Review Article

THE ENVIRONMENT AND SUSTAINABLE TRADE DEVELOPMENT

Economics

Keywords: Environment, Sustainable growth, Trade, Pollution havens, Sustainable development, Environmental policies, Technological innovation, Natural resources, Environmental economics.

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Abstract

This paper analyzes and reviews scholarly information on the relationship between trade and the environment through case studies such as that of South Korea, which illustrates their connectivity. These two concepts are explored from both an environmentalist perspective and an economic perspective, which highlights the benefits and limitations between the two. Considering that both notions are affected by one another, this review looks through the positive and negative lenses of the impact of trade in the environment. Moreover, to enhance the understanding of the topic, this research uses economic sources that provide definitions and graphical information of all measurable impacts. Because their questionable relationship is supported and contradicted by both realms, the works referenced include articles that focus on diminishing the barrier between the environment and trade schemes. Additionally, to illustrate the relationships and effects, selected case studies are analyzed and set as a baseline for comparison throughout this review. The environment, which is a very broad concept, has been examined in terms of socioeconomic value and assessed through economic methods that evaluate its importance in terms of state development through trade. This paper examines how trade influences environmental outcomes and evaluates the conditions under which trade can support or undermine sustainable development.

INTRODUCTION

The environment plays a vital role in healthy living on our planet. A quality environment such as clean air, water, land and food provides the essential needs that humans are all dependent on. However, in addition to these needs, living in a prosperous and developed country is also crucial. Even though the environment in which one lives is a pillar of concern, economic growth, decent employment and living standards are all needed to achieve good living. All these additional elements of prosperity are initiated and developed through trade, which is an important process for countries in terms of developing, functioning and meeting the demand for different needs. Trade can lead to economic growth, more job opportunities, increased living standards, better international relations, and incentivized innovation and technology advancements (Copeland, 2005). There is a strong connection between trade and the environment, but the impact that trade has on the environment is a matter of discussion. Whether trade has a positive or a negative effect on the environment is a question that, even after decades of discussion, does not have an obvious answer. Economic growth, which results from international trade, can have a negative effect on the environment through increased pollution and resource degradation. Countries sometimes first

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experience a negative environmental impact by trading; however, this becomes positive as soon as countries reach a certain point in development (Esty, 2001). This relationship is explained by the environmental Kuznets curve. There are actual examples that support this hypothesis, such as South Korea (Suleyman, 2020). This topic was recognized relatively early and has been a point of discussion since the end of the Uruguay round in 1986--1994, when real concerns about global warming, species endangerment and industrial pollution were raised (Copeland, 2005). For decades, many unsettled debates and many studies have been conducted concerning the significance and type of impact that trade has on the environment. This paper analyzes the relationships and impacts of trade on the environment and how they coincide.

CONCEPTUAL FRAMEWORK

This paper is guided by a conceptual framework that combines three major analytical models used to explain the relationship between trade and environment. The scale, composition and technique effects, the Environmental Kuznets Curve and the pollution haven hypothesis, together provide a structured foundation for understanding how economic activity from trade can either harm or improve the environmental quality. The scale, composition and technique effects help break down the different channels through which trade leads to pollution. The scale effect shows how economic activity increases emissions, the composition effect explains how countries shift to cleaner or dirtier industries depending on the comparative advantage and the technique effect which captures how improvements in technology and environmental standards often come with higher income and more trade. The Environmental Kuznets Curve, provides a perspective by proposing that environmental degradation rises in early stages of economic growth but falls once a country reaches a higher level of income. This model is useful to show how growth from trade improves or makes worse the environmental conditions. The pollution haven hypothesis adds a dimension by examining how differences in environmental regulations between countries affect the location of pollution-intensive industries. This model explains how trade may lead to firms relocating their work to countries with weaker environmental regulations, therefore shifting the pollution elsewhere. These models lead to a well-structured framework and evaluation of trade's environmental impact through different lenses. This combined analytical approach guides the interpretation of empirical studies, cases and theories.

METHODS

To conduct this review, it was highly important to focus on empirical data and research that presented the relationship between trade and the environment. Considering that trade is an economical phenomenon that is best defined and described through an economic lens, it was crucial to also view the concept from an environmentalist approach. Therefore, scholarly articles that describe the relationship between the two concepts have been analyzed, referenced and quoted

for precise explanations. Moreover, statistical and quantitative data have been used to illustrate the effects of trade in developed and developing countries. In selecting these sources, studies were also screened for credibility. Priority was given to peer-reviewed articles, academic books, and institutional reports that clearly outlined their methods and provided measurable indicators such as CO_2 emissions, trade volumes, or pollution levels. However, to properly define the effects of trade on the environment and the correlation between the two, this review also adapts the environmental Kuznets curve. The curve is the most concrete empirical evidence that explains how trade and the environment benefit and limit one another. This model was chosen because it offers a structured way to compare countries at different stages of development and helps identify whether environmental improvements follow economic growth. The hypothesis presented by the Kuznets curve is also analyzed through a case study of South Korea, which provides a basis for the literature in this paper. South Korea was selected as it provides long-term, well-documented data on trade openness and pollution trends, making it a suitable example for evaluating how accurately the Kuznets curve reflects real-world outcomes.

DISCUSSION

Trade is an efficient method that can lead to economic development, but it can help or even harm the environment (Chang, 2016). However, two of the main causes of concern from trade in regard to the environment are pollution and resource degradation (Copeland, 2005). To better determine the impact that trade has on the environment, different effects are used. The final outcome depends on which of the following effects is greater (Werner Antweiler, 2001). The technique effect is the first type of effect that is considered a pro-environmental trade effect. This means that countries experiencing economic growth can implement new strategies that lower the amount of emissions per unit of output in different sectors of the economy. Furthermore, there is a composition effect, which implies that when a country is experiencing a change in national output, different sectors of the economy will experience an impact, and depending on whether trade is more clean or dirty, environmental changes will occur. On the other hand, the scale effect claims that, by producing more, a country will experience an increase in CO_2 emissions and pollute more. The results from research on technique, composition and scale effects indicate that these effects are theoretical constructs that can be identified, and their magnitude can be measured (Werner Antweiler, 2001). Once the effects are measured, they can be helpful indicators for identifying potential environmental consequences as a result of trade openness and technological development (Werner Antweiler, 2001).

One of the main arguments about the relationship between trade and the environment is that trade leads to more economic activity, and this increase harms the environment of a country (Copeland, 2005). Trade liberalization is directly linked to increased economic activity in areas such as transportation, the production of goods, services and consumption. By this interpretation, if more economic activity means further environmental pollution, more trade is expected to lead

to more environmental pollution. (Copeland, 2005). Transport is one of the main challenges to the environment, and for a country to trade, some sort of transportation must be used. The most common type of transportation is land, which causes air pollution and is carried out in relatively small quantities. However, the most efficient and, at the same time, least polluting type for trade is transportation by sea. A shift toward transportation by sea for trade has been strongly advised for a very long time, as it is more efficient because of the lower transportation cost and ship size capacity and is more environmentally friendly in terms of the pollution caused. Additionally, natural resources are directly affected by trade liberalization. Considering that trade contributes to an increase in economic activity, resource degradation may very well occur as a result of an increase in consumption and production (Esty, 2001). Trade itself, does not determine the level of pollution, but it depends on other national factors (Wang et al, 2023). Several factors can influence and determine the level of pollution, although trade does have a role. Human capital, resource rents and renewable energy consumption all influence the level of pollution (Wang et al, 2023). This shows how trade openness can improve environmental quality only when combined with factors such as strong institutions, clean energy, skilled workforce etc. Nevertheless, the effect that trade has on a country's natural resources is entirely dependent on the terms with which trade is conducted. Trade can have a negative impact on natural resources as a result of increased economic activity. More activity in the economic sector demands additional extraction of resources; this can lead to waste and pollution unless strong regulations are placed to ensure that additional use of resources does not cause more harm than good (IISD, 2005). If a country excels at producing goods that need natural resources, trade liberalization could increase the demand for production from these industries, leading to additional resource harvesting, which causes environmental degradation and pollution (IISD, 2005). However, as trade creates wealth, benefits can occur as a result. Efficient use of resources can be seen as an advantage to the economy, as efficient industries need fewer resources to produce, thus leading to sustainable development (IISD, 2005). In addition, open trade can be an effective method of reducing waste, as countries can export excessive unwanted goods or trade their waste where it can be recycled (IISD, 2005). However, only a small portion of global waste is traded (Copeland, 2005). There are concerns that developed countries tend to ship their waste to developing countries, as it is usually cheaper to export it rather than invest in recycling and landfills. To protect the environment and health from waste, treaties and regulations have been created. An example is the Basel Convention, which came as a result of concern from developing countries that they can become the go-to place of dumping hazardous waste from well-developed countries (IISD, 2005).

Economic growth is considered to be the main purpose of trade (Esty, 2001). Therefore, an increase in trade and economic activity can be seen as a challenge to environmental sustainability. However, many economists argue that this is not always the case. Many developed countries work toward protecting a clean environment but also seek high consumption levels and do so by importing pollution-intensive goods from other places, thus creating pollution havens (Copeland, 2005). In addition to the pollution haven approach, economic growth can sometimes translate to a cleaner environment once it reaches a certain point of development, which is explained by the

environmental Kuznets curve (Esty, 2001). These two notions are important when trying to understand the relationship between the environment and trade and when analyzing whether more development through trade leads to environmental harm.

Pollution havens

Pollution havens are supported by the argument that massive factories are not considered to cause loads of pollution in the most developed cities of the world. However, when looking into less developed and more polluted countries such as China, India or Bangladesh, we can even find these factories close to regions with a high population density. Simply put, the pollution haven hypothesis suggests that dirty industries will migrate to places with less strict environmental policies that are more suitable for high-pollution industries (Karp, 2011). This is seen as a threatening challenge to trade, because once a less developed country with a weaker environmental policy liberalizes trade, there is an incentive for it to export dirty goods and therefore also increase the production of these goods, which cause massive pollution (Copeland, 2005). This can only go from bad to worse once developed countries shift their production toward this country and cause even more pollution and environmental degradation. If two countries that differ in their income per capita start trading, research shows that they will both benefit from trade; however, owing to the income effect, rich countries will usually be better off as pollution shifts toward poor countries (Copeland, 2005). This is often criticized and called out because it is unfair not just to poor countries, as it negatively contributes to world pollution. Pollution havens do not directly affect only trading countries in terms of pollution; the consequences are also felt throughout the entire world. Countries with looser environmental regulations and rules usually attract more pollution-intensive industries (Gymafi et al, 2021). It was found that both, oil and non-oil countries show th effect of pollution havens, however oil countries are more vulnerable as they already have established heavy industries, weaker environmental rules and large foreign investments (Gymafi et al, 2020). By trading, the richer country usually shifts the environmental consequences to the poorer country; however, this only increases world pollution (Copeland, 2005). Trade effects in a pollution haven model can be clarified by technique, composition and scale effects. If we look at the compensation effect, trade shifts the most polluting industries to countries with weaker environmental policies but also shifts the cleaner industries to already clean countries. However, the scale effect simply states that if there is more of a good being produced, pollution increases. Therefore, because of these two effects, world pollution tends to increase as a result of pollution haven (Copeland, 2005). However, there are some cases in which the pollution haven helps the environment by shifting pollution to countries that can better withstand the pollution. If two countries have the same level of environmental policies in place and start trading, the pollution-intensive production of goods will shift toward cleaner countries where pollution has a lesser impact (Copeland, 2005). The reason behind this is that a place with a better environment has a more resilient environment, as the marginal pollution caused by additional production is lower than that in an already highly polluted country (Copeland, 2005). This type of trade is good for the

environment, as it places less pressure on sensitive highly polluted parts of the world. Pollution factors provide support when assessing the relationship between trade and the environment while also influencing the relationship between developed and developing countries. The latter notions, however, can also be analyzed through the environmental Kuznets curve, which introduces the concept of economic growth as an important element of this analysis.

The environmental Kuznets curve

When the notion of the environmental Kuznets curve is adapted to trade and environment relationships, the curve displays an inverted U-shaped relationship, which indicates that a country will pollute more in the short term when experiencing economic growth; however, after reaching a certain point of progress in income per capita or GDP, the environment will improve (Esty, 2001). A concern from the environmental Kuznets curve is that as countries begin to develop, they tend to cause water and air pollution, which presents an issue in their development process (Esty, 2001). The arguments of the environmental Kuznets curve suggest that after a country reaches a certain point of economic growth, its citizens will place more value on living in a clean environment, and the government will implement regulations that will prevent environmental degradation and implement environmentally friendly strategies to achieve a cleaner output (Suleyman, 2020).

An example that is often used in the environmental Kuznets curve hypothesis is South Korea, and its rapid economic growth is linked to trade. South Korea is the 14th largest economy; it is not rich in natural resources but is open to trade and depends heavily on exports produced industrially (Suleyman, 2020). South Korea is a good example of this hypothesis because it acquired the desired economic growth through trade openness and commuting to high levels of environmental pollution. However, South Korea improved its environment soon after reaching a certain point in growth (Suleyman, 2020). The findings indicate that technique and composition effects are dominant in South Korea, with the country having a comparative advantage in clean industries (Suleyman, 2020). However, an N-shaped relationship was found when looking at the relationship between per capita CO_2 emissions and per capita GDP, thus leading to large questions being raised regarding whether the environmental Kuznets curve actually stands for South Korea (Suleyman, 2020). Research conducted on the environmental Kuznets curve indicates that the inverted-U relationship represents local pollutants but is not always the case for global pollutants such as CO_2 (Karp, 2011). South Korea shows evidence of the environmental Kuznets curve, indicating that emissions rise with early economic growth but later fall as income and technology grows (Koc & Bulus, 2020). This study also found that renewable energy improves environmental quality and strengthens the downward side of the EKC (Koc & Bulus, 2020). The environmental Kuznets curve is often a good indicator of water and air pollution, but it has also been criticized for not considering other factors related to environmental degradation, such as climate change, species endangerment, resource use and land degradation. Trade has a positive effect on the environment only if environmental policies are implemented during trade and economic growth

(Esty, 2001). However, if a country is experiencing economic growth but ignoring environmental degradation through institutional failure, the environmental Kuznets curve hypothesis will not hold (Karp, 2011). The rising income per capita itself that might come as a result of trade liberalization will not automatically take care of the environment without many changes, such as environmental regulations, public awareness and cleaner production.

Every person ideally prefers living in a clean environment, and this is a great challenge to globalization. Trade globalization is considered to play a very active role in climate change, and its role is increasing (Chang, 2016). Trade is expected to have both positive and negative impacts on the environment, which mainly depend on the pollutants and the country (Shunsuke Managi, 2009). Trade is frequently criticized when richer countries with high levels of consumption use less developed countries to dump their waste and shift pollution to them. Instead of implementing regulations that would see their environment improve while maintaining the same production level, more developed countries sometimes tend to move production to countries with weaker environmental policies (Copeland, 2005). Pollution haven is one of the biggest issues of trade, as it can directly lead to more waste, pollution and inequality (Chang, 2016). The world has never been more polluted, and climate change has become a major issue. As trade openness increases, there is a fear that this will further contribute to pollution and climate change. Therefore, the environmental regulations that a country implements against pollution might very well be crucial in terms of trading without environmental degradation.

CONCLUSIONS

This paper analyzes the interconnectivity between trade and the environment as two concepts of economic development. Owing to the presence of uncertainties and subjectivity, their relationship has been questioned by many. Their connection has been studied since as early as 1970 and is yet to be settled because of its complexity and changing nature. These findings suggest that trade can have both positive and negative effects on the environment and that it is dependent on many factors that influence this impact. These factors can address the income effect, environmental policies, economic growth, the haven effect, the type of production and many more. To determine whether trade has a positive or a negative effect on the environment, it is important to measure the technique, composition and scale effects, on the basis of which we have a cleaner view of the outcomes. This research has also investigated methods of trading with positive environmental effects, such as sea transportation. Using ships for trade is considered the most efficient method of trade because it can be performed in very large quantities and cause less pollution. Therefore, a shift from land transportation to sea could turn out to be beneficial if it is done according to the rules and principles of a trade policy. There are other hypotheses that circulate around trade, economic growth, and the environment; however, the environmental Kuznets curve is one of the most debated. The curve provides an overview of the effects in terms of water and air pollution; however, continued research shows the shortcomings of the

environmental Kuznets curve in terms of being a reliable approach in regard to assessing the relationship between trade and the environment. The environmental Kuznets curve is lacking in other areas, as it does not cover resource degradation, species endangerment, climate change, government regulations, population levels or more. The presented case study of South Korea shows best how this hypothesis can be proven correct; however, that still remains questionable, as the results are highly dependent on environmental policies and regulations. This paper also reviews articles on the creation of pollution havens and how much of a concern they have become. Pollution havens pose a direct threat to environmental sustainability, as they are directed toward less developed countries and worsen world pollution. However, similar to many economic concepts, there is also a potential positive side to pollution havens, which occurs only when both trading countries have the same environmental regulations implemented. It is not just the less developed countries that are endangered by pollution havens, as world pollution has been uninterruptedly increasing (Copeland, 2005).

In today's world, a country that is not open to trade could miss many benefits that come along. Trade is considered an essential and very beneficial process for the development of a country's economy and global relations. The relationship between trade and the environment varies from country to country, and a single conclusion cannot be derived. By trading with other nations, a country will explore many possible opportunities that can lead to different outcomes. There will always be threats and opportunities, and every country should try to minimize these threats. If environmental degradation is neglected and the total focus is given to economic development, there might be more economic development in the short run; however, this development will lead to an increasing number of problems in the future, as environmental damage will become uncontrollable. Thus, whether trade benefits or disturbs a country's prosperity is dependent on the balance maintained between economic development and environmental protection (IISD, 2005).

References

Antweiler, W., Copeland, B. R., & Taylor, M. S. (2001). Is free trade good for the environment? *American economic review*, *91*(4), 877-908. https://doi.org/10.1257/aer.91.4.877

Chang, W. W. (2017). World trade and the environment: Issues and policies. *Pacific Economic Review*, *22*(3), 435-479. https://doi.org/10.1111/1468-0106.12100

Copeland, B. R. (2005). *Trade and the environment: Theory and evidence.* Princeton University Press.

Esty, D. C. (2001). Bridging the trade-environment divide. *Journal of Economic Perspectives*, *15*(3), 113-130. DOI: https://doi.org/10.1257/jep.15.3.113

Gyamfi, B. A., Bein, M. A., Udemba, E. N., & Bekun, F. V. (2021). Investigating the pollution haven hypothesis in oil and non-oil sub-Saharan Africa countries: Evidence from quantile regression technique. *Resources Policy*, *73*, 102119.

https://doi.org/10.1016/j.resourpol.2021.102119

IISD. (2005). *Environment and Trade, A handbook: Second Edition.* UNEP, Division of Technology, Industry and Economics, Economic and Trade Branch.

Karp, L. (2011). The environment and trade. *Annu. Rev. Resour. Econ.*, *3*(1), 397-417. https://doi.org/10.1146/annurev-resource-083110-115949

Koc, S., & Bulus, G. C. (2020). Testing validity of the EKC hypothesis in South Korea: role of renewable energy and trade openness. *Environmental Science and Pollution Research*, *27*(23), 29043-29054. https://doi.org/10.1007/s11356-020-09172-7

Koc, S., & Bulus, G. C. (2020). Testing validity of the EKC hypothesis in South Korea: role of renewable energy and trade openness. *Environmental Science and Pollution Research*, *27*(23), 29043-29054. https://doi.org/10.1007/s11356-020-09172-7

Managi, S., Hibiki, A., & Tsurumi, T. (2009). Does trade openness improve environmental quality?. *Journal of environmental economics and management*, *58*(3), 346-363. https://doi.org/10.1016/j.jeem.2009.04.008

Wang, Q., Zhang, F., & Wang, S. (2023). Revisiting the environmental Kuznets curve hypothesis in 208 countries: The roles of trade openness, human capital, renewable energy, and natural resource rents. *Environmental Science and Pollution Research*, 30(5), 12683–12696.