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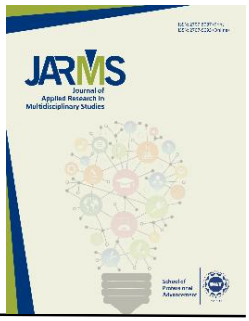

Title: **Environmental Policy and CO 2 Emissions: A Study of South Asian Countries**

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Environmental Policy and CO_2 Emissions: A Study of South Asian Countries

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Abstract

The policymakers and academics in developing countries are concerned about the rapidly increasing pollution, particularly the CO_2 emissions. The South Asian Association for Regional Cooperation (SAARC) countries are currently experiencing rapid economic growth, leading to increased CO_2 emissions. To address this challenge, various policies have been formulated, with the Environmental Protection Act being a significant initiative within the SAARC nations. This study aims to analyze the effectiveness of the Environmental Protection Act (EPA) in mitigating CO_2 emissions and evaluates its indirect role in reducing carbon emissions. By employing the Fixed Effects methodology and using the panel data from 1965 to 2019 across four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka), this study revealed significant findings. The analysis demonstrated a negative correlation between the Environmental Protection Act and CO_2 emissions, indicating its effectiveness in mitigating the environmental degradation. The study also examined how this policy moderates the influence of other sources of pollution on CO_2 emissions. However, it is important to acknowledge the developmental stage of these four nations, which may limit their resources in addressing the environmental challenges. Consequently, this research highlights the positive impact of implementing environmental policies, such as the Environmental Protection Act, in mitigating pollution and reducing the CO_2 emissions. It further emphasized upon the need to maintain and strengthen such policies to promote a healthier environment.

***Keywords*:** CO_2 emissions, environmental policies, pollution, SAARC

Introduction

In this era, developing countries are putting significant emphasis on economic growth. The extant research confirms that countries having rapid economic growth tend to face more environmental challenges. This growth often results in increased levels of carbon dioxide (CO_2) emissions.

CO_2 emissions are a significant source of climate change. Burning fossil fuels like natural gas, oil, and coal to carry out economic activities such as power generation, transportation, and industrial activities results in the emission of CO_2 (Quadrelli & Peterson, 2007). These emissions are a growing concern among policymakers and academics. As economies expand, specifically at initial stages, they rely on fossil fuels for industrial processes, thus deteriorating environmental quality. This issue is more significant in developing countries that are undergoing rapid industrialization. Consequently, academics, environmentalists, and policymakers are increasingly focusing on addressing the factors that are responsible for environmental degradation.

In order to deal with such challenges, countries enact environmental policies, such as the Environmental Protection Act, which aims to control pollution and CO_2 emissions (Nabernegg et al., 2019). These policies incorporate provisions related to environmental standards and regulations. They cover a wide range of aspects, such as conservation of natural resources and measures to address the climate change. It is pertinent to understand whether these policies have an effect on mitigating environmental pollution.

Numerous researchers have attempted to analyze the effects of environment related policies. Carbon taxes are one of the policies to reduce CO_2 emissions (Andersson, 2017; Metcalf, 2019). Kyoto Protocol is a multilateral environmental agreement that includes mechanisms to mitigate

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carbon emissions (Aichele & Felbermayr, 2013; Wang et al., 2019). The governments of South Asian countries have devised policies to curb CO_2 emissions and pollutions and for this matter, they have introduced Environmental Protection Act. Indeed, the Environmental Protection Act has numerous policy areas that aim to reduce pollution and CO_2 Emissions. This Act supports and promotes the management and enhances the awareness for environmental issues.

Environmental policies act as an institutional mechanism that regulates the activities related to environment. Indeed, their effective implementation determines the limitation of CO_2 emissions. Therefore, environmental quality depends on adequate policymaking. In addition, the quality of institutions and regulatory bodies are critical for betterment (Ali et al., 2019; Ibrahim & Law, 2015).

These policies may comprise subsidies to the industries. Further, taxes may be implemented for carbon emissions. Openness in trade and capital activities has a positive impact on the climate as it helps in developing new techniques and improving the process of production. Trade liberalization is also the cause of higher income levels that in result aware people for the healthy climate (Choi et al., 2010). Such situations sometimes also increase the political pressures on policymakers for ensuring a better environment.

Various governments have put restrictions on the manufacturing industries which are responsible for global warming. In addition, firms in developed countries set up their production facilities in underdeveloped countries in order to keep them safe from the government penalties in their home country. This is pollution haven hypothesis (Cole, 2004; Gill et al., 2018; Murthy & Gambhir, 2018). The country's economic growth, at first increases CO_2 but with the passage of time, the increase in gap helps to reduce the CO_2 emissions. This is a well-known Environmental Kuznets Curve (Antonakakis et al., 2017).

Such problems need to be addressed and their pollution increasing effects can be mitigated through policy mechanism. There are numerous policies and laws designed at the government, regional, and national levels to reduce air pollution and CO_2 emissions. Numerous environmental policy measures, as mentioned above, are formulated by the South Asian countries in the form of Environmental Protection Act to get rid of pollution and CO_2 emissions.

This study examines the impact of environmental protection acts, particularly focusing on the Environmental Protection Act, on CO_2 emissions within the context of South Asian Association for Regional Cooperation (SAARC) countries. By exploring into the nexus between policy interventions, economic growth, and CO_2 emissions, this research focuses to contribute to the efficacy of environmental policies in mitigating the environmental degradation among developing economies.

. Environmental policies play a moderating role in shaping the impact of economic development on CO_2 emissions. The study explores how factors like Gross Domestic Product (GDP), financial development, and a country's openness to trade interact with the environmental policies. This will provide a more nuanced understanding of how these policies indirectly affect CO_2 emissions.

The research mainly focuses on analyzing the impact of environmental policy on CO_2 emissions. The objectives of the study are as follows:

- To what extent has the environmental policies influenced the reduction of CO_2 emissions in SAARC countries.
- Whether the environmental policies play a moderating role in mitigating the adverse environmental effects resulting from the economic growth.

In Section 2, literature review is presented on the relationship between environmental policy, growth, and pollution emissions. Whereas, in Section 3, the variables are defined and methodology is explained. Section 4 focuses on the results and provides discussion And Section 5 concludes the research.

Literature Review

CO_2 emissions are gradually rising among the developing countries. This increase is closely related to the rapid growth and industrialization in these economies, emphasizing the fact that economic expansion is a significant source of CO_2 emissions. In order to control the environmental pollution, various governments adopt policies aimed at reducing CO_2 emissions. Nevertheless, the question that arises is whether these policies have a significant role in reducing CO_2 emissions.

An Environmental Protection Act (EPA) generally includes environmental regulations and standards. It may set emissions reduction targets and emissions reporting requirements for various industries (Li & Zhang, 2022; Yin et al., 2022). These regulations often require corporations to monitor and report their emissions. Further, numerous environmental protection acts include provisions to promote the use of renewable energy sources, such as hydroelectric power, wind, and solar. These regulations are established within the framework of international climate and trade law, which encourages the use of renewable energy (Monti, 2023). These acts directly contribute to the environmental performance in the context of energy sector (Liu et al., 2023). Such legislation establishes energy efficiency standards for vehicles (Sachs, 2012). Improvement in energy efficiency results in lower CO_2 emissions associated with energy generation (Houde & Spurlock, 2016). Environmental protection acts may encourage sustainable land usage and agriculture practices that reduce CO_2 emissions. They may also allocate funds for research and development of clean technologies which can directly impact CO_2 emissions (Bianchini & Croce, 2022).

Additionally, such legislation usually includes penalties for non-compliance with emissions regulations. This incentivizes businesses and industries to reduce their emissions in order to avoid financial penalties (Li & Zhang, 2022). However, several studies explained that there are no significant effects of penalties, such as paying fines in case of violation and it is still profitable for firms after paying the fines (Atkinson, 2022). A study by Shevchenko (2021) analyzed the US public firms that were penalized for violating the environmental regulations. It was conducted to determine whether the penalties improved their environmental performance or not. However, the researcher found that the firms penalized for non-compliance did not exhibit improvements in the environmental performance. Environmental protection act can also be influenced socially by promoting public awareness and education about the importance of reducing CO_2 emissions, which can lead to behavioral changes at the individual and community levels.

At international level, these acts are passed to fulfill a country's commitments under multilateral environmental agreements such as Kyoto Protocol and Paris Agreement that aim to limit global temperature rise by reducing the CO_2 emissions (Averchenkova & Matikainen, 2017; Eskander et al., 2020). Hilmi et al. (2020), analyze the process of energy transition and economic diversification in Kuwait to achieve pollution mitigation goals outlined in the Paris agreement.

The researchers have analyzed the impact of different policies and factors on the reduction of CO_2 emissions. Notably, they found that carbon taxation emerged as one of the most effective policies and compared its effectiveness to that of several other measures employed for greenhouse gas reduction (Costa et al., 2018; Huisingh et al., 2015; Metcalf, 2019; Nabernegg et al., 2019).

There are various mandatory and voluntary policy measures and their results showed that these policies and technologies are effective for emission reduction. Public benefit funds play a significant role in reducing greenhouse gas emissions (Dietz & Venmas, 2019; Martin & Saikwa, 2017). One remarkable study focused on improving the efficiency of policies by examining the implementation of various policies, assessing the cost-effectiveness of taxes at the market level, utilizing different policy tools to create the most effective policy package, and identifying the potential for the most effective policy. However, the results did not support cap and trade policies as an effective method for reducing the emissions. Furthermore, it was found that the imposition of carbon taxes and value-

added fuel taxes have a significant causal effect on the emissions (Andersson, 2017; Jose et al., 2019; Scheraga & Leary, 1992).

Nevertheless, the policy measures are only effective in the presence of quality institutions that implement environmental policies to reduce CO_2 emissions and improve environmental quality. Certainly, the emerging countries prioritize institutional reforms to create more favorable economic environments, even when their GDP is relatively low (Ali et al., 2019; Ibrahim & Law, 2015; Khan et al., 2020; Nguyen et al. 2018; Yang et al., 2016).

Numerous policies are introduced not only at domestic level but at international level too. Kyoto Protocol is a multilateral environmental treaty signed by various countries to reduce the CO_2 emissions followed by the Paris Agreement adopted in 2015. Previous researches have proven that Kyoto Protocol is effective in reducing the emissions (Grunewald, 2015; Hartl, 2019; Kim et al., 2020; Wang et al, 2019). The European Union Emissions Trading System has secured CO_2 of almost 1.2 billion tons, which is due to the commitments of government and Kyoto protocol (Bayer & Aklin, 2020)

Environmental Protection Act (EPA) may influence the impact of factors related to economic growth on CO_2 emissions. In other words, it moderates the effects of economic growth factors on pollution.

A higher GDPPC, specifically at initial stages, indicates a stronger economic growth, thereby leading to an increase in pollution. An EPA moderates this effect by incorporating strict environmental regulations on various sectors. Subsequently, these regulations impose penalties in case of non-compliance. Thus, the increasing effects of economic growth on CO_2 emissions may be moderated by EPA. Further, EPA contains policies that encourage the use of renewable energy. Thus, the growth will be experienced through renewable energy instead of pollution emitting non-renewable energy sources (Chien, 2022).

The EPA can promote financial initiatives that are sustainable, such as green investment funds. In this way, financial development within a country can have a mitigating impact on the pollution emissions. A well-developed financial system can facilitate investment in clean technologies and renewable energy, making it easier for firms to comply with environmental regulations (Jamil et al., 2023). Additionally, access to financial resources can support research and development efforts aimed at reducing the emissions (Lin et al., 2023). Therefore, greater financial development may enhance the effectiveness of environmental policies in reducing the CO_2 emissions.

International trade can increase or decrease CO_2 emissions in a country. On one hand, trade openness may lead to the transfer of pollution emitting industries from countries with stringent environmental regulations to those with lax regulations (referred to as pollution haven hypothesis). This leads to increasing pollution emissions. On the other hand, trade can facilitate cleaner technologies between the countries, leading to reduction in carbon emissions (Taşdemir, 2022). The EPA can incorporate emission standards for traded goods and services. Hence, this ensures pollution mitigation through trade (Ye et al., 2021).

In conclusion, the literature on the impact of environmental policy on CO_2 emissions provides important insights into the complex relationship between policy and environment. Recently, policy innovation has emerged as an important factor to combat climate change. As evidenced by numerous studies, policies such as promotion of renewable energy technologies, encouraging energy efficiency, and sustainable transportation through investments in public transportation have demonstrated significant potential to reduce the pollution emissions. Further, these policies do not only have direct effects on CO_2 emissions, but they also moderate the potential pollution emissions from the rising economic growth, financial development, and openness to international trade. The literature

emphasizes the importance of a policy approach to achieve reductions in pollution while fostering sustainable economic growth.

Therefore, the hypotheses formulated are as follows:

H_1: Environmental policy significantly mitigates pollution emissions.

H_2: Environmental policy plays a significant role in mitigating the adverse environmental impacts resulting from economic growth, financial development, and trade openness.

Data and Methodology

The panel data for four SAARC countries, namely Bangladesh, India, Pakistan, and Sri Lanka was taken for the period of 1965-2019. The dependent variable, CO_2 emissions is measured as metric tons per capita. The source for the data of CO_2 emissions is (BP) British Petroleum. On the other hand, the explanatory variable is the Environmental Protection Act (EPA). It contains policy mechanisms that intend to mitigate pollution. The policy variable is denoted with dummy, taking value of '1' from the year, Environmental Protection Act is enacted and '0' otherwise. Controlled variables used in this study are the signing of Kyoto Protocol, GDP per capita (GDPPC), Gross Fixed Capital Formation (GFCF), Foreign Direct Investment as a percentage of GDP (FDI), trade as a percentage of GDP, energy use, and financial development that is proxied as domestic credit to private sector. Kyoto protocol is a dummy variable taking value '1' for the years after Kyoto protocol is signed by the respective countries and '0' otherwise. The data for variable energy use is taken from British Petroleum (BP) and the data for other controlled variables are taken from the World Development Indicators (WDI).

The econometric analysis employs the country and time fixed effects methodology. The country fixed effects involve including of all the dummy variables for each country. These dummy variables capture unobserved heterogeneity across countries that might affect CO_2 emissions but are constant over the time. By including country fixed effects, the time-invariant country-specific factors that could influence CO_2 emissions, such as geographical features, cultural practices, or historical factors can be controlled.

The year (time) fixed effects entail introducing dummy variables for each year in the sample. These variables capture common shocks or trends that affect all countries in a given year but may vary across different years. By incorporating year fixed effects, this analysis helps to mitigate the impact of time-varying variables that might affect CO_2 emissions, such as economic conditions, technological advancements, and significant global events like economic recessions or major climate events. This approach helps to mitigate the risk of spurious correlations or omitted variable bias stemming from the time-varying factors that could potentially confound the analysis.

The model specification is shown as:

$$lnCO2_{it} = \alpha + \beta_1 EPA_{it} + \beta_2 lnGDPPC_{it} + \beta_3 lnGDPPC_{it}^2 + \beta_4 lnFINDEV_{it} + \beta_5 lnGFCF_{it} + \beta_6 lnTRADE_{it} + \beta_7 lnFDI_{it} + \beta_9 KYOTO_{it} + \gamma_i + \varphi_t + \varepsilon_{it}$$

Here, $CO2_{it}$ represents CO_2 emissions for country i in year t. While, EPA_{it} is the explanatory variable capturing the presence of a comprehensive environmental policy. The variables $GDPPC, FINDEV, GFCF, TRADE, FDI, ENERGYUSE, and\ KYOTO$ are GDP per capita, financial development, gross fixed capital formation, trade, foreign direct investment, energy consumption, and the signing of KYOTO protocol respectively. The terms $\gamma_i and\ \varphi_t$ represent country and year (time) fixed effects, respectively. The error term ε_{it} captures unobserved factors that affect CO_2 emissions and are not included in the model.

Results and Discussion

The study seeks to examine the effects of the Environmental Protection Act on CO_2 emissions. Table 1 shows the estimated results for the CO_2 emissions through country and time fixed effects methodology.

Table 1
Impact of Policy on CO_2 Emissions

Variables	(1)	(2)	(3)	(4)
EPA	-0.103	0.246***	-0.362	-0.108**
	(0.291)	(0.566)	(0.338)	(0.0503)
KYOTO	0.179	0.125**	-0.662	-0.106
	(0.273)	(0.054)	(0.597)	(0.065)
GDPPC	8.115***	1.905***	17.427***	1.466***
	(1.7401)	(0.404)	(3.277)	(0.397)
$GDPPC^2$	-0.591***	-0.098***	-1.251***	-0.126***
	(0.126)	(0.0301)	(0.225)	(0.028)
FINDEV	1.557***	0.2206***	1.3608***	0.2409***
	(0.295)	(0.591)	(0.3505)	(0.047)
GFCF	1.055**	-0.529***	1.837***	0.297**
	(0.447)	(0.145)	(0.549)	(0.135)
TRADE	-3.048***	0.117	-3.66***	-0.163**
	(0.198)	(0.074)	(0.281)	(0.064)
FDI	0.225***	0.0545***	0.302***	-0.008
	(0.064)	(0.013)	(0.0806)	(0.013)
Country FE	NO	YES	NO	YES
Time FE	NO	NO	YES	YES
Observations	181	181	181	181
R-Squared	0.694	0.045	0.769	0.252
No. of Countries	4	4	4	4

Note. Standard errors in parentheses The dependent and all independent variables are logged except EPA and KYOTO.
*** $p<0.01$. ** $p<0.05$. * $p<0.1$.

Column 1 shows the estimation results without controlling for the country and time specific effects. The policy variable shows negative sign and Kyoto is positive, however both are insignificant, implying no effects on CO_2 emissions. The control variables, GDPPC, FDI, and FINDEV have a positive and significant relationship with CO_2 at a significant level of 1%. GFCF also shows positive effects at the significant level of 5% on CO_2 emissions. Trade and GDPPC square affect CO_2 emissions negatively at 1% significance level.

In Column 2, the results of regressions including country fixed effects are presented, although the time trend is not specified in this estimation. The obtained results indicate a positive and statistically significant impact of the Environmental Protection Act (policy) and the Kyoto Protocol on CO_2 emissions. This suggests a positive association between the policy measures and emissions at the 1% significance level. However, it is important to note that this positive association may be due to the omission of time trends in this estimation. Additionally, variables such as GDPPC, FINDEV, and FDI exhibit a positive and significant impact on CO_2 emissions that too at the 1% significance level. Conversely, variables GFCF and GDPPC square demonstrate a negative impact on CO_2 emissions, significant at the 1% level. It should be noted that these estimations may suffer from spurious correlation issues, as they do not account for the time effects.

Similarly, Column 3 shows the estimation findings by including time trends but ignoring country fixed effects. The results indicate that both policy and Kyoto exhibit a negative impact on CO_2 emissions, although these effects are statistically insignificant. This suggests that there is no significant impact of Kyoto and environmental policy measures on CO_2 emissions.

Column 4 presents the estimation outcomes, incorporating both country and time fixed effects, which represent the full model. This is most pertinent among all estimations presented before. The results show that environmental policy in the form of Environmental Protection Act has a negative impact on CO_2 emissions and these results are significant at 5%. It further shows that adoption of policy causes around 11% decrease in CO_2 emissions. Thus, the findings suggest that environmental policies, such as EPA are effective in achieving their intended objectives of reducing CO_2 emissions among the sample countries of the current study. This implies that regulatory measures and initiatives aimed at promoting environmental conservation and sustainability are making a positive difference in addressing the pollution concerns. It also suggests that the governmental or institutional initiatives aimed at regulating emissions, promoting renewable energy, or incentivizing cleaner technologies are effective in mitigating environmental impact. Increased investment and focus on environmental policy measures could potentially result in even more significant reductions in CO_2 emissions over the time.

The results also show that Kyoto variable has negative but insignificant effects on CO_2. Kyoto Protocol is an international environmental agreement and is signed by 191 states and the European Union (Kim et al., 2020). The selected four countries in the panel analysis of this research have signed Kyoto protocol, however in different years. The negative but insignificant impact shows that SAARC countries did not manage the commitments affirmed in Kyoto Protocol thus, failed in reducing the CO_2 emissions. It is argued that Kyoto Protocol failed to achieve the goals because of less funds and resources available in these acts. There was also deficiency in the institutional design of Kyoto agreements Rosen (2015), which undermined their capacity to reduce carbon emissions, thus confirming the results of current study.

The income has a positive effect on CO_2 emissions and this result is highly significant at 1%. The results show that a 1% increase in GDPPC leads to a 1.46% increase in CO_2 emissions. Similarly, a 10% increase in GDPPC causes a 14.6% increase in CO_2 emissions, if other things remain constant. The reason why CO_2 and GDPPC have a positive relationship is that whenever developing countries experience economic growth, it results in an increase in pollution and hence CO_2 emissions.

However, the positive coefficient of the GDP variable alone does not provide a comprehensive understanding of the relationship between income and emissions. This is because the coefficient of the quadratic term of the income variable is both negative and statistically significant. This suggests that when income increases beyond a certain threshold, environmental degradation may actually decrease. At the initial stages, countries relied on fossil fuels in order to meet their energy needs. Subsequently, with the increase in income/revenue, the countries eventually shift towards renewable energy resources that result in enhancing the quality of environment. This claim is shown by the outcome of GDPPC^2 which has a negative sign along with high significance at 1% level. This also shows that the Environmental Kuznets Curve exists in the current analysis in the form of inverted U-shaped curve. The inflection point is 5.82. Hence, it is proved that when economic growth takes place, a surge in CO_2 emissions also appears.

The results of the controlled variable that is, financial development show that it negatively affects environmental performance and the results are highly significant at 1%. A 10% increase causes a 2.4% increase in CO_2 emissions. The focus of the developing countries is to attain growth and the private sector's goal is to achieve more and more profit. Therefore, when the domestic credit is given to the private sector, instead of using a part of this finance on climate issues and carbon emission reductions, almost all of it is spent on new businesses and other profitable investments in

order to earn more economic growth disregarding the environment. Further, GFCF has a positive impact on CO_2 emissions and the results are significant at 5%. A 10% increase in GFCF leads to a 2.97% increase in CO_2 emissions. Capital formation means to invest on the capital goods and utilize the resources to the fullest, which in turn increases the economic growth but also have negative impact on the environment. Developing countries invest more on the machinery, infrastructure, and resource intensive assets that cause increase in carbon emissions. On the other hand, developed countries invest in new software and services that are less resource intensive and are not the source of emissions (Sodersten et al, 2018).

Interestingly trade openness shows a negative relationship with CO_2 emissions and is significant at 5%. It is because trade provides awareness to the people regarding clean environment. Trade also increases the affluence in the country and more prosperity results in the reduction of CO_2 emissions (Choi et al., 2010; Yu et al., 2019). FDI has a negative, however, insignificant effects on CO_2 emissions. This suggests that there is no relationship between FDI and CO_2 emissions. Among the developing countries, FDI is useful and developing countries try that more and more people invest in the country so that there is an increase in the economic growth. Here, the results indicate no evidence for the pollution haven hypothesis, as the coefficient of FDI is statistically insignificant. This implies that FDI does not have a significant impact on pollution levels.

The study also analyses the influence of the Environmental Protection Act on the impact of growth variables (sources of pollution) on pollution emissions by using interaction terms. Table 2 shows the results.

Table 2

Impact of Policy on CO_2 Emissions and Other Sources of Pollution

Variables	(1)	(2)	(3)	(5)	(6)
POLICY	3.1***	1.6***	-1.0***	0.6***	-0.1***
	(0.682)	(0.359)	(0.27)	(0.144)	(0.065)
KYOTO	-0.148*	-0.15**	-0.050	-0.122*	-0.129*
	(0.06)	(0.06)	(0.06)	(0.059)	(0.066)
GDPPC	0.90**	0.382	1.7***	1.3***	1.4***
	(0.383)	(0.427)	(0.387)	(0.36)	(0.393)
$GDPPC^2$	-0.045	0.002	-0.1***	-0.1***	-0.1***
	(0.031)	(0.037)	(0.028)	(0.026)	(0.028)
FINDEV	0.1***	0.1***	0.041	0.2***	0.2***
	(0.045)	(0.045)	(0.071)	(0.432)	(0.048)
GFCF	0.173	0.166	0.4***	0.2***	0.28**
	(0.126)	(0.126)	(0.134)	(0.122)	(0.133)
TRADE	-0.107*	-0.103*	-0.2***	-0.048	-0.14***
	(0.06)	(0.06)	(0.06)	(0.062)	(0.065)
FDI	0.004	0.003	-0.011	0.012	0.006
	(0.012)	(0.012)	(0.013)	(0.013)	(0.015)
POL*GDPPC	-0.05***				
	(0.116)				
$POL*GDPPC^2$		-0.05***			
		(0.01)			
POL*FINDEV			0.3***		
			(0.09)		
POL*TRADE				-0.2***	
				(0.042)	
POL*FDI					-0.33*
					(0.01)

Variables	(1)	(2)	(3)	(5)	(6)
Observations	181	181	181	181	181
R-Squared	0.224	0.2224	0.287	0.263	0.250
No. of Countries	4	4	4	4	4

Note. Standard errors are in parentheses The dependent and all independent variables are logged expect EPA and KYOTO.
*** $p<0.01$. ** $p<0.05$. * $p<0.1$.

The above results show that as GDPPC increases (causing higher emissions), the presence of environmental policy acts as a mitigating factor, leading to a decrease in CO_2 emissions (see column 1). This suggests that environmental policy interventions have a mitigating effect on the positive relationship between GDPPC and CO_2 emissions. The negative moderating effect of the environmental policy indicates that as the economy grows beyond a certain point (represented by the quadratic term), the presence of environmental policy either diminishes the increase in CO_2 emissions or leads to a decrease in it (column 2). Hence, this suggests that environmental policy becomes increasingly effective in mitigating emissions as economic development reaches the higher levels.

The above statement also suggests that the impact of trade openness on CO_2 emissions is moderated by the presence of environmental policies. More specifically, it indicates that when environmental policies are in place, they have a negative and significant moderating effect on the relationship between trade openness and CO_2 emissions. This can further be attributed to the regulatory standards set in the policy. These policies influence industries to get engaged in international trade in order to adopt cleaner technologies, improve energy efficiency, or reduce emissions during production. Further, these policies may have provisions for innovation and development of cleaner technologies and leading to the trade of cleaner technologies thus, mitigating the CO_2 emissions. Finally, the policy variable is not found to be significantly moderating the effects of FDI on the CO_2 emissions.

Conclusion

The CO_2 emissions have emerged as a major concern in recent years. The researchers are investigating its causes whereas the policy makers are devising policies in order to control it. The purpose of this study was to examine the impact of the Environmental Protection Act enacted by SAARC countries for the reduction of CO_2 emissions. Through an analysis of various environmental policy instruments, including carbon taxes, the Kyoto Protocol, and carbon emissions trading schemes, the study pursued to assess their impact on CO_2 emissions.

By utilizing country and time fixed effects methodology, the study revealed that Environmental Protection Acts play a significant role in reducing the carbon emissions. The findings emphasized the importance of domestic policies in handling the environmental pollution. However, the study also found limitations in international agreements, such as the Kyoto Protocol, indicating that they may not be effective in mitigating the CO_2 emissions.

Moreover, the Environmental Protection Acts were found to moderate the impact of income, financial development, and trade on CO_2 emissions. This signifies the role of environmental policies in incorporating an integrated framework.

Policy Recommendations

The results of the study suggest few important policy implications. These include the need for implementation of environmental policies to mitigate the CO_2 emissions. The governments should incorporate strong environmental regulations so that economic growth, trade, and financial development has positive effects on the environment.

Conflict of Interest

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

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