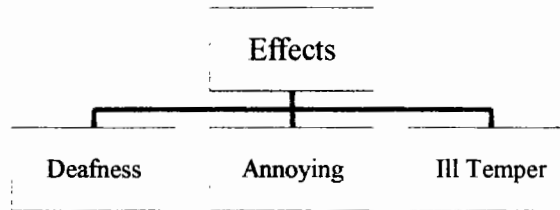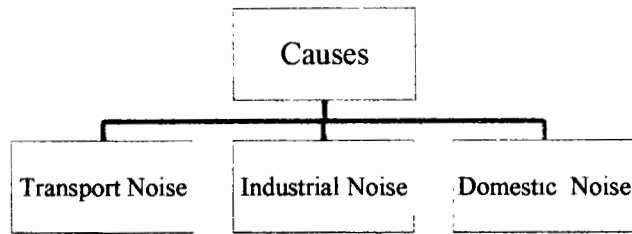
2.1.8   Solid Waste:

Solid waste refers to undesirable or unusable solid items produced by human activity in residential, industrial, or commercial areas (Chadar, 2017). Pollution is primarily caused by plastic. Plastic is a huge harmful contaminant because it is a non-biodegradable substance. However it is extremely useful for packaging and keeping items that are to be exported.Globalization has caused many environmental changes in the world that it is impossible to reverse them (Adkar 2015).There are various types of noise pollution. It includes residential, industrial, municipal and agricultural. The effects of solid waste are described inFigure 2.1.16 and Figure 2.1.17.

```
┌───────────────┐ ┌───────────────┐ ┌───────────────┐ ┌─────────────────┐ ┌───────────────┐
│               │ │               │ │               │ │Construction and │ │               │
│Rsidential Waste│ │  Commercial   │ │  Agricultura  │ │   Demolition    │ │   Biomedical  │
│               │ │     Waste      │ │     Waste     │ │      Waste      │ │     Waste     │
└───────────────┘ └───────────────┘ └───────────────┘ └─────────────────┘ └───────────────┘
```

```
                    ┌──────────────┐
                    │   Effects    │
                    └──────┬───────┘
        ┌──────────────────┼──────────────────┐
┌────────────────┐ ┌────────────────┐ ┌────────────────┐
│ Water Pollution│ │  Air Pollution │ │ Land Pollution │
└────────────────┘ └────────────────┘ └────────────────┘
```
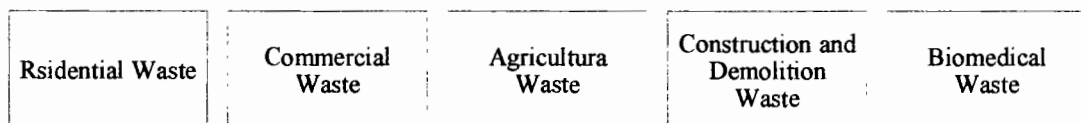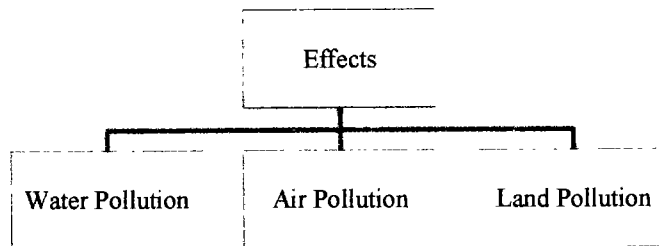
2.1.9 Deforestation:

Deforestation occurs when trees are cut down to a great extent for logging, construction, housing, and furnishings, as well as for usage as a fuel source.Deforestation is a severe environmental concern that causes to biodiversity loss, soil erosion, and global warming, among many other things. Africa has lost a significant amount of forested land over the last half-centurydue to changing economic structures, rising population, and expanding globalization (Lane, 2015).Different causes and effects are shown in Figure 2.1.18 and Figure 2.1.19.

Urbanization	Industries	Minning	Population Increase	Aggriculture	Fuel Woods
Cultivation On Hill Slopes	Overgrazing	Forest Fires	Insufficient Afforestation	Cash Crop	
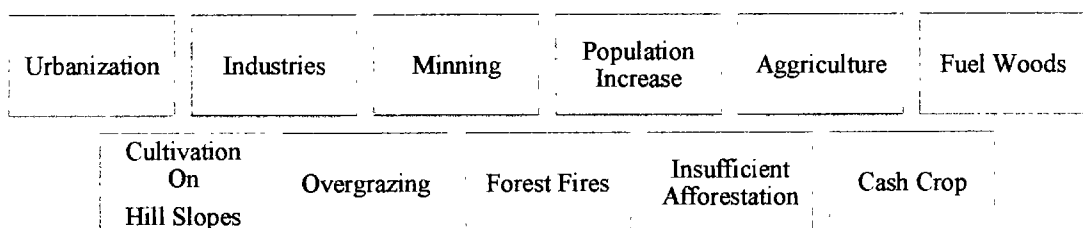
Global Warming	Erosion	Increse Floods	Reduce Biodiversity	Increse GHS Emission	Air Pollution

All the environmental challenges are the major concern of developed and developing economies. It is important to take initiatives to curtail the negative consequences of human activities. Efforts are required not only at individual level but also at collective level to prevent the environment.

2.2   Empirical Studies

Previous research has shown the impact of various factors on environment but recently the focus has shifted on the impact of globalization on environment. However, there is little research that takes the effects of globalization indices on the ecosystem. For this reason, we divided the literary component into two sections. In the first part, we examine relevant literature that has used different indicators and proxies of globalization in order to determine the link between globalization and pollution. In the second section, we look at research that has used the globalization index to examine the impact of globalization on the environment.

Adkar (2015) explained that globalization has influenced our way of life in profound ways. It has resulted in the most cutting-edge technology and new ideas. It has economic success and has opened up broad channels of commerce, in addition to playing a vital role in connecting people from different cultures together. Globalization has also raised several concerns, the most significant of which is its influence on the environment. Globalization has resulted in greater product

36

consumption, which has had an impact on the ecological cycle; higher consumption leads to increased production. As a result, the environment is under strain. As a result of globalization, the transportation sector has grown, resulting in hazardous pollution in the environment. Other environmental effects of globalization include noise pollution and landscape incursion, including the degradation of the ozone layer as a result of different gases. Globalization also affects industry, increasing chemical waste and having a negative impact on the environment.

Bakirtas and Cetin (2017) used foreign investment (FDI), as an indicator of globalization. The study found that FDI reduces carbon emissions in MIKTA nations. Alternatively, Behera and Dash (2017) claimed that increased FDI raises carbon emissions, because the entrance of FDI will cause serious environmental pollution in the host countries and worsen their environment. Furthermore, Ali et al. (2017) and Park et al. (2018) discovered thatcarbon emissions are reduced as a result of financial progress, but Amri (2018) argued that financial development increases environmental pollution, because goods production and consumption have the potential to deplete resources and pollute the environment. Solar (2018) explained that climate change is an inherent risk that could have irreversible consequences. Pollution of water, air, and land plus increasing generation waste can lead to one of the most significant threats to environment, which is climate change. According to the Destek (2019) findings, increasing economic and social globalization will raise carbon emissions, whereas political globalization will reduce pollution.

According to the findings explored by Jahanger (2022), financial development and consumption of renewable energy significantly reduce environmental deterioration. On the other hand, other potential factors such as globalization, economic expansion, and non-renewable energy contribute to higher environmental degradation. Also, the

37

growth of the economy is helped by both nonrenewable and renewable sources of energy, natural resources, globalization, and financial development.

Kalayc1 et al. (2019), highlighted that economic globalization is gaining attraction and has brought environmental concerns. Higher levels of production, particularly in developing nations that have relatively high emission intensities, will raise global carbon dioxide emissions and air pollution under the trade scenario (Lin et al. 2019). The findings of Emmanuel et al. (2020) revealed that trade, transportation (export and import), energy use, and economic expansion are contributing to environmental degradation in Africa over time.

According to Xue et al. (2021), globalization has a negative impact on CO2 and nitrogen oxide emissions. The recent work of Rehman et al. (2021) demonstrated that globalization has aided numerous technological developments, connecting people all around the world and propelling us into the contemporary economic system. However, the poor impact of globalization on biodiversity can be effortlessly overlooked in the face of speedy economic growth and industrialization. Pollutants, global warming and weather-altering globalization are an irrefutable aspect of planet's devastation. Environmental pollution is a new problem that contributes to weather changing due to greenhouse fuel line emissions. A good way to stimulate economic growth is to enforce modern regulations to make sure that CO2 emissions are reduced.

According to Tsurumi (2014), increased trade openness leads to more deforestation. Xue et al. (2021) said widespread human meddling has resulted in severe environmental issues such as pollution, global warming, land degradation, and biodiversity loss, all of which have a direct impact on the environments and ecosystem's sustainability and quality. As was stated by Ajanaku (2021), deforestation

is a major environmental issue that contributes to biodiversity loss, land degradation, soil depletion, and global warming.

There are also contrasting results when it comes to social globalization. Ozcan and Apergis (2018)discovered that using the internet reduces carbon pollution. On the other hand, Salahuddin et al. (2016) came to the conclusion that internet use is bad for the environment. Park et al. (2018) confirmed thattelecommunications and information technology, including the internet has rising environmental degradation.

Furthermore, De Vita et al. (2015) discovered that tourism payments or tourist arrivals increase carbon emissions in Turkey. Unlike this study, Dogan et al. (2017) concluded that boosting tourism reduces carbon emissions in OECD countries. According to Zhao et al. (2018), tourism is the world's largest industry. The impact of tourism on the environment is continually emerging, both in negative and positive elements, as the industry continues to grow. The environment is harmed by tourism because of transportation, tourist attractions, and tourist hotels. Dogan and Aslan (2017) supported that tourism has a favourable impact on environmental quality.

In the case of political globalization,it appears that some researchers tracked environmental policy agreements using the Climate Agreement as a dummy variable. Grunewald (2016) discovered that Kyoto Protocol reduced carbon emissions in 170 nations. Similarly, Bozkurt and Okumuş (2017) agreed that Kyoto Protocol cuts carbon pollution in 33 nations.

In the second part of the literature, we evaluate past studies that look into the association between the globalization index and carbon dioxide emissions. For instance, Shahbaz et al. (2013) used the ARDL bound test to investigate the impact of

real income, energy consumption, and the overall globalization index on carbon dioxide emissions in Turkey over the period of 1970 to 2010. The findings suggest that growing globalization reduces carbon emissions. Khan et al. (2019) explained that energy consumption, financial development, trade, foreign direct investment, economic globalization, social globalization and political globalization have positive impact on CO_2 emissions in Pakistan.

Leito (2014) conducted an analysis that used the VECM Granger causality method to determine the extent to which greenhouse gases, real income, energy consumption, the utilization of alternative energy sources, and globalization were all linked in Portugal from 1970 to 2010. There isn't much of an effect that globalization has on carbon emissions. Destek and Ozsoy (2015) evaluated the relationship between Turkey's Gross Domestic Product (GDP) growth, energy consumption, urbanization, the Economic Globalization Index, and greenhouse gases between the years 1970 and 2010. They used both an ARDL bound test and an asymmetrical causality method in their investigation. The data indicates that economic globalization results in lower levels of carbon emissions. The ARDL bound test was utilized by Shahbaz et al. (2016) in order to investigate the impact that GDP growth, energy intensity, and globalization on carbon dioxide emissions in 19 African nations between the years 1971 and 2012. According to the findings of the study, globalization leads to a reduction in the amount of carbon pollution in Angola, the Congo Republic, Libya, Tunis, and Zambia, while it leads to an increase in the amount of pollution in Egypt, Morocco, South Africa, Sudan, and Tanzania.

Shahbaz et al. (2017) looked at the relationship between globalization and carbon emissions in 25 developed nations from 1970 to 2014 using the Conventional

Correlated effect-mean set estimator. The study discovered evidence that globalization increases carbon emissions. Shahbaz et al. (2017) also examined Japan's data from 1970 to 2014 to observe whether or not there is a correlation between real income, energy consumption, globalization, and carbon emissions. According to the results of the non-linear ARDL test, there is a link between globalization and pollution.

In addition, research is being done to investigate the effect of different types of globalization on pollution. For example, Shahbaz et al. (2015) used the ARDL bound test to evaluate the impact of globalization in general, as well as economic, social, and political globalization indices, on carbon pollution in India between the years 1970 and 2012. According to the research results, economic globalization results in lower levels of carbon emissions. On the other hand, globalization in all of its forms—including overall globalization, social globalization, and political globalization—increases pollution. The ARDL bound test approach was utilized by Shahbaz et al. (2017) in order to investigate the impact that the overall globalization index, in addition to economic, social, and political globalization, had on carbon pollution in China between the years 1970 and 2012. According to the findings of various pieces of research, the state of the environment tends to get better as globalization indexes rise. Xu et al. (2018) examined the effects of global, economic, social, and political globalization indices on carbon pollution in Saudi Arabia between the years 1971 and 2016 by employing the ARDL bound test as their primary method of data analysis. They came to the conclusion that globalization of the economy causes carbon emissions, but globalization of the political and social spheres doesn't hurt the planet.**Conclusion:**

In a nutshell, previous studies have looked at the effects of globalization on different economies by using either a single indicator of globalization or a composite index. However, the results are not conclusive. Some country specific cases are showing favorable effect of globalization on environment while others have shown beneficial effect of globalization on environment. In this study, large sample size of developed and developing countries has selected to provide fresh evidence on the impact of globalization on environment.

Chapter3

Theoretical Framework

There are three major dimensions of globalization, i.e., economic globalization, social globalization and political globalization.All the three types of globalization is effecting environment in developed and developing economies. For instance, economic globalization is affecting environment through trade, investment and more production. The higher economic integration can be viewed as a threat to environment in terms of more carbon emission due to more production but at the same time collaborative efforts can lessen the effects of environmental degradation. Similarly, social globalization is causing environmental issues through tourism, internet usage and free movement of people across globe. Political globalization also has its direct and indirect impact on environment through different environmental agreements. Each dimension differs in its effect on the environment through various direct and indirect channels. Figure 4.1 shows the different dimensions of globalization and their impact on the environment. Multiple indicators are used to define economic, political, and social globalization. The impact of each of the dimensions is discussed in the subsequent sections.

Figure 4.1 Relationship between Different Dimensions of Globalization and Economic Space: Author's construction

43
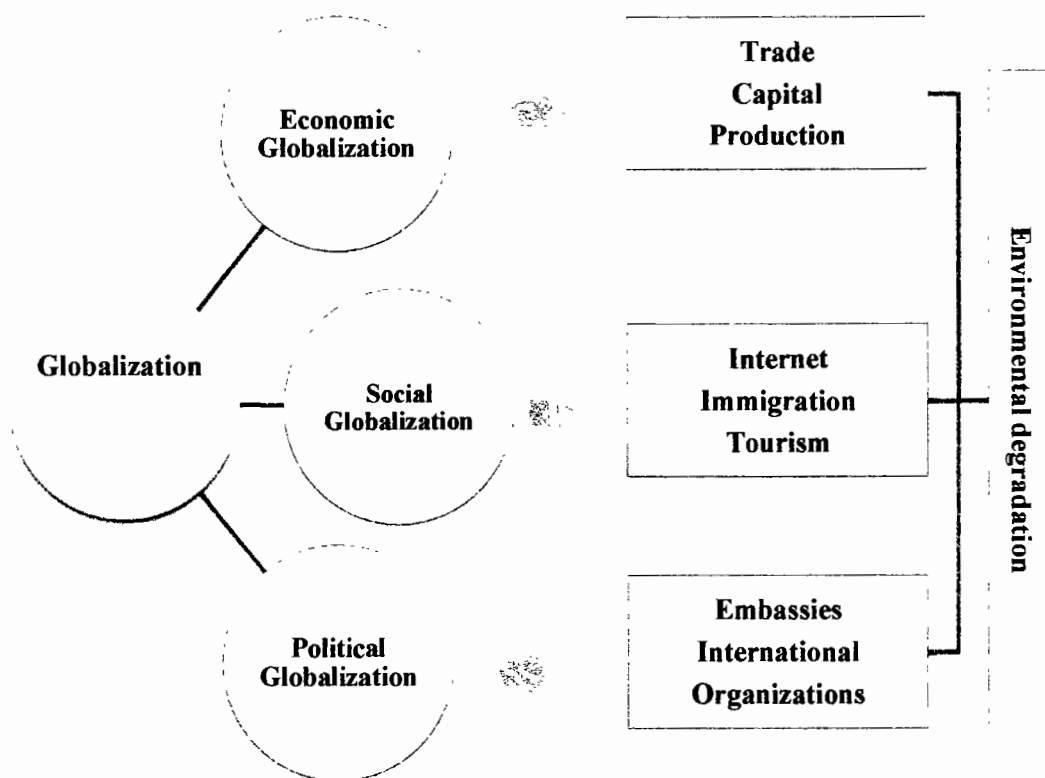
3.1 Effect of Economic Globalizationon Environment:

The growth of trade, transportation, and communications networks on a worldwide scale is referred to as economic globalization (ETH Zurich database). The indicators which are used to define the aspects of economic globalization include trade production, corporation capital, labor services, and direct investment.

In both rich and developing countries, the impact of commerce on environmental quality is always equivocal. It takes a long time to see how commerce affects ecosystems. This mostly supports the idea that trade is bad(Lukman O Oyelami, 2019). Behera and Dash (2017) claimed that increased FDI raises carbon emission;because the entrance of FDI will cause serious environmental pollution in the host countries and worsen their environment.

44

Kalaycl et al. (2019), highlighted that economic globalization is gaining attraction and has brought environmental concerns. Higher levels of production, particularly in developing nations that have relatively high emission intensities, will raise global carbon dioxide emissions and air pollution under the trade scenario (Lin et al. 2019). The findings of Emmanuel et al. (2020) revealed that trade; transportation (export and import), energy use, and economic expansion are contributing to environmental degradation in Africa over time.

The term "globalization" is also referred to the process of bringing people together from all over the world. It is used in economics to describe the process by which firms, organizations, and countries come to operate on a worldwide scale (Wang et al. (219). Globalization is most commonly associated with economics, but it also has an impact on politics and culture. Globalization has been demonstrated to improve living standards in developing countries in general, but other analysts warn that it may have a negative impact on local or growing economies, as well as individual employees (Wang et al. (219).

Wang et al. (2019) explained thateconomic globalization helps undeveloped regions to develop economically, but it also has an impact on their natural surroundings, such as forest deterioration. According to a land use transfer matrix analysis, Laos had a huge conversion of 14.43 percent of forest land to plantation forest, as well as a degradation of 5.94 percent of forest land to shrub land and grassland during 2000 to 2017. Landscape pattern analysis revealed that these alterations were the primary cause of ecological patch fragmentation, which resulted in biodiversity loss. Furthermore, topographic studiesrevealed that forest area degradation occurred primarily in high-altitude and large-slope areas, thus increasing the risk of natural disasters like floods. Even though Laos is an interior developing country, combining

45

analyses with data on exports and imports reveals that economic globalization has a substantial impact on the country's ecological environment.

3.2 Effect of Social Globalization on Environment:

Social globalization is the exchange of knowledge and thoughts between and even across countries. The indicators which are used to define the aspect of social globalization include tourism, internet, immigration, culture etc (ETH Zurich database).

There are also discrepancies in the outcomes of social globalization indicators. For example, Ozcan (2018) discovered that increased internet usage lowers carbon pollution;However, Salahuddin et al. (2016) found that internet use has a negative impact on environmental quality.Park et al. (2018) confirmed that technology of information and communication, including the internet, has a rising impact on environmental degradation.De Vita et al. (2015) discovered that tourism payments or tourist arrivals increase carbon emissions in Turkey. Therefore, social globalization contributes in CO_2 emissions.

International immigrants'CO_2 footprint has increased from 1.8 Gt in 1995 to 2.9 Gt in 2015. In 2015, international immigrants were responsible for the highest overall per capitaCO_2 emissions (Liang, 2020).

3.3 Effects of Political Globalization on Environment:

Political globalization is defined as the spread of government policies and is assessed by the numbers of embassies, participation in international organizations, and membership in UN summits, as well as international treaties among two or more countries (ETH Zurich database).In the context of political globalization, several

46

researchers appear to have used the Climate Accord as a dummy variable to assess environmental agreements. The reducing emissions effect of the Kyoto Protocol was discovered by Grunewald and Martinez (2016) for 170 countries. In a study that was identical to this one. Bozkurt and Okumuş (2017) found that the Kyoto Protocol reduces carbon emissions in 33 countries.

It can be concluded that all the three types of globalization areaffecting environment in developed and developing economies.Multiple indicators are used to define economic, political, and social globalization.

Chapter4

Methodology, Model and Variables

The main purpose of this study is to analyze the relationship between globalization and the environment. In this section, models construction are discussed to examine the nexus among different dimensions of globalization and the environment.

4.1 Econometric Model:

In this section Model 1 is constructed to observe the impact of overall globalization on environment.

Model 1: $Environment = f(Globalization)$

$$CO_{2it} = \alpha_0 + \alpha_1 Globalization_{it} + \alpha_2 X_{it} + \mu_{it} \qquad \text{Eq 1}$$

In equation (1)CO_2emission is used to measure environment degradationand globalization is referred as overall globalization that include three indices (economic, social and political globalization).It is a composite index constructed by using various indicators of economic, social and political aspect. This index is obtained from Zurich database. We are using CO_2 to measure environment degradation because it is the most dominant factor. X shows set of control variables. Control variables are GDP, population and inflation.In model 2; we have used different dimensions of globalization (economic, social and political globalization). This model is constructed to examine the impact of each of the dimensions of globalization on environment.

$CO_2 = f[Eco.\ Globalization,\ Political\ Globalization,\ Social\ Globalizaion]$

Model 2: $CO_2 = \alpha_0 + \alpha_1 Eco_{it} + \alpha_2 Pol_{it} + \alpha_3 Soc_{it} + \alpha_4 X_{1it} + \mu_{it} \qquad \text{Eq.2}$

48

In model 2 'Eco' shows economic globalization, 'Pol' shows political globalization and 'Soc' shows the social globalization.

4.2 Estimation Technique:

In this study we will followthe standard panel data estimation procedure.

4.2.1 Stationary of Data:

It is a preliminary step to check the stationarity of the data for the variables under consideration. The stationarity of the data describes that mean and the variance being the same, while the non-stationarity of the data describes that mean and the variance being different (Dickey, Fuller, W.A. 1979).However, it is possible that panel data will suffer from the problem of spurious regression; therefore, it is recommended that the data be checked for stationarity. Further, if the problem of heterogeneity persists, it can also be resolved by generating the. pool. If the problem of spurious regression occurs, then we assume that the estimated coefficients do not meet the assumption of blue properties. The following hypothesis will be tested in the panel data for the stationarity of the variables.

H0 – the panel set contains the unit root. (It means the data is non-stationarity)

H1 ·· the panel set do not contain the unit root. (It means the data is stationarity)

4.2.2 Panel Unit Root Tests:

For each individual series in a panel, most panel unit root tests are designed to test the null hypothesis of a unit root.Due to the availability of fresh datasets with the same order of time series and cross-section dimension, substantial research has been done on unit roots and cointegration in data sets using integrated time series over the previous decade. The examination of this unusual panel data set necessitates the use of novel methodologies. Two generations of tests have been developed in the panel

49

unit root test framework: a first generation (Levin, Lin, and Chu test (2002); Im, Pesaran, and Shin test (2003); and Fisher-type tests) for whom the main limit is the implication of cross-sectional independence along all units; and a second generation (Levin, Lin, and Chu test (2002); Im, Pesaran, and Shin test (2003); and Fisher-type tests) that denies the cross-sectional independence hypothesis.

The economic theory for dealing with panel data was primarily created for data sets with a small number of time series observations (T) but a large number of individuals or groups (N). In this example, the asymptotic statistics theory was developed by letting N for fixed T rather than by letting T for fixed N, as in time series analysis.

Nonetheless, over the last two decades, a wide range of new data sets have been developed and are now available electronically (e.g. the Penn World Tables by Summer and Heston, 1991). One of the most notable characteristics of these sets of data is that T and N are occasionally of identical magnitudes. Understanding the consequences of this trait for theories and empirical studies is critical for economists working with this type of data. As a result, the number of articles on unit roots as well as cointegration in panels of data with integral time series has increased dramatically in recent years.

The Levin, Lin, and Chu's test (2002), Im, Pesaran, and Shin (2003), and the Fisher-type analysis presented by Maddala and Wu (1999) and improved by Choi (2003) are among the first group of tests (2001). The main problem with these analyses is that they all assume that the different time periods in the panels are cross-sectionally independent. However, a lot of research shows that economic variables move together(Barbieri, 2006).

4.2.3 Pedroni's Cointegration Test:

Pedroni (1999, 2004) suggested seven non-stationary panel test statistics for evaluating null hypotheses. Because of the seven test statistics, the panel could be heterogeneous in nature in terms of short-run dynamics and also long-run slope and intercept coefficients. Unlike standard time-series analysis, this tool ignores normalization and the real number of cointegrating relationships. The hypothesis, on the other hand, is basically a measure of the degree of confidence, or lack thereof, in cointegration in a panel of two or more variables.

Group-mean statistics, which average the findings of separate country test statistics, and panel statistics, which group the statistical data along the within-dimension, are the two types of test statistics. Both groups have nonparametric test statistics (p and t) and parametric test statistics (augmented Dickey–Fuller and v)(Neal, 2014).

4.2.4 GMM:

Generalized Method of Moments (GMM) method is used to check the impact of globalization on environment. In GMM unknown parameters are obtained by combining economic data with information about population moment conditions. The generalized method of moments is a statistical model parameter estimation method used in econometrics and statistics(Zsohar, 2012). It is most often used in semi parametric modeling, where the point of interest is finite-dimensional and the whole shape of the number's distribution function is unknown, making maximum likelihood estimation ineffective.

The method necessitates the model's specification from a certain set of moment conditions. These moment conditions are functions of the design variables and data, with a zero expectation at true parameter values. The GMM approach then minimizes

51

certain norms of the simple form of the estimated model, making it a special case of minimal level estimation.

In the category of all estimators that do not employ any additional information aside from that provided in the moment conditions, the GMM estimation techniques are established to be continuous, asymptotically normal, and efficient. Lars Peter Hansen proposed the generalized method of moments (GMM) in 1982 as a generalization of Karl Pearson's 1894 technique of moments. Theoretically, though, these estimators are the same as those based on "orthogonality criteria" (Sargan, 1958, 1959) and "unbiased estimating formulas" (Zsohar, 2012).

4.3 Variables and Data Sources:

4.3.1   Economic Globalization:

The flow of products, services, and capital is referred as economic globalization. The ETH (*Eidgenössische Technische Hochschule*) Zurich database provides the KOF (*Konjunkturforschungsstelle*) economic globalization index. It is a comprehensive indicator that is derived from eight variables. It takes into account commerce, FDI (Foreign Direct Investments), portfolio investment, and foreigners' income, as well as import limitations, tariffs, trade taxes, and capital account restrictions.

4.3.2   Social Globalization:

Information, ideas, and people spread throughout the world. This index is obtained from ETH Zurich database, and it displays three dimensions: personal contact information, flows, and culture. International tourism, international populations, transfers, phone traffic, and international correspondence are all examples of personal contact. All of these variables have the ability to obtain and spread data to other countries in some way. Information flows include television viewing by internet users

52

and newspaper sales. The number of McDonald's restaurants, Ikea stores, and international book sales are used to gauge the cultural component.

4.3.3 Political Globalization:

The dissemination of government policy is referred to as political globalization. It is made up of the number of embassies, membership in international organizations, involvement in UN peacekeeping missions, and international treaties between two or more nations. The data for this index comes from the ETH Zurich database.

4.3.3 CO2 Emissions:

Gaseous, liquid, and solid fuels are rated using aCO_2 emission index, which is defined as the quantity of carbon dioxide released per amount of energy value. This index's data is likewise gathered from WDI (World Development Indicators).

4.3.4 Control Variables:

Control variable are GDP, population and inflation. Control variables data has been taken from World Bank.

4.3.4.1 Gross Domestic Product (GDP)

Gross domestic product is the entire amount or market worth of all total output inside a country's borders in a given time period (GDP). Because it is a broad measure of any and all domestic production, it serves as a full assessment of the overall health of the economy (Farnando, 2022).In this study we use GDP (constant 2015 US$) for data from WDI.

4.3.4.2 Population:

A population is defined as the total number of people who dwell in a certain area (Farnando, 2022). In this study population measure in millions and data source is WDI.

53

4.3.4.5 Inflation:

Inflation is defined as the rate at which prices increase over time. Inflation is usually thought of as a broad way to measure the rise in prices or the rise in the cost of living in a country (Farnando, 2022).In this study we use Inflation, consumer prices (annual %) from WDI.

Chapter 5

Results and Discussions

5.1 Panel Unit Root Analysis:

There is a plethora of empirical literature available which postulates that the validity time series or panel data models demand that the understudied data series is stationary. The stationarity can have a significant impact on the properties and behavior of the data series. For instance, the consistency of shocks will be infinite for the non-stationary data series. Also, as mentioned by Gujrati (2007), if two data series are non-stationary in nature and regressing one on the other could have a higher R-squared value even if both are totally unrelated. This proposition is known as spurious regression. In order to check the stationarity of the variables used in this study, we employed a series of panel unit root tests. There are several kinds of panel unit root tests available in the literature but all share a common null hypothesis. These tests are different from each other by enabling the autoregressive coefficient to be heterogeneous or homogenous. All tests employed in this study impose heterogeneity while Levin et al. (2002) enable homogenous autoregressive coefficient under the alternative hypothesis. Another distinctive feature of these tests is that they all are asymptotically normally distributed which is good for the estimation of big panel datasets. The results of panel unit root testing are reported in Table 1. It reveals that no matter which unit root test is employed; all understudied variables are stationary at 1st difference. These findings suggest that the Pedroni (1999) and Kao (1990, 1999) panel cointegration tests are appropriate to check the long-term association among the variables.

55

Variable Name	Levin, Lin & Chu t*	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-square	PP - Fisher Chi-square	Order of Integration
$CO_2 EMISSIONS_{it}$	-24.6013 (0.0000)	-30.2929 (0.0000)	1262.72 (0.0000)	2253.52 (0.0000)	I(1)
$KOFGI_{it}$	-23.4842 (0.0000)	-24.5373 (0.0000)	1019.56 (0.0000)	1778.91 (0.0000)	I(1)
$KOFECGI_{it}$	-25.3850 (0.0000)	-27.2190 (0.0000)	1126.60 (0.0000)	1990.54 (0.0000)	I(1)
$KOFSOGI_{it}$	-16.2766 (0.0000)	-19.1256 (0.0000)	775.144 (0.0000)	1594.66 (0.0000)	I(1)
$KOFPOGI_{it}$	-30.5909 (0.0000)	-32.8750 (0.0000)	1381.53 (0.0000)	2050.70 (0.0000)	I(1)
$GDPPERCAPITA_{it}$	-16.8802 (0.0000)	-20.3321 (0.0000)	841.610 (0.0000)	1592.92 (0.0000)	I(1)
$POPULATION_{it}$	-12.4925 (0.0000	-8.9516 (0.0000)	678.777 (0.0000)	766.621 (0.0000)	I(1)
$INFLATION_{it}$	-156.566 (0.0000)	-76.1031 (0.0000)	2157.91 (0.0000)	2687.24 (0.0000)	I(1)

Note: P-values are presented in the parenthesis.

5.2 Panel Cointegration Testing:

The next stage of our analysis is to examine whether the long-run or cointegration relationship exists among the understudied variables or not. For this purpose, we employed Pedroni (1999) test because all our data series are integrated at the first difference. This test is built on the poolingwithin dimensions and between dimensions. Also, it enables heterogeneity in theautoregressive term. The result of the test consists of two segments which report a total of 7 different statistics. The 1st segment reports four different statistics which include panel ADF-statistics, panel PP-statistics, panel rho-statistics, and panel v-statistics.While the 2nd segment presents three different statistics which include group ADF-statistics, group PP-statistics, and

group rho-statistics. As far as the null hypothesis is concerned, it indicates there is no cointegration exists among the variables against the alternative hypothesis of cointegration. Moreover, to allow homogeneity among coefficients, we employed the Kao test of cointegration. Table 2 reports the results of both cointegration tests for model 1 of our study which is constructed to observe the impact of overall globalization onenvironmental quality. According to Pedroni's results, the majority of statistics both at common and individual AR coefficients are statistically significant at a 1% level of significance. It infers that the null hypothesis of no cointegration is rejected so there is a cointegration relationship that exists among variables. Similarly, the Kao (1999) test statistic is also statistically significant at a 1% level of significance which further verifies the existence of a cointegration relationship. Thus, both tests are indicating that there is a long-run relationship exists between the variables of model 1.

Table 2. Results of the Cointegration Test (Overall Globalization)

Model 1: Common AR Coefficients Within Dimension

Pedroni Cointegration Tests						Kao Cointegration	
	Statistics	Prob	Weighted Statistics	Prob		t-Statistics	Prob
Panel v-Statistic	-0.4674	0.6799	-3.3242	0.9996	ADF	-2.3446	0.0095
Panel rho-Statistic	-0.4717	0.3185	1.3756	0.9155			
Panel PP-Statistic	-9.7214	0.0000	-8.2717	0.0000			
Panel ADF-Statistic	-11.9304	0.0000	-10.5996	0.0000			

Individuals AR Coefficients Between Dimensions

Group rho-Statistic	3.9113	1.0000
Group PP-Statistic	-10.8169	0.0000
Group ADF-Statistic	-10.5208	0.0000

Table 3 reports the results of cointegration tests for model 2 which explains the impact of different dimensions of globalization on the environmental quality. As per the Pedroni test, the majority of statistics both at common and individual AR coefficients are statistically significant at a 1% level of significance. It infers that the null hypothesis of no cointegration is rejected so there is a cointegration relationship that exists among variables. Likewise, the Kao (1999) test statistic is also statistically significant at a 5% level of significance which further validates the presence of a cointegration relationship. Thus, both tests are indicating that there is also a long-run relationship exists between the variables of model 2.

Table 1. Results of the Cointegration Test (Multi-Dimensional Globalization)

Model 2: Common AR Coefficients Within Dimension

	Statistics	Prob	Weighted Statistics	Prob		t-Statistics	Prob
Panel v-Statistic	-1.9503	0.9744	-6.2047	1.0000	ADF	-1.7790	0.0376
Panel rho-Statistic	3.1387	0.9992	7.0832	1.0000			
Panel PP-Statistic	-12.9602	0.0000	-8.2262	0.0000			
Panel ADF-Statistic	-13.2996	0.0000	-9.6049	0.0000			

Individuals Coefficients Between Dimensions

Group rho-Statistic	9.3314	1.0000
Group PP-Statistic	-16.2505	0.0000
Group ADF-Statistic	-10.8015	0.0000

5.3 Panel GMM Regression Analysis:

After confirming the existence of long-run cointegration among the understudied variables, we applied the generalized method of moments (GMM) technique to our pre-defined econometrical equations. The reason behind the selection of the GMM technique over Panel ARDL or other panel data techniques is because the number of cross-sections i.e., countries is greater than the number of years of the selected data series. To get a more comprehensive picture of the impact of globalization on carbon dioxide (CO_2) emissions, we divided our regression analysis into three segments where each segment is further divided into two parts. First, we pooled our dataset, both of developed economies and developing economies. Sample size of full panel is 107 countries. Second, we applied GMM estimation techniques to the data of 72 developing economies only. Third, we repeat the GMM analysis for the 35 developed economies dataset only.

Table 4 presents the results of panel GMM to evaluate how globalization impacts CO_2 emissions across world. The results are obtained with the help of two models where Model 1 is an attempt to check how the overall globalization index has an impact on the CO_2 emissions. While Model 2 is an attempt to check how different types of globalization like economic, social, and political globalization is effecting

global CO2 emissions. Both models are controlled for different macroeconomic variables which include gross domestic product, population, and inflation rate.

According to literature, globalization means the movement of technology or economic integration of the countries through trade and foreign direct investment. The study in hand uses the KOF globalization indices to capture globalization impact on CO2 emissions[1]. Table 4 reports that$LCO_2(-1)$is a lag dependent and it has a statistically significance and adverse impact on the environment. Theoverall globalization index has a statistically significant and adverse impact on the environmental quality in terms of CO2 emissions. Similar kinds of results are also reported by Frankel (2003), Shahbaz et al., (2013, 2018), Yang et al. (2021), and Jahanger (2022). It infers that an increase in globalization means the opening of new businesses in new markets which means an increase in product travel, transportation of raw materials, and fuel consumption that leads to a higher level of greenhouse gas emissions i.e., CO2 emissions. Also, the economic integration of different economies means an increase in the consumption levels which further increases the production activities that put stress on the environment.

As far as control variables of model 1 are concerned, gross domestic product and inflation rate have a statistically significant and favorable impact on the CO2 emissions, while the population has adverse impact on the CO2 emissions. An increase in GDP per capita means a reduction in CO2 emissions. Quantitatively speaking, a 1% increase in the GDP per capita leads to a 0.19% reduction in CO2 emissions. The implication of this result shows the target of sustainable growth. The prime objective of every economy is to achieve higher level of GDP per capita. Hence, in order to get this target most of the economies ignores environment and

[1]ETH Zurich database is used to defines the KOF globalization indices.

therefore contributes in higher level of CO2 emissions. However, sustainable development not only focused on growth but also take the environmental issues (sustainability accounting). The current finding shows that now economies are also taking in to account the environmental threats and GDP is increasing not at the cost of environment. This result is in line with the series of existing literature (Roca et al., 2001; Azomahou et al., 2006; Baek & Pride, 2014; Ajmi et al., 2015; Salahuddin et al., 2016; Dogan & Aslan, 2017). Likewise, the coefficient of the inflation rate also indicates that the increase in the general price level in an economy leads to a reduction in CO2 emissions. According to basic economics principles, a higher inflation rate means a low consumption level by the people which leads to a reduction in fuel consumption in terms of production and transportation activities of the business world. This interpretation and coefficient can be confirmed from the existing literature where Ronaghi et al. (2019) and Setyadharma et al. (2021) also report the negative impact of inflation rate on CO2 emissions for different countries. The list of instruments contains second lag of variables and a constant term.

Table 4: Results of Full Panel Case for Model 1

Model 1: Dependent Variable is LCO_2

Variable	Coefficients	t- Statistics	Prob
LCO_2(-1)	0.6574	408.4683	0.0000
LGlob	0.0150	2.5230	0.0117
LGDP	-0.1987	-65.3161	0.0000
LPOP	0.2346	26.9416	0.0000
LINF	-0.0048	-11.5915	0.0000
J-statistic	104.5617		0.4385

Model 2 in Table 5 examines the impact of different dimensions of globalization on the environmental quality in terms of CO2 emissions. The results reveal that lag dependent has a statistically significance and adverse impact on environment. The economic globalization and social globalization have a statistically significant and favorable impact on CO2 emissions, while political globalization has adverse impact on CO2 emissions. It infers that an increase in economic and social globalization is healthy for the economy because both lower down the CO2 emissions in the country while political globalization has a determinantal impact on the environment because it increases the CO2 emissions levels. The list of instruments contains second lag of variables and a constant term.

Table 5: Results of Full Panel Case for Model 2

Model 2: Dependent Variable is LCO $_2$

Variable	Coefficients	t- Statistics	Prob
$LCO_2(-1)$	0.6537	.187.1310	0.0000
LECO	-0.1402	-36.9139	0.0000
LSOC	-0.0372	-3.4507	0.0006
LPOL	0.1997	58.3537	0.0000
LGDP	-0.2074	-46.3295	0.0000
LPOP	0.2306	13.8708	0.0000
LINF	-0.0039	-10.3555	0.0000
J-statistic	104.3392		0.3901

Economic integration across global is mitigating CO2 emissions. It means that modern economic interdependence replaces the traditional modes of production and promotes efficient technologies which help in education of CO2 emissions. Social globalization is also reducing environmental degradation. The role of media and

awareness regarding environmental challenges increase sense of responsibility at individual level which may results in beneficial effect on environment. Hence, social factors are also contributing in reducing environmental burden. However, political globalization seems to have adverse impact on environment. It may be due ineffective political agreements between countries which seems to be powerless in affecting environmental conditions.

In Table 5, as compared to economic and social globalization; political globalization has the strongest impact on CO2 emissions. It means that political globalization damages the environment relatively more than the improvement of the environment from economic and social globalization. Very similar kinds of results are reported by Le and Le (2022) for 128 countries and territories over the period 2001–2014. Additionally, the signs of control variables coefficients in model 2 are similar to the signs reported in model 1.

Developing Countries for Model 1

Model 1: Dependent Variable is LCO_2

Variable	Coefficients	t-Statistics	Prob
$LCO_2(-1)$	0.5771	170.8413	0.0000
LGlob	-0.0378	-2.4482	0.0144
LGDP	-0.0044	-0.1681	0.8665
LPOP	0.2028	15.1945	0.0000
LINF	-0.0125	-19.4710	0.0000
J-statistic	70.8167		0.3515

Table 6 replicate our baseline results for the 72 developing economies. According to Table 6,lag dependent has a statistically significance and adverse impact on environment. The overall globalization index has a significantly andfavorable

impact on the CO2 emissions which implies that an increase in globalization in developing economies leads to a reduction in the CO2 emissions i.e., improvement in the environmental quality. This result may be due to the efforts of emerging economies in addressing the issues of environment. The population and inflation are consistent with the baseline results i.e., the population has adverse impact and the inflation rate has a favorable impact. However, the GDP per capita is found statistically insignificant which infers that the GDP per capita plays no role in the reduction of CO2 emissions in developing economies. The list of instruments contains second lag of variables and a constant term. As far as disaggregate analysis is concerned, the results are present in Table 7.

Table 7: Results of 72 Developing Countries for Model 2

Model 2: Dependent Variable is LCO$_2$

Variable	Coefficients	t- Statistics	Prob
$LCO_2(-1)$	0.5594	77.0056	0.0000
LECO	-0.0497	-4.1366	0.0000
LSOC	-0.1390	-6.4436	0.0000
LPOL	0.2365	6.2690	0.0000
LGDP	0.0312	1.0700	0.2847
LPOP	0.1835	11.5561	0.0000
LINF	-0.0125	-13.4960	0.0000
J-statistic	64.4056		0.4974

The results reveal that lag dependent has a statistically significance and adverse impact on environment and economic globalization and social globalization have statistically significant and favorable impacts on the CO2 emissions, while political globalization has anadverse impact on the CO2 emissions. These results are also in line with the results reported in full sample panel estimations. It concludes that

economic globalization and social globalization are good for developing economies, while political globalization has a severe impact on the environment. The coefficients of control variables of model 2 are similar to model 1 in terms of signs and significance.The list of instruments contains second lag of variables and a constant term.

Table 8 reports the coefficients of model 1 and model 2 for the sample of 35 developed economies. As per Table 8 in model 1, lag dependent has a statistically significance and adverse impact on environment and overall globalization index has a significantly andfavorable impact on the CO2 emissions which indicates that an increase in globalization in developed economies leads to a reduction in the CO2 emissions i.e., improvement in the environmental quality. Developed economies are more concerned regarding environmental degradation. These economies have achieved the target of higher growth and now they are trying to prevent environment it is evident from the results that higher connectivity with the rest of the world is increasing the pace of production and commerce while it is not hurting environment. Higher international collaboration results in reduction of CO2 emission. Hence, these economies are not only achieving the traditional targets growth but also taking care of environment. From the set of control variables, gross domestic product and inflation rate have a statistically significant and favorable impact on the CO2 emissions, while the population has a adverse impact on the CO2 emissions. The connection between GDP and environmental quality reported in Table 8 is in line with the studies of (Azomahou et al., 2006; Ajmi et al., 2015; Dogan & Aslan, 2017). Likewise, the coefficient of the inflation rate also indicates that the increase in the general price level in an economy leads to a reduction in CO2 emissions. An increase in inflation is supplemented by higher general prices of products. As the result, people's demands

65

for products will fall, and by reducing production, CO2 emissions will fall. Ronaghi et al. (2019) and Setyadharma et al. (2021) also report similar kinds of findings. The list of instruments contains second lag of variables and a constant term.

Table 9: Results of 35 Developed Countries for Model 1

Model 1: Dependent Variable is LCO_2

Variable	Coefficients	t-Statistics	Prob
$LCO_2(-1)$	0.7517	30.6479	0.0000
LGlob	-0.1551	-1.9110	0.0563
LGDP	-0.0830	-2.9607	0.0031
LPOP	0.0111	3.6993	0.0002
LINF	-0.7008	-1.5346	0.1252
J-statistic	32.2968		0.3538

The results of model 2 are presented Table 9. It indicates that only social globalization has a significant and favorable impact on the CO2 emissions, while economic and political globalization has no impact on the environmental quality in developed economies andlag dependent has a statistically significance and adverse impact on environment. If social globalization increases by 1% then CO2 emission is reduced by 0.28% which infers that social globalization is good for the developed economies. Surprisingly, the coefficients of population and inflation for developed economies indicates that increase in population lower down the CO2 emissions, while an increase in inflation boosts the CO2 emissions in the case of developed economies. Also, the GDP per capita coefficient becomes insignificant if we include dimensional globalization indices in place of the overall globalization index.

66

Model 2: Dependent Variable is LCO_2

Variable	Coefficients	t- Statistics	Prob
$LCO_2(-1)$	0.7058	25.4594	0.0000
LECO	0.1361	1.3305	0.1837
LSOC	-0.2794	-3.1493	0.0017
LPOL	-0.0581	-0.4329	0.6651
LGDP	-0.0683	-1.4928	0.1358
LPOP	-1.0709	-1.9793	0.0481
LINF	0.0098	2.1937	0.0285
J-statistic	28.6245		0.4317

Higher population leads to the reduction in CO2 emission in developed economies, it implies that these economies are not only fighting to environmental threats at connective level but also at individual's level. Individuals are aware of environmental challenges and they are not dependent on natural resources for their livelihood. Therefore, higher population is not putting pressure on environment. Further inflation is linked with more environmental degradation. The plausible explanation of this result can be the profit margins. Higher profits margin results in more production without considering environmental damage. The list of instruments contains second lag of variables and a constant term.

In general, it can be concluded that overall globalization has beneficial effect on environment in 35 developed and 72 developing countries. While, its adverse effect is evident in the full panel across world. Economic globalization and social globalization are good for 72 developing economies, while political globalization has severe impact on the environment.And only social globalization has a significant and favorable

impact on the CO2 emissions, while economic and political globalization has no impact on the environmental quality in developed economies.

Chapter 6

Conclusion and Policy Implications

Globalization is the process of interaction and integration among people, companies, and governments worldwide or it is the free and frictionless flow of products, services, and people around the world. Globalization can also be defined as the effect of the openness of global economy resulting increase in cross-national trade. In other words, the world's economies become more interconnected and integrated as a result of higher international investment (Fernando, 2021) andenvironment means the locality or a condition in which humans, animal or plants live and operate. In this study the issue of globalization has been taken to determine its impact on environment.

The current study looks into the connection between various types of globalization and environmental issues andinvestigates the impact of different dimensions of globalization (i.e., overall globalization index, economic globalization index, social globalization index, and political globalization index) on environment. Second, the current study contributes to the body of knowledge by giving theoretical and empirical analyses of globalization and the environment in developed and developing countries. Third, this research offers policy recommendations on environmental issues and globalization in all of its forms. Also, this study uses the most up-to-date data for developed and developing countries from 1991 to 2021 and comes to real-world conclusions about the effects of globalization's dimensions on the environment.

The balanced panel data was used for this investigation. Stationarity has thus been checked as a prerequisite. It shows that all of the series are stationary at the first

difference; hence Pedroni's cointegration test is used. CO_2 and economic, political, and social globalization are all cointegrated. The coefficients are estimated by using the GMM technique.It does a good job of dealing with endogeneity and therefore is able to generate effective results despite the fact that there are many time dimensions that are limited. The method of moments is generalized by the generalized method (GMM), which allows for a greater number of criteria than there are parameters to be used. As a result, GMM achieves a higher level of productivity than MM as a result of its use of these additional moment conditions (Drukker, 2015).

The data is then separated into two models, model 1 attempts to determine that how the total globalization index affects CO_2 emissions. Model 2 is an attempt to see how different types of globalization, such as economic, social, and political globalization, affect CO_2 emissions globally. According to model 1 in case of full panel the KOF globalization index has a statistically significant and positive impact on environmental quality in terms of CO_2 emissions. Model 2 investigates the impact of different dimensions of globalization on environmental quality in terms of CO_2 emissions in the case of full panel. According to the findings, economic and social globalization has a statistically significant negative influence on CO_2 emissions, whereas political globalization has a positive impact on CO_2 emissions, according to the findings.

In 72 developing countries the overall globalization index has a statistically significant negative effect on CO_2 emissions. This means that more globalization in developing economies reduces CO_2 emissions. At disaggregated level, economic and social globalization has statistically significant negative effects on CO_2 emissions, while political globalization has a positive effect on CO_2 emissions.

70

In case of 35 developed countries, the overall globalization index has a significantly negative impact on CO2 emissions, implying that increased globalization in developed economies reduces CO2 emissions; while only social globalization has a significant impact on CO2 emissions, while economic and political globalization have no effect on environmental quality in developed economies.

In the end, this study came to the conclusion that globalization, both economically and socially, has a favorable impact on the environment. Despite the fact that globalization as a whole and political globalization lead to increased environmental pollution, our results indicate that when put into the context of policy implications, our results indicate that lawmakers of these nations should examine and attempt to minimize the negative effects that globalization has had on the environment. They ought to impose stringent environmental regulations on both domestic and international businesses, with the goal of having those businesses implement environmentally friendly production structures. In point of fact, globalization hastened the spread of environmentally friendly technologies by means of globally connected channels of industry, capital flows, and research and innovation. Also, the rise of digital technologies will make it much easier to keep track of things and will make climate action much more obvious.

....

REFERENCES

Adkar, Amrin. 2015. "IMPACT OF GLOBALIZATION ON ENVIRONMENT". *Academia Edu*.
https://www.academia.edu/33171585.

Ahad, M.A. and Khan, W. (1970) *[PDF] does globalization impede environmental quality in*
Bangladesh? the role of real economic activities and energy use: Semantic scholar. [PDF]
Does Globalization Impede Environmental Quality in Bangladesh? The Role of Real Economic
Activities and Energy Use | Semantic Scholar. Available at:
https://www.semanticscholar.org/paper/Does-Globalization-Impede-Environmental-Quality-in-
Ahad-Khan/51ab12366b3e80d8472a4240c6c7f0745f05e1d8 (Accessed: February 10, 2023).

Ajanaku, B.A., and A.R. Collins. 2021. "Economic Growth And Deforestation In African Countries: Is
The Environmental Kuznets Curve Hypothesis Applicable?". *Forest Policy And Economics* 129:
102488. doi:10.1016/j.forpol.2021.102488.

Ajmi, A. N., Hammoudeh, S., Nguyen, D. K., & Sato, J. R. (2015). On the relationships between CO 2
emissions, energy consumption and income: The importance of time variation. In Energy
Economics (Vol. 49, pp. 629–638). Elsevier BV. https://doi.org/10.1016/j.eneco.2015.02.007

Amri, Fethi. 2018. "Carbon Dioxide Emissions, Total Factor Productivity, ICT, Trade, Financial
Development, And Energy Consumption: Testing Environmental Kuznets Curve Hypothesis For
Tunisia". *Environmental Science And Pollution Research* 25 (33): 33691-33701.
doi:10.1007/s11356-018-3331-1.

Baek, J., & Pride, D. (2014). On the income -nuclear energy–CO2 emissions nexus revisited. In Energy
Economics (Vol. 43, pp. 6–10). Elsevier BV. https://doi.org/10.1016/j.eneco.2014.01.015

72

Bakirtas, I., & Cetin, M. (2017). Revisiting the environmental Kuznets curve and pollution haven hypotheses: MIKTA sample. *Environmental Science And Pollution Research, 24*(22), 18273-18283. https://doi.org/10.1007/s11356-017-9462-y

Behera, Smruti Ranjan, and Devi Prasad Dash. 2017. "The Effect Of Urbanization, Energy Consumption, And Foreign Direct Investment On The Carbon Dioxide Emission In The SSEA (South And Southeast Asian) Region". *Renewable And Sustainable Energy Reviews* 70: 96-106. doi:10.1016/j.rser.2016.11.201.

Bozkurt C. Okumuş I (2017) Gelişmiş Ülkelerde Çevresel Kuznets Eğrisi

Bu, M., Lin, C., & Zhang, B. (2016). GLOBALIZATION AND CLIMATE CHANGE: NEW EMPIRICAL PANEL DATA EVIDENCE. *Journal Of Economic Surveys, 30*(3), 577-595. https://doi.org/10.1111/joes.12162

De Vita G, Katircioglu S, Altinay L, Fethi S, Mercan M (2015) Revisiting the environmental Kuznets curve hypothesis in a tourism development context. Environ Sci Pollut Res 22(21):16652–16663

de Vita, G., Katircioglu, S., Altinay, L., Fethi, S., & Mercan, M..(2015). Revisiting the environmental Kuznets curve hypothesis in a tourism development context. In Environmental Science and Pollution Research (Vol. 22, Issue 21, pp. 16652–16663). Springer Science and Business Media LLC. https://doi.org/10.1007/s11356-015-4861-4

Dergisi 5(4):57 67

Destek MA, Balli E, Manga M (2016) The relationship between CO2 emission, energy consumption, urbanization and trade openness for selected CEECs. Res World Economy 7(1):52

Destek MA, Ozsoy FN (2015) Relationships between economic growth, energy consumption, globalization, urbanization and environmental degradation in Turkey. Int J Energy Stat 3(04):1550017

Destek, M. (2019). Investigation on the role of economic, social, and political globalization on environment: evidence from CEECs. *Environmental Science And Pollution Research, 27*(27), 33601-33614. https://doi.org/10.1007/s11356-019-04698-x

73

Destek, Mehmet Akif, and Ferda Nakipoglu Ozsoy. 2015. "Relationships Between Economic Growth,

    Energy Consumption, Globalization, Urbanization And Environmental Degradation In

    Turkey". *International Journal Of Energy And Statistics* 03 (04): 1550017.

    doi:10.1142/s2335680415500179.

Destek, Mehmet Akif. 2019. "Investigation On The Role Of Economic, Social, And Political

    Globalization On Environment: Evidence From Ceecs". *Environmental Science And Pollution*

    Research 27 (27): 33601-33614. doi:10.1007/s11356-019-04698-x.

Dickey, D. A.; Fuller, W. A. (1979). "Distribution of the estimators for autoregressive time series with

    a unit root". Journal of the American Statistical Association. 74 (366a): 427–431.

    doi:10.1080/01621459.1979.10482531

Dogan, E., Seker, F., & Bulbul, S. (2015). Investigating the impacts of energy consumption, real GDP,

    tourism and trade on CO2emissions by accounting for cross-sectional dependence: A panel study

    of OECD countries. *Current Issues In Tourism, 20*(16), 1701-1719.

    https://doi.org/10.1080/13683500.2015.1119103

Dogan, Eyup, and Alper Aslan. 2017. "Exploring The Relationship Among CO 2 Emissions, Real

    GDP, Energy Consumption And Tourism In The EU And Candidate Countries: Evidence From

    Panel Models Robust To Heterogeneity And Cross-Sectional Dependence". *Renewable And*

    Sustainable Energy Reviews 77: 239-245. doi:10.1016/j.rser.2017.03.111.

Dogan, Eyup, Fahri Seker, and Serap Bulbul. 2015. "Investigating The Impacts Of Energy

    Consumption, Real GDP, Tourism And Trade On Co2emissions By Accounting For Cross-

    Sectional Dependence: A Panel Study Of OECD Countries". *Current Issues In Tourism* 20 (16):

    1701-1719. doi:10.1080/13683500.2015.1119103.

economic growth on CO2 emissions in OECD countries: a panel

Environment | Definition, Importance, & Examples. Encyclopedia Britannica. (2021). Retrieved 2

    December 2021, from https://www.britannica.com/science/trophic-cascade.

Fernando, J. (2021). *Globalization*. Investopedia. Retrieved 2 December 2021, from

    https://www.investopedia.com/terms/g/globalization.asp.

Figge, L., Oebels, K., & Offermans, A. (2015). The effects of globalization on Ecological Footprints: an empirical analysis. *Environment, Development And Sustainability, 19*(3), 863-876. https://doi.org/10.1007/s10668-016-9769-8 .

Frankel, J. (2003). The Environment and Globalization. doi: 10.3386/w10090

Gang, Chen. 2018. "Clean Technology And Sustainable Urban Solutions In Singapore". *Green Development Of Asia-Pacific Cities*. 107-117. doi:10.1142/9789813236820_0005.

Grunewald, Nicole, and Inmaculada Martinez-Zarzoso. 2016. "Did The Kyoto Protocol Fail? An Evaluation Of The Effect Of The Kyoto Protocol On Co2emissions". *Environment And Development Economics* 21 (1): 1-22. doi:10.1017/s1355770x15000091.

Hipotezinin Test Edilmesi: Kyoto Protokolünün Rolü. Isl. ve Ikt Cal. https://link.springer.com/article/10.1007/s11356-019-06556-2#Bib1 .

Huppert, H., & Sparks, R. (2006). Extreme natural hazards: population growth, globalization and environmental change. Philosophical Transactions Of The Royal Society A: Mathematical, Physical And Engineering Sciences, 364(1845), 1875-1888. doi: 10.1098/rsta.2006.1803

investigation. Renew Sust Energ Rev 62:1226 -1235

Kalayci, C., & Hayaloglu, P. (2019). THE IMPACT OF ECONOMIC GLOBALIZATION ON CO2 EMISSIONS: THE CASE OF NAFTA COUNTRIES. *International Journal Of Energy Economics And Policy, 9*(1), 356-360. https://doi.org/10.32479/ijeep.7233

Khan, Muhammad Kamran, Jian-Zhou Teng, Muhammad Imran Khan, and Muhammad Owais Khan. 2019. "Impact Of Globalization, Economic Factors And Energy Consumption On CO2 Emissions In Pakistan". Science Of The Total Environment 688: 424-436. doi:10.1016/j.scitotenv.2019.06.065.

Konbattulwar, V., Velaga, N. R., Jain, S., & Sharmila, R. B. (2016). Development of in-vehicle noise prediction models for Mumbai Metropolitan Region, India. In Journal of Traffic and Transportation Engineering (English Edition) (Vol. 3, Issue 4, pp. 380–387). Elsevier BV. https://doi.org/10.1016/j.jtte.2016.04.002

75

Kukreja, R. (2021). *20 Current Environmental Problems That Our World is Facing - Conserve Energy Future*. Conserve Energy Future. Retrieved 2 December 2021, from https://www.conserve-energy-future.com/15-current-environmental-problems.php.

Lane, Jan-Erik. 2015. "Coping With Global Warming". *Applied Economics And Finance* 2 (3). doi:10.11114/aef.v2i3.937.

Leitão, Nuno Carlos. 2021. "Economic Growth, Carbon Dioxide Emissions, Renewable Energy And Globalization". *Hdl Handle Net*. http://hdl.handle.net/10400.15/1082.

Liang, S., Yang, X., Qi, J., Wang, Y., Xie, W., Muttarak, R., & Guan, D. (2020). CO2 Emissions Embodied in International Migration from 1995 to 2015. Environmental Science & Technology, 54(19), 12530-12538. https://doi.org/10.1021/acs.est.0c04600

Lin, Jintai, Mingxi Du, Lulu Chen, Kuishuang Feng, Yu Liu, Randall V. Martin, and Jingxu Wang et al. 2019. "Carbon And Health Implications Of Trade Restrictions". *Nature Communications* 10 (1). doi:10.1038/s41467-019-12890-3.

Longe, Adedayo Emmanuel, Olawunmi Omitogun, Oluwole Oluniyi Adelokun, Emmanuel Olajide Adebayo, and Shehu Muhammad. 2020. "The Impact Of Trade And Transport Services On The Environment In Africa". *Economic Themes* 58 (3): 415-439. doi:10.2478/ethemes-2020-0024.

Mehmood, U., & Tariq, S. (2020). Globalization and CO2 emissions nexus: evidence from the EKC hypothesis in South Asian countries. Environmental Science And Pollution Research, 27(29), 37044-37056. doi: 10.1007/s11356-020-09774-1

Mohajan. (2019). Acid Rain is a Local Environment Pollution but Global Concern Acid Rain is a Local Environment Pollution but Global Concern. (91622).

Muhammad, B., & Khan, S. (2021). Understanding the relationship between natural resources, renewable energy consumption, economic factors, globalization and CO 2 emissions in developed and developing countries. *Natural Resources Forum*, 45(2), 138-156. https://doi.org/10.1111/1477-8947.12220

Oyelami, L. (2019). Relative effects of regional and global trade on carbon emissions in ECOWAS member countries. International Area Studies Review, 22(1), 64-75.

Oyelami, L. O. (2019). Relative effects of regional and global trade on carbon emissions in ECOWAS member countries. In International Area Studies Review (Vol. 22, Issue 1, pp. 64 -75). SAGE Publications. https://doi.org/10.1177/2233865918822259

Ozcan, Burcu, and Nicholas Apergis. 2018. "The Impact Of Internet Use On Air Pollution: Evidence From Emerging Countries". *Environmental Science And Pollution Research* 25 (5): 4174-4189. doi:10.1007/s11356-017-0825-1.

PANEL UNIT ROOT TESTS: A REVIEW. (2006). JOUR, 1(43). Retrieved from https://www.researchgate.net/publication/252756953_Panel_Unit_Root_Tests_A_Review

Park, Yongmoon, Fanchen Meng, and Muhammad Awais Baloch. 2018. "The Effect Of ICT, Financial Development, Growth, And Trade Openness On CO2 Emissions: An Empirical Analysis". *Environmental Science And Pollution Research* 25 (30): 30708-30719. doi:10.1007/s11356-018-3108-6.

Rehman, A., Radulescu, M., Ma, H., Dagar, V., Hussain, I. and Khan, M., 2021. The Impact of Globalization, Energy Use, and Trade on Ecological Footprint in Pakistan: Does Environmental Sustainability Exist?. *Energies*, 14(17), p.5234.

Rehman, Abdul, Magdalena Radulescu, Hengyun Ma, Vishal Dagar, Imran Hussain, and Muhammad Kamran Khan. 2021. "The Impact Of Globalization, Energy Use, And Trade On Ecological Footprint In Pakistan: Does Environmental Sustainability Exist?". *Energies* 14 (17): 5234. doi:10.3390/en14175234.

Roca, J., & Alcántara, V. (2001). Energy intensity, CO2 emissions and the environmental Kuznets curve. The Spanish case. In Energy Policy (Vol. 29, Issue 7, pp. 553–556). Elsevier BV. https://doi.org/10.1016/s0301-4215(00)00154-3

Ronaghi, Marzieh and Scorsone, Eric, The Negative Impact of the Ukraine War on the Us Economy. Available at SSRN: https://ssrn.com/abstract=4253863 or http://dx.doi.org/10.2139/ssrn.4253863

Sahlan, R. (2016). Dynamic Ordinary Least Squares Estimator (DOLS) with Stata (Time Series) [Blog]. Retrieved 17 February 2022, from http://rizaudinsahlan.blogspot.com/2016/06/dynamic-ordinary-least-squares_18.html.

Salahuddin, Mohammad, Khorshed Alam, and Ilhan Ozturk. 2016. "The Effects Of Internet Usage And

    Economic Growth On CO2 Emissions In OECD Countries: A Panel Investigation". *Renewable*

    And Sustainable Energy Reviews 62: 1226-1235. doi:10.1016/j.rser.2016.04.018.

SalahuddinM, Alam K, Ozturk I (2016) The effects of internet usage and

Setyadharma, A., Oktavilia, S., Sri Wahyuningrum, I. F., Nikensari, S. I., & Saputra, A. M. (2021).

    Does Inflation Reduce Air Pollution? Evidence from Indonesia. In T. R. Soeprobowati, B.

    Warsito, & T. Triadi Putranto (Eds.), E3S Web of Conferences (Vol. 317, p. 01068). EDP

    Sciences. https://doi.org/10.1051/e3sconf/202131701068

SHAHBAZ, M., KHAN, S., ALI, A. and BHATTACHARYA, M., 2017. THE IMPACT OF

    GLOBALIZATION ON CO2 EMISSIONS IN CHINA. *The Singapore Economic Review*,

    62(04), pp.929-957.

Shahbaz, M., Mallick, H., Mahalik, M., & Loganathan, N. (2015). Does globalization impede

    environmental quality in India?. *Ecological Indicators*, *52*, 379-393.

    https://doi.org/10.1016/j.ecolind.2014.12.025

Shahbaz, M., Shahzad, S., Mahalik, M., & Hammoudeh, S. (2017). Does Globalization Worsen

    Environmental Quality in Developed Economies?. *Environmental Modeling & Assessment*, *23*(2),

    141-156. https://doi.org/10.1007/s10666-017-9574-2

Shahbaz, Muhammad, Hrushikesh Mallick, Mantu Kumar Mahalik, and Nanthakumar Loganathan.

    2015. "Does Globalization Impede Environmental Quality In India?". *Ecological Indicators* 52:

    379-393. doi:10.1016/j.ecolind.2014.12.025.

Shahbaz, Muhammad, Qazi Muhammad Adnan Hye, Aviral Kumar Tiwari, and Nuno Carlos Leitão.

    2013. "Economic Growth, Energy Consumption, Financial Development, International Trade

    And CO2 Emissions In Indonesia". *Renewable And Sustainable Energy Reviews* 25: 109-121.

    doi:10.1016/j.rser.2013.04.009.

Shahbaz, Muhammad, Sakiru Adebola Solarin, and Ilhan Ozturk. 2016. "Environmental Kuznets Curve

    Hypothesis And The Role Of Globalization In Selected African Countries". *Ecological*

    Indicators 67: 623-636. doi:10.1016/j.ecolind.2016.03.024.

SHAHBAZ, MUHAMMAD, SALEHEEN KHAN, AMJAD ALI, and MITA BHATTACHARYA. 2017. "THE IMPACT OF GLOBALIZATION ON CO2 EMISSIONS IN CHINA". *The Singapore Economic Review* 62 (04): 929-957. doi:10.1142/s0217590817400331.

Shahbaz, Muhammad, Syed Jawad Hussain Shahzad, and Mantu Kumar Mahalik. 2017. "Is Globalization Detrimental To CO2 Emissions In Japan? New Threshold Analysis". *Environmental Modeling & Assessment* 23 (5): 557-568. doi:10.1007/s10666-017-9584-0.

Shahbaz, Muhammad, Syed Jawad Hussain Shahzad, Mantu Kumar Mahalik, and Shawkat Hammoudeh. 2017. "Does Globalization Worsen Environmental Quality In Developed Economies?". *Environmental Modeling & Assessment* 23 (2): 141-156. doi:10.1007/s10666-017-9574-2.

Soler, Carmen Echazarreta, and Albert Costa Marcé. 2018. "Sustainable Companies. Addressing Climate Change. A Theoretical Review". *Business And Management Studies* 4 (1): 33. doi:10.11114/bms.v4i1.2911.

Timmons, D. S., Buchholz, T., & Veeneman, C. H. (2015). Forest biomass energy: assessing atmospheric carbon impacts by discounting future carbon flows. In GCB Bioenergy (Vol. 8, Issue 3, pp. 631-643). Wiley. https://doi.org/10.1111/gcbb.12276

Tsurumi, Tetsuya, and Shunsuke Managi. 2012. "The Effect Of Trade Openness On Deforestation: Empirical Analysis For 142 Countries". *Environmental Economics And Policy Studies* 16 (4): 305-324. doi:10.1007/s10018-012-0051-5.

Ugwu Kelechi Enyinna, Osuji Emmanuel, & Ejike, D. E. (2020). GLOBALIZATION AND ECONOMIC ENVIRONMENT: NIGERIAN EXPERIENCE FROM 1990-2018. https://doi.org/10.5281/ZENODO.3952455

Vlahinić Lenz, N. and Fajdetić, B.. 2021. Globalization and GHG Emissions in the EU: Do We Need a New Development Paradigm?. *Sustainability*, 13(17), p.9936.

Wang, Z. *et al* (2019) "Dynamic linkages among CO2 emissions, Human Development, financial development, and globalization: Empirical evidence based on PMG long-run panel estimation,"

79

Environmental Science and Pollution Research, 26(36), pp. 36248–36263. Available at: https://doi.org/10.1007/s11356-019-06556-2.

Xu, Zefeng, Muhammad Awais Baloch, Danish, Fanchen Meng, Jianjun Zhang, and Zahid Mahmood. 2018. "Nexus Between Financial Development And CO2 Emissions In Saudi Arabia: Analyzing The Role Of Globalization". *Environmental Science And Pollution Research* 25 (28): 28378-28390. doi:10.1007/s11356-018-2876-3.

Xue, Jian, Zeeshan Rasool, Raima Nazar, Ahmad Imran Khan, Shaukat Hussain Bhatti, and Sajid Ali. 2021. "Revisiting Natural Resources—Globalization-Environmental Quality Nexus: Fresh Insights From South Asian Countries". *Sustainability* 13 (8): 4224. doi:10.3390/su13084224.

Yang, X., Li, N., Mu, H., Pang, J., Zhao, H., & Ahmad, M. (2021). Study on the long-term impact of economic globalization and population aging on CO2 emissions in OECD countries. In Science of The Total Environment (Vol. 787, p. 147625). Elsevier BV. https://doi.org/10.1016/j.scitotenv.2021.147625

Zafar, M., Saud, S. and Hou, F., 2019. The impact of globalization and financial development on environmental quality: evidence from selected countries in the Organization for Economic Co-operation and Development (OECD). *Environmental Science and Pollution Research*, 26(13), pp.13246-13262.

Zafar, Muhammad Wasif, Shah Saud, and Fujun Hou. 2019. "The Impact Of Globalization And Financial Development On Environmental Quality: Evidence From Selected Countries In The Organization For Economic Co-Operation And Development (OECD)". *Environmental Science And Pollution Research* 26 (13): 13246-13262. doi:10.1007/s11356-019-04761-7.

Zhao, Jing, and Shu Min Li. 2018. "THE IMPACT OF TOURISM DEVELOPMENT ON THE ENVIRONMENT IN CHINA". *Acta Scientifica Malaysia* 2 (1): 1-4. https://mpra.ub.uni-https://ideas.repec.org/a/hur/ijareg/v2y2015i1p1-5.html muenchen.de/76278/1/MPRA_paper_76278.pdfdoi:10.26480/asm.01.2018.01.04.

80

Zsohar, P. (2012). Short introduction to the generalized method of moments.

https://journals.sagepub.com/doi/pdf/10.1177/1536867X1401400312Hungarian Statistical

Review, 16, 150-170.

Appendix-1: List of Developing Countries

1	Algeria	28	Honduras	55	Samoa
2	Angola	29	India	56	Sao Tome and
3	Bangladesh	30	Indonesia	57	Senegal
4	Belize	31	Iran, Islamic Rep	58	Sierra Leone
5	Benin	32	Kenya	59	Solomon Islands
6	Bhutan	33	Kiribati	60	Sri Lanka
7	Bolivia	34	Kyrgyz Republic	61	Sudan
8	Burkina Faso	35	Lao PDR	62	Tajikistan
9	Burundi	36	Lesotho	63	Tanzania
10	Cabo Verde	37	Liberia	64	Togo
11	Cambodia	38	Madagascar	65	Tunisia
12	Cameroon	39	Malawi	66	Uganda
13	Central African Republic	40	Mali	67	Ukraine
14	Chad	41	Mauritania	68	Uzbekistan
15	Comoros	42	Micronesia, Fed. Sts.	69	Vanuatu
16	Congo, Dem.Rep	43	Mongolia	70	Vietnam
17	Congo, Rep	44	Morocco	71	Zambia
18	Cote d'Ivoire	45	Mozambique	72	Zimbabwe
19	Egypt, Arab Rep	46	Myanmar		
20	El Salvador	47	Nepal		
21	Eswatini	48	Nicaragua		
22	Ethiopia	49	Niger		
23	Gambia, The	50	Nigeria		
24	Ghana	51	Pakistan		
25	Guinea	52	Papua New Guinea		
26	Guinea-Bissau	53	Philippines		
27	Haiti	54	Rwanda		

Appendix-2: List of Developed Countries

1	Australia	19	Italy
2	Austria	20	Japan
3	Belgium	21	Latvia
4	Bulgaria	22	Lithuania
5	Canada	23	Luxembourg
6	China	24	Malta
7	Croatia	25	Netherlands
8	Cyprus	26	Norway
9	Czech Republic	27	Poland
10	Denmark	28	Portugal
11	Estonia	29	Romania
12	Finland	30	Slovenia
13	France	31	Spain
14	Germany	32	Sweden
15	Greece	33	Switzerland
16	Hungary	34	United Kingdom
17	Iceland	35	United States
18	Ireland		

Data sources, country classifications and aggregation methodology. (2022). Retrieved 14 June 2022,

from

https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classific

ation.pdf