Economic Journal of Emerging Markets, 16(2) 2024, 151-163

EJEM
Econ.J.Emerg.Mark.

Economic Journal of Emerging Markets
Available at https://journal.uii.ac.id/jep

Effects of foreign direct investment on climate change in the Asian region

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Article Info

Article history:
Received 05 March 2024
Accepted 16 October 2024
Published 30 October 2024

JEL Classification Code:
P34, Q56.

Author's email:
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DOI: 10.20885/ejem.vol16.iss2.art5

Abstract

Purpose — This research aims to empirically investigate and compare the effects of foreign direct investment on climate change in five South Asian nations.

Methodology — This research uses yearly data covering 1980–2020 in five South Asian nations: Bangladesh, India, Nepal, Pakistan, and Sri Lanka. Vector Autoregressive (VAR) methods with variance decomposition and impulse response function provide the basis of the empirical data for comparison analysis.

Findings — This research shows that foreign direct investment's impact on pollution ranges from 1% to 10% in four countries and 16.13% in Pakistan. This indicates that in five South Asian states, there is little endogenous correlation between foreign direct investment and pollution. Furthermore, a shock to foreign investment improves the environmental conditions in Bangladesh and India while harming the growth of other nations.

Implications — The impact of foreign direct investment on pollution may vary based on each country's economic situation. Public efforts to enhance capital goods, education, health, and infrastructure are essential for reducing pollution and attracting foreign investment. Therefore, improved transparency and governance are essential for a positive relationship between growth and foreign investment.

Value/Originality — This research contributes to analyzing and comparing the effects of foreign direct investment on climate change in five South Asian nations using Vector Autoregressive (VAR) methods.

Keywords — Climate change, foreign direct investment, South Asia, vector autoregressive

Introduction

Environmental contamination is a growing issue that concerns many nations and is studied by many academics. However, it still needs to be clarified and debatable exactly what factors contribute to environmental contamination. Because of the rising emissions from manufacturing and consumption activities, the environment is getting worse. In addition to harming people's health and quality of life, this also contributes to global warming, a grave threat to human survival. Natural disasters, including super typhoons, droughts, and forest fires, occur more frequently, with more significant losses due to climate change (Omri & Kahouli, 2014; Behera & Dash, 2017).

The industrial sector is one of the main drivers of economic growth in these states, accounting for almost 26% of GDP. The most crucial factor influencing development in this

P ISSN 2086-3128 | E ISSN 2502-180X

industry is increasing foreign resource mobilization, which is needed to improve industrial production (Khan & Kim, 1999). In addition to a wide range of structural reforms and incentives to be friendly to foreign investors and local sectors, South Asia is implementing good macroeconomic policies (Khan & Samad, 2010; Mckinnon, 2010; Sims, 1992). The relationship between FDI inflows and their drivers has been studied (Afza et al., 2019; Hakro & Ghumro, 2021). However, prior research on the connection between pollutant emissions and FDI needs to be more extensive. The role of foreign direct investment in economic growth is gradually growing, as is concern over environmental issues. As a result, the function of FDI has generated questions that can enhance their capacity for innovation and efficiency (De Gregorio et al., 1998). Foreign direct investment (FDI) is a source of capital and can be essential for investments in technology, infrastructure, and other productive assets. This inflow of capital promotes economic growth and aids in financing development initiatives. FDI frequently results in the development of new jobs. When foreign businesses shop in a nation, they usually hire local laborers, which lowers unemployment and creates job prospects (Alfaro et al., 2021).

Foreign businesses frequently introduce cutting-edge management techniques, technology, and expertise to the nation where they operate. Increased productivity and competitiveness in home industries can result from this technology and skill transfer, advancing economic growth. FDI can increase imports and exports. Foreign businesses may export products and services made in the destination nation to increase export revenue. They might also import intermediate products and services, boosting commerce (Ndikumana & Verick, 2018). Foreign direct investment (FDI) frequently includes investments in the construction of factories, transportation networks, and utilities. In addition to helping foreign businesses, these investments strengthen the nation's infrastructure and encourage more trade. Foreign direct investment can produce positive spillover effects on domestic businesses and industries. For instance, through partnerships with regional suppliers, competition, and knowledge sharing, domestic businesses

In comparison to developed countries, developing countries could have laxer environmental laws. Several causes could be a need for more enforcement resources, conflicting development goals, or a desire to draw in foreign capital to boost the economy. This could include measures or regulations that prefer economic growth over environmental preservation, such as easing the process of obtaining permissions or laxly enforcing existing laws. Due to the lax environmental rules, international investors may find it profitable to move their operations to these countries. By doing this, they may be able to avoid paying expenses related to meeting more stringent environmental regulations back home. The situation presents a potential opportunity for global investors to capitalize on the comparatively lighter regulatory burden. (Khan & Kim, 1999).

The literature has differing opinions on how foreign direct investment (FDI) affects environmental risk. Most studies (Frutos-Bencze et al., 2017; Jorgenson et al., 2007; Omri & Kahouli, 2014) conclude that FDI toxins the environment. On the other hand, other researchers contend that FDI enhances the host country's environment by deploying advanced climate-resilient technologies (Hines & Rice, 1994). This makes it difficult for policymakers and researchers to understand fully how FDI affects the environment. According to empirical data (De Gregorio et al., 1998; Mckinnon, 2010), the availability of capital resources supports economic activity. For this reason, the empirical literature (Frutos-Bencze et al., 2017; Jorgenson et al., 2007; Zhu et al., 2016) is leaning toward examining the impact of capital resources on environmental risk. There is little doubt that South Asia and Africa need more cash to expand their economies (Ho et al., 2007).

For several reasons, the impact of FDI on the environment is very important. Advanced nations tighten environmental regulations as they become wealthier, making it costly for businesses that use much carbon to stay in business. Most of these businesses relocate to emerging and developing nations with laxer environmental regulations. This is another reason why studies have found that FDI increases environmental risk. For instance, (Singhania & Saini, 2021) examined the connection between FDI and environmental sustainability between 1990 and 2016 using a sample of 21 nations using dynamic system GMM, and the finding is that FDI significantly reduces environmental risk.

According to the empirical findings, FDI considerably raises environmental risk in Africa, (Halliru et al., 2020) also investigated the impact of foreign direct investment on the environment in Western Africa and found findings that agreed with those of (Bokpin, 2017; Yang et al., 2017). Numerous studies have linked foreign direct investment to poor environmental quality (Frutos-Bencze et al., 2017; Omri & Kahouli, 2014; Sbia & Shahbaz, 2017; Zheng & Sheng, 2017). The pollution-haven theory is the foundation of every study that claims that FDI pollutes the environment. This shows that multinational corporations (MNCs) choose countries with the lowest labor, materials, and land when choosing where to establish worldwide branches (Levinson & Taylor, 2008). Conversely, other researchers contest the arguments made by the advocates of the pollution-haven theory by pointing out several flaws in their work, including unsuitable measurement methods and scant empirical evidence (Kim & Adilov, 2011; Demena & Afesorgbor, 2020) did a thorough evaluation of the research that investigated how FDI affected emissions.

The main reasons for the contradictions in the literature include disparities in data samples (which combine industrialized and developing nations), econometric approaches, variations in environmental indicators, and various control variables. The heterogeneity issues in the plethora of research are exacerbated using different levels of development and emissions, which is why (Halliru et al., 2020) used 65 primary studies to create 1006 elasticities in their meta-analysis of the impact of FDI on environmental emissions. They also state that the underlying impact of FDI on environmental emissions is almost zero. However, after considering heterogeneity in the study, they discovered that FDI significantly lowers environmental emissions. Thus, the results of the studies on the effect of FDI on pollution levels have been conflicting. Few researchers have looked at the effect of FDI on CO2 emissions in many countries. Instead, most of the literature focuses on the effect of FDI on carbon emissions in a single country.

Due to a shortage of native capital, South Asian countries are known for getting the greatest foreign direct investment. They mainly rely on foreign finance to accelerate the state's pollution level and economic growth. This study examines the effects of FDI on environmental quality in five South Asian states, Bangladesh, India, Nepal, Pakistan, and Sri Lanka, for which time series data are available from 1980 to 2020. By comparing the potential effects of foreign direct investment on pollution for each of the five South Asian countries, this study seeks to present empirical data. Generally, a complex interaction of variables, such as the nature of investments, legal frameworks, technical developments, and the dedication of both local and foreign parties to environmental sustainability, determines how FDI affects pollution in South Asian nations. Effective environmental management and regulatory compliance are crucial to minimize potential drawbacks and optimize the advantages of FDI for sustainable development.

Methods

This study employs a vector autoregression (VAR) model using data from five South Asian countries from 1980 to 2020. The World Development Indicators produced by the World Bank provided the data for the three variables: real GDP per capita (henceforth, PGDP), pollution measured by carbon dioxide (henceforth, CO2), and foreign direct investment (henceforth, FDI).

The VAR model assesses the relative significance of numerous dynamic influences on macroeconomic variables (Bernanke,1986; Sims,1992). Additionally, the variance decomposition and impulse response function approaches are used to conduct the empirical analysis. The VAR model can be expressed as:

$$CO2_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 CO2_{t-1} + \sum_{i=1}^{p} \alpha_2 GDP_{t-1} + \sum_{i=1}^{p} \alpha_3 FDI_{t-1} + \varepsilon_t \quad (1)$$

$$GDP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 CO2_{t-1} + \sum_{i=1}^{p} \beta_2 GDP_{t-1} + \sum_{i=1}^{p} \beta_3 FDI_{t-1} + \mu_t \quad (2)$$

$$FDI_t = \gamma_0 + \sum_{i=1}^{p} \gamma_1 CO2_{t-1} + \sum_{i=1}^{p} \gamma_2 GDP_{t-1} + \sum_{i=1}^{p} \gamma_3 FDI_{t-1} + \epsilon_t \quad (3)$$

Where $\mathrm{CO2_t}, \mathrm{GDP_t}$, and $\mathrm{FDI_t}$ represent the values of $\mathrm{CO2}$ emissions, PGDP, and FDI at time t, respectively. α_0, β_0, and γ_0 are the intercept terms. α_1, β_1, and γ_1 are the coefficients representing the effects of lagged values of $\mathrm{CO2}_t$, α_2, β_2, and γ_2 are the coefficients representing the effects of lagged values of $\mathrm{GDP_t}$, α_3, β_3, and γ_3 are the coefficients representing the effects of

lagged values of $\mathrm{FDI_t}$ on the current values of each variable. ε_t, μ_t, and ϵ_t are error terms representing the stochastic disturbances or shocks in the system.

The time series of endogenous variables must be stationary, and no cointegration exists to estimate a VAR model. A VAR model helps assess the association among a set of economic variables. Each variable has an equation describing its evolution based on its own lags and the lags of all the other variables in the model. This is how all variables in a VAR model are handled symmetrically. The estimates that are produced can also be applied to forecasting. However, if a long-term association between the variables is found, a VEC model is calculated before variance decomposition and impulse response function techniques are used.

Results and Discussion

Unit root tests are run before the empirical analysis to ascertain whether time series data are stationary. That is, the stationarity requirement of the data is ensured using the conventional technique of the augmented Dickey-Fuller (ADF) test. All conceivable instances of "intercept," "intercept + trend," and "none" are taken into consideration using some selection criterion to identify the best lags for the unit root tests. The results of unit root tests are shown in Table 1, where all variables are non-stationary at levels but stationary when transformed to the first differences, i.e., when each variable is integrated of order one (I(1)), the most basic form of integration.

Table 1. Unit root test

Country	Variable	Intercept		Intercept and Trend		None	
		Level	1st Diff.	Level	1st Diff.	Level	1st Diff.
Bangladesh	CO2	12.23	-0.95	1.83	-7.96**	1.88	0.90
		(1.00)	(0.82)	(1.00)	(0.00)	(0.96)	(0.90)
	PGDP	-2.54	-7.23**	-2.76	-6.14**	0.86	-9.04**
		(0.50)	(0.00)	(0.22)	(0.00)	(0.88)	(0.00)
	FDI	-0.67	-7.54**	-1.39	-4.17*	-2.69*	-2.62
		(0.84)	(0.00)	(0.38)	(0.01)	(0.01)	(0.10)
India	CO2	3.06	-4.82**	-1.29	-6.04**	7.81	-0.21
		(1.00)	(0.00)	(0.88)	(0.00)	(1.00)	(0.60)
	PGDP	-0.91	-7.27**	-4.33	-7.12**	0.55	-7.29**
		(0.77)	(0.00)	(0.06)	(0.00)	(0.83)	(0.00)
	FDI	0.07	-7.22**	-1.21	-5.09**	-1.61	-6.71**
		(0.96)	(0.00)	(0.89)	(0.00)	(0.10)	(0.00)
Nepal	CO2	1.67	-6.88**	-0.82	-7.86**	7.81	-0.21
		(1.00)	(0.00)	(0.96)	(0.00)	(1.00)	(0.60)
	PGDP	-0.91	-7.27**	-2.50	-7.21**	0.55	-7.29**
		(0.77)	(0.00)	(0.33)	(0.00)	(0.83)	(0.00)
	FDI	0.07	-7.22**	-2.07	-7.35**	-1.61	-6.71**
		(0.96)	(0.00)	(0.55)	(0.00)	(0.10)	(0.00)
Pakistan	CO2	-0.89	-5.05**	-3.71	-5.05**	7.75	-3.73*
		(0.75)	(0.00)	(0.24)	(0.02)	(1.00)	(0.01)
	PGDP	-2.30	-7.60	-5.16*	-6.73**	4.07	-8.24**
		(0.62)	(0.00)**	(0.01)	(0.00)	(1.00)	(0.00)
	FDI	0.40	-8.11**	-2.48	-8.24**	2.16	-7.42**
		(0.98)	(0.00)	(0.34)	(0.00)	(0.99)	(0.00)
Sri Lanka	CO2	1.17	-5.16**	-374	-6.23*	14.91	-1.28
		(1.00)	(0.00)	(0.72)	(0.01)	(1.00)	(0.21)
	PGDP	-0.21	-8.25**	-2.42	-8.30**	2.42	-7.40**
		(0.93)	(0.00)	(0.37)	(0.00)	(1.00)	(0.00)
	FDI	-3.58	-7.95**	-3.42	-7.82**	0.08	-8.05**
		(0.11)	(0.00)	(0.06)	(0.00)	(0.71)	(0.00)

Notes: (i) *p*-values are provided in parentheses. (ii) * and **are significant at 5% and 1 % significance levels, respectively.

Examining whether FDI and CO2 have a long-term relationship is crucial because I(1) governs all variables. Table 2 displays the test findings for cointegrating links using the efficient method proposed by (Johansen, 1988). The null hypothesis is that no cointegrating relationship exists between CO2, FDI, and GDP. As a result, the analysis is based on VAR models.

Table 2. Cointegration test

Country	H_0	Trace Test		Max-Eigenvalue Test	
		H_1	Statistic	H_1	Statistic
Bangladesh	$\gamma = 0$	$\gamma \geq 1$	32.71** (0.00)	$\gamma = 1$	25.52** (0.00)
	$\gamma \leq 1$	$\gamma \geq 2$	7.19 (0.30)	$\gamma = 2$	4.20* (0.51)
India	$\gamma = 0$	$\gamma \geq 1$	64.12** (0.00)	$\gamma = 1$	39.82** (0.00)
	$\gamma \leq 1$	$\gamma \geq 2$	24.30** (0.00)	$\gamma = 2$	17.83** (0.05)
Nepal	$\gamma = 0$	$\gamma \geq 1$	37.77 (0.13)	$\gamma = 1$	16.23 (0.76)
	$\gamma \leq 1$	$\gamma \geq 2$	20.53 (0.31)	$\gamma = 2$	12.79 (0.61)
Pakistan	$\gamma = 0$	$\gamma \geq 1$	26.43** (0.00)	$\gamma = 1$	18.24** (0.00)
	$\gamma \leq 1$	$\gamma \geq 2$	9.18 (0.44)	$\gamma = 2$	7.99 (0.37)
Sri Lanka	$\gamma = 0$	$\gamma \geq 1$	41.31 (0.54)	$\gamma = 1$	24.62 (0.77)
	$\gamma \leq 1$	$\gamma \geq 2$	4.68 (0.39)	$\gamma = 2$	4.75 (0.40)

Notes: (i) *p*-values are provided in parentheses. (ii) * and **: significant at 5% and 1 % significance level, respectively

Table 3. Variance decomposition of FDI

Period	Bangladesh	India	Nepal	Pakistan	Sri Lanka
FDI impact on CO2					
1	0.90	3.20	2.90	8.42	5.71
2	1.10	4.22	4.56	11.11	7.37
3	1.44	5.31	5.96	13.11	8.73
4	1.60	6.63	7.16	14.12	9.23
5	1.95	7.80	8.16	16.13	10.94
FDI impacts on GDP					
1	0.00	0.00	0.00	0.00	0.00
2	0.35	5.77	3.28	14.62	2.22
3	3.13	25.22	3.13	26.16	2.89
4	7.48	45.29	3.26	29.47	2.83
5	9.06	54.59	3.64	28.30	3.56

Note: The figures denote the impact of FDI on pollution.

The outcomes of variance decomposition for FDI shocks are shown in Table 3. The results of the fifth period show that the impacts of changes in FDI on the calculation of CO2 are 1.95%, 7.80%, 8.16%, 16.13%, and 10.94%, respectively, for Bangladesh, India, Nepal, Pakistan, and Sri Lanka. In other words, the effect of any shocks to FDI on CO2 variation ranges from 1% to 16%, with Pakistan having the most significant influence (16.13%) and Bangladesh having the most negligible impact (1.95%). Apart from Pakistan, the CO2 shock alone accounts for over 90% of the CO2 volatility in five nations. This indicates that in five South Asian nations, the endogenous relationship between foreign investment and pollution is insignificant. However, when contrasting

Bangladesh and Pakistan, the impact of FDI shock on pollution determination is estimated to vary greatly depending on each country's economic environment.

On the other hand, the FDI impacts on GDP of the fifth period are 9.06%, 54.59%, 3.64%, 28.30%, and 3.56%, respectively. In this case, India has the highest (54.59%), and Sri Lanka has the lowest impact on GDP (3.56%). FDI significantly impacts India's GDP because of its advantageous economic policies, sizable and expanding market, sectoral variety, and strategic advantages.

Table 4 displays the results of the variance breakdown of CO2 shocks. The fifth period's findings indicate that for Bangladesh, India, Nepal, Pakistan, and Sri Lanka, the effects of variations in CO2 on the computation of FDI are 33.45%, 1.21%, 3.97%, 0.89%, and 2.82%%, respectively. Otherwise, any shock to CO2 impacts FDI variation that varies from 0.5% to 33%, with Bangladesh having the most impact (33.45%) and Pakistan having the most minor influence (0.89%). This suggests that the endogenous association between pollution and foreign investment is insignificant in five South Asian countries. However, comparing Bangladesh and Pakistan reveals that the predicted effects of foreign direct investment shock on pollution determination differ significantly based on the respective economic environments of each country.

Conversely, in that order, the fifth period's CO2 impacts on GDP are 14.38%, 50.48%, 0.91%, 1.41%, and 2.30%. In this instance, Nepal has the most negligible impact on GDP (0.91%), while India has the most significant (50.48%). Many factors contribute to India's high GDP from CO2 emissions, including the country's reliance on agriculture, health effects, issues in the energy sector, urbanization, effects of climate change, management of water resources, financial expenses associated with mitigation, and the tourism industry. When taken as a whole, these elements demonstrate the intricate connection between India's economic expansion and environmental sustainability. Integrated policies and investments that balance environmental preservation and economic development are necessary for controlling CO2 emissions and reducing their effects. In the case of Nepal, why CO2 has a low impact because CO2 emissions on Nepal's GDP can be attributed to several factors, including its low industrial base, reliance on renewable energy, emphasis on sustainable tourism, efficient government policies, small urban footprint, adaptive economic practices, limited dependency on fossil fuels, and international support. Nepal can manage its environmental impact and preserve economic stability.

Table 4. Variance decomposition of CO2

Period	Bangladesh	India	Nepal	Pakistan	Sri Lanka
CO2 impact on FDI					
1	0.00	0.00	0.00	0.00	0.00
2	2.16	0.88	3.38	0.78	2.27
3	19.62	2.35	4.20	1.06	3.33
4	29.51	1.82	4.20	1.00	3.13
5	33.45	1.21	3.97	0.89	2.82
CO2 impacts on GDP					
1	0.00	0.00	0.00	0.00	0.00
2	0.48	9.65	0.25	0.05	0.00
3	6.70	26.95	0.26	0.25	0.02
4	13.14	42.41	0.35	0.83	0.45
5	14.38	50.48	0.91	1.41	2.30

The variance decomposition of GDP is presented in Table 5. The impact on FDI in the fifth period varies from 1% to 10%, with the highest digit in Bangladesh and the lowest in India. The disparities in economic size, structure, sectoral focus, and growth stages account for the higher FDI shocks on GDP in Bangladesh as opposed to the lower FDI shocks in India. While India's more significant, diversified economy produces more muted GDP reactions to FDI inflows, Bangladesh's smaller, more concentrated economy leaves it more vulnerable to significant effects from FDI. GDP impacts on CO2 emissions range from 2% to 37%, with the biggest value in India and the lowest value in Pakistan.

In conclusion, India's broad and diverse industrial base, high energy consumption from fossil fuels, rapid urbanization, and historical emphasis on economic expansion above environmental sustainability are the leading causes of the country's most significant CO2 shocks on GDP. On the other hand, Pakistan's less industrialized economy, smaller population, slower rate of urbanization, growing emphasis on renewable energy, and more recent adoption of efficient technology account for the country's lower CO2 shocks on GDP. The two countries' GDPs are affected differently by CO2 emissions due to differences in structure and policy.

Table 5. Variance decomposition of GDP

Period	Bangladesh	India	Nepal	Pakistan	Sri Lanka
GDP impact on FDI					
1	0.15	20.66	0.22	0.21	9.25
2	1.49	10.48	1.33	0.08	10.69
3	3.88	5.46	2.97	0.15	9.65
4	6.57	2.58	2.79	0.63	8.36
5	10.54	1.11	2.42	1.49	7.44
GDP impacts on CO2					
1	0.19	7.48	0.67	0.18	13.63
2	0.20	19.37	37.40	0.92	9.86
3	1.36	27.19	35.67	1.59	9.64
4	3.96	33.22	30.68	2.12	9.65
5	7.70	37.90	24.46	2.46	9.69

Impulse Response Function

Figures 1 to 5 show the results of the impulse response function for the five countries. Here, we present them country-wise. Impulse Response of three variables (CO2 emissions, FDI, and GDP) in India shows that a shock to CO2 emissions leads to a modest increase in the first period and a cumulative effect in the subsequent periods. FDI shows a negative response initially but leads to an immediate increase in GDP. A shock to GDP leads to a significant positive response, resulting in increased economic output. The analysis highlights the dynamic interplay between these variables over time.

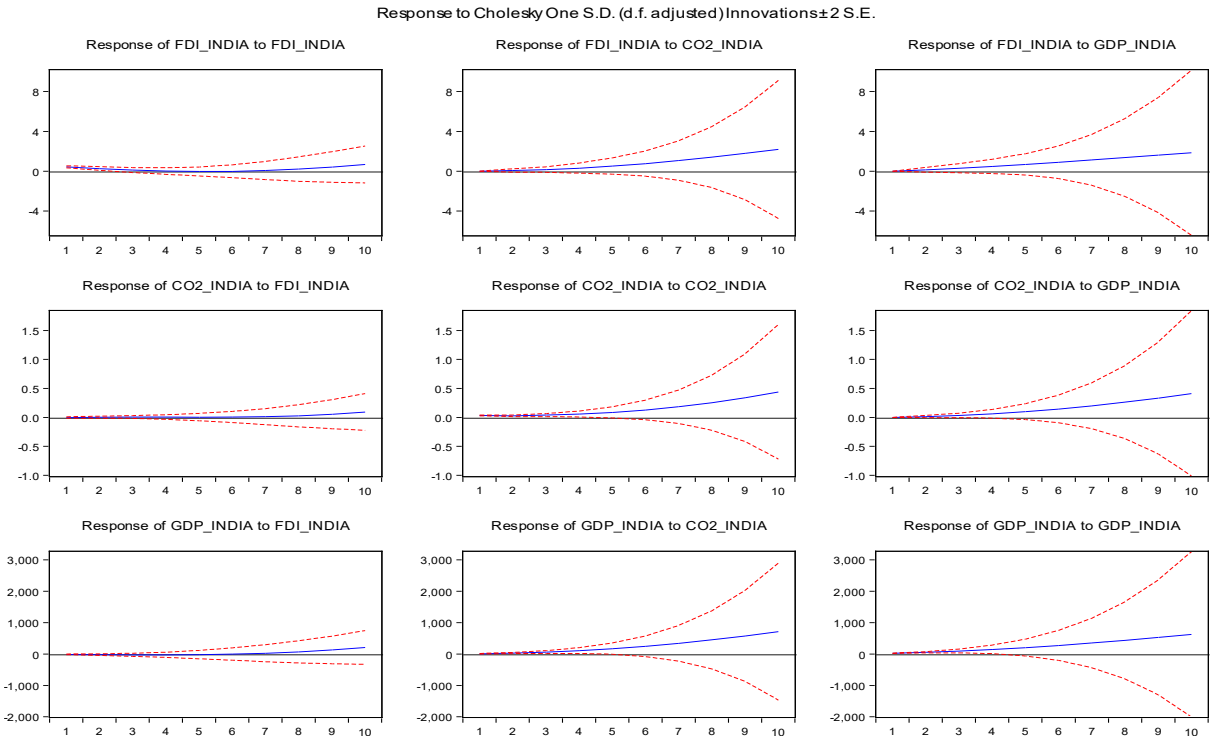

Figure 1. Impulse response function of India

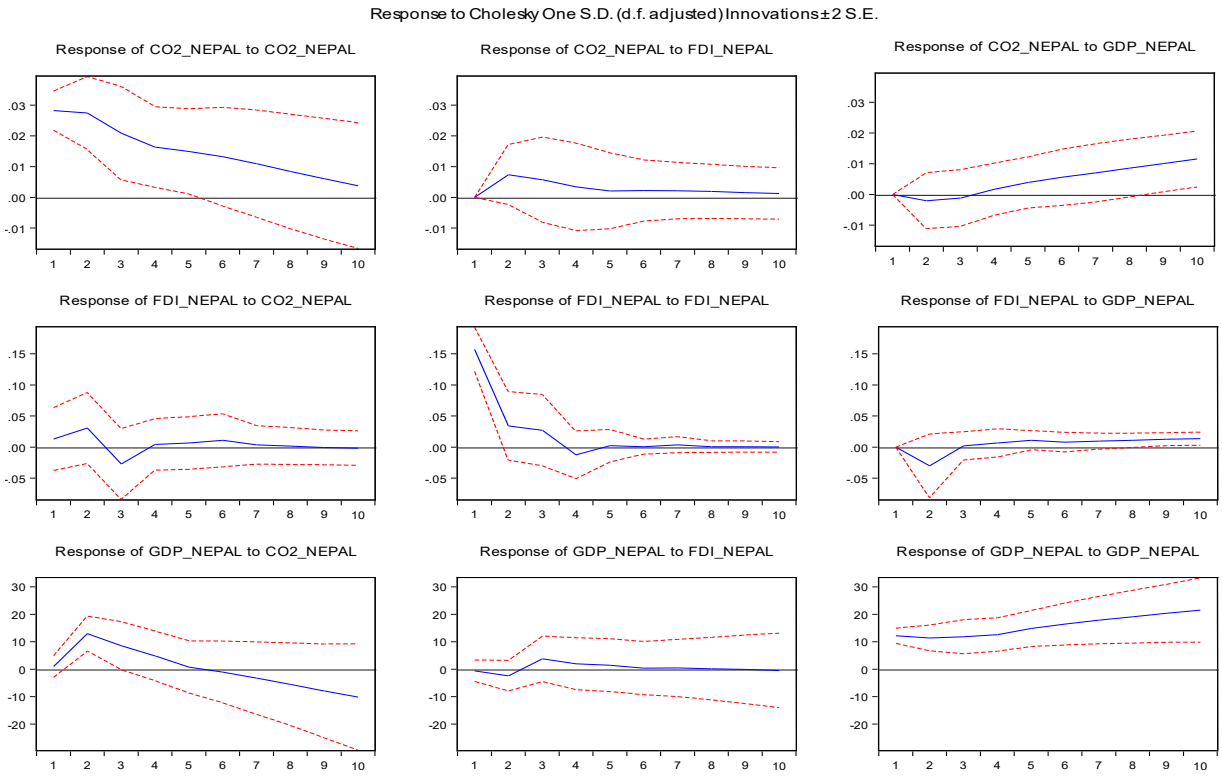

Figure 2. Impulse response function of Nepal

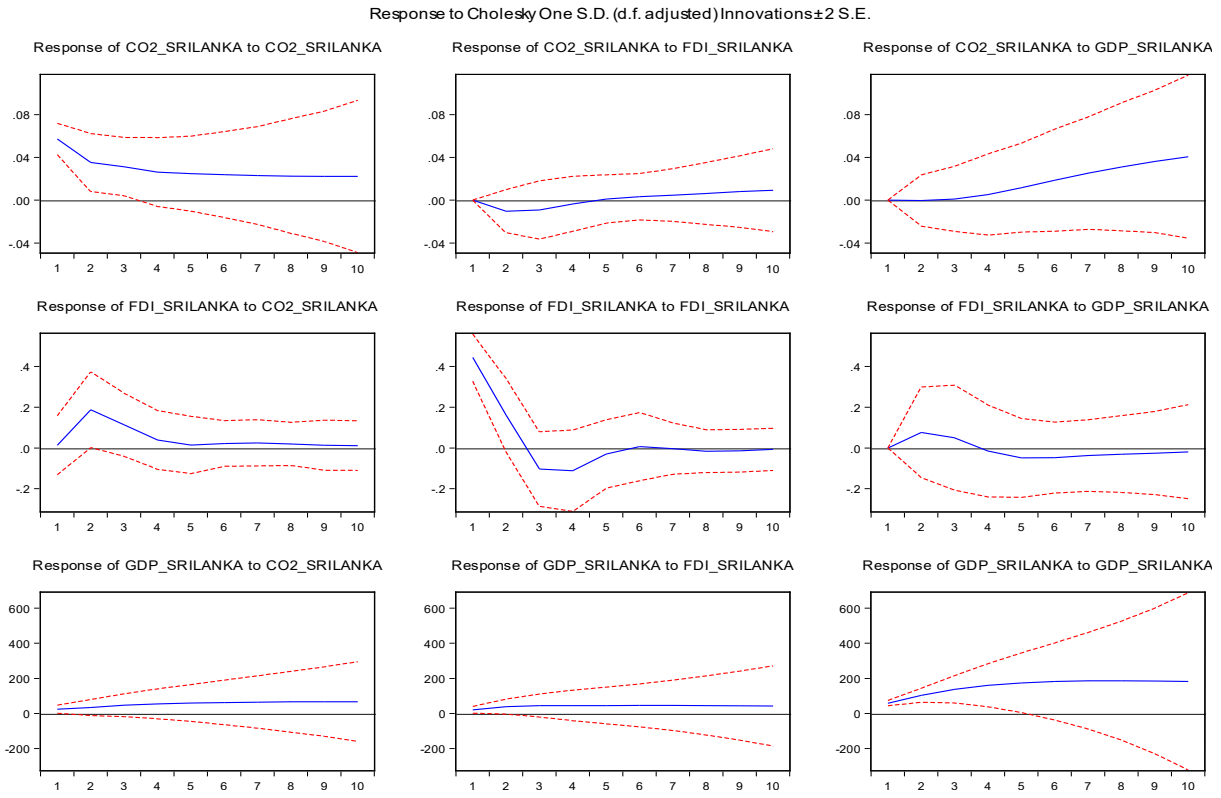

Figure 3. Impulse response function of Sri Lanka

The CO2 emissions shock has a cumulative impact on Nepal's CO2 emissions. The FDI shock has a slight increase in FDI but no significant impact on CO2 emissions or GDP. The GDP shock significantly increases GDP but negatively affects CO2 emissions and FDI. In Sri Lanka, a shock to CO2 emissions initially increases CO2 emissions itself but has no immediate impact on FDI or GDP. A shock to FDI initially increases FDI but does not immediately affect CO2

emissions or GDP significantly. A shock to GDP initially boosts GDP significantly and leads to increased CO2 emissions and FDI, although these effects diminish over time. In the case of Bangladesh, a shock to CO2 emissions initially increases CO2 emissions itself, while a shock to FDI initially boosts FDI and positively impacts GDP over time. A shock to GDP initially has a negative impact on CO2 emissions but leads to increased FDI and GDP over time. In Pakistan, a shock to CO2 emissions initially increases CO2 emissions, while a shock to FDI initially boosts FDI and positively impacts GDP over time. A shock to GDP initially positively impacts FDI and GDP itself but leads to decreased CO2 emissions over time.

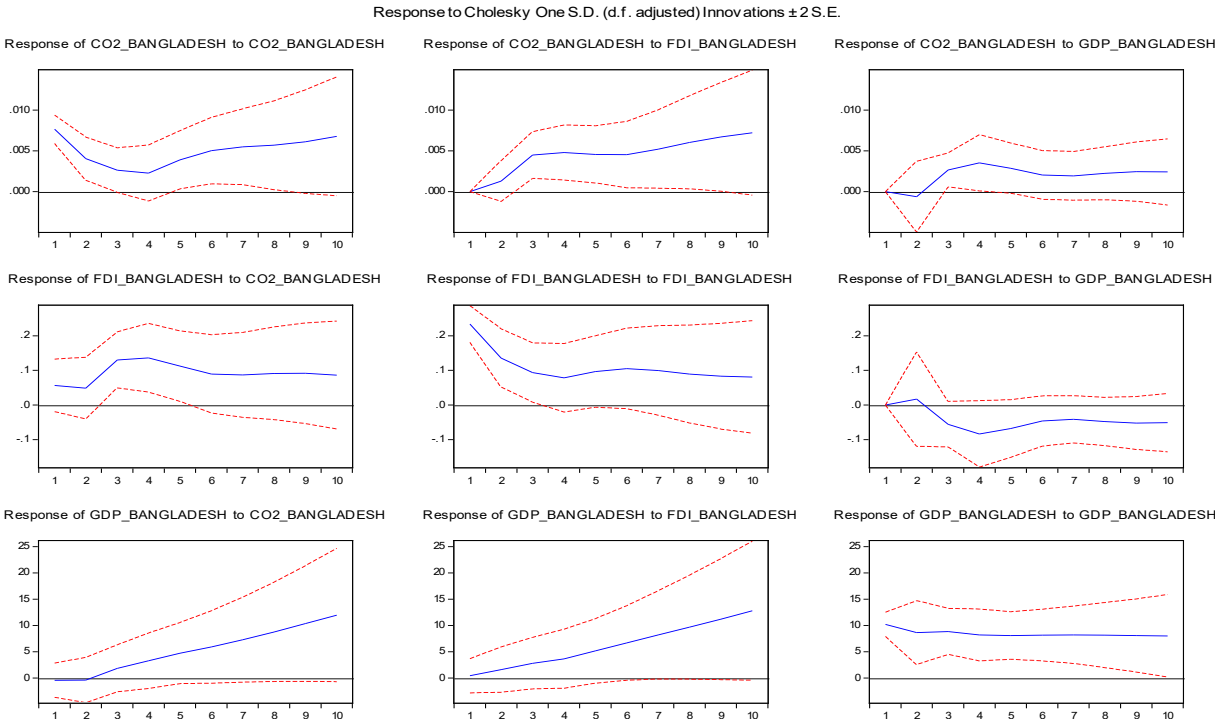

Figure 4. Impulse response function of Bangladesh

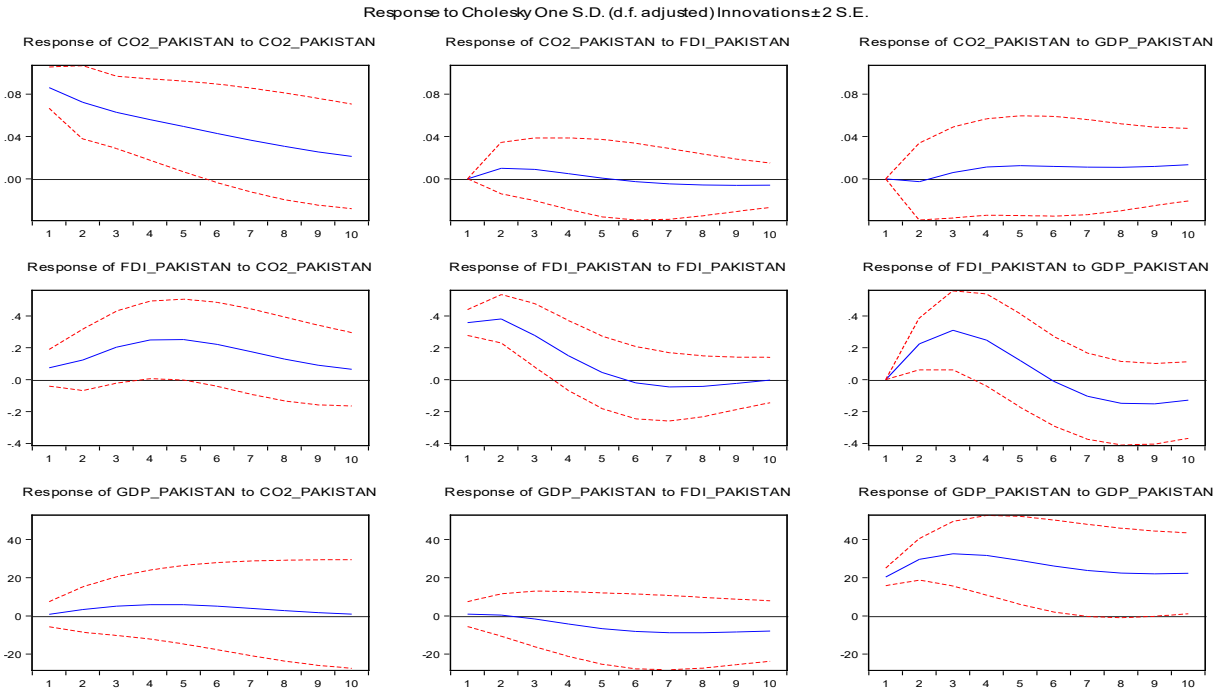

Figure 5. Impulse response function of Pakistan

Many studies have noted that the governance and corruption of the recipient nation may have an impact on how much FDI causes pollution (Ahmed & Long, 2012), (Levinson & Taylor,

2008), (Alfaro et al., 2010; Lai et al., 2020), (Ho et al., 2007) highlighted the possibility that foreign inflow may influence governance, demonstrating an endogenous relationship between the two. Therefore, it was concluded from the available research that foreign direct investment might have a detrimental effect on environmental quality in nations where corruption and weak governance are widespread.

In the South Asian region, foreign direct investment has a wide range of intricate consequences on pollution. More industrial emissions and the relocation of polluting businesses are two outcomes of FDI, even if it can also result in the transfer of cleaner technologies and more substantial environmental restrictions. The kind of industries receiving FDI, the strength and implementation of environmental laws, and the level of economic growth affect how much FDI impacts pollution in South Asia (Acheampong, 2019; Ntow-Gyamfi et al., 2020). Empirical data from many Asian nations reveals inconsistent outcomes. This study examined how foreign direct investment (FDI) affected Indonesia's CO2 emissions between 1975 and 2011. According to their findings, FDI initially raises pollution because it brings in industries that produce more emissions. However, as the economy expands and new technologies are embraced, FDI eventually helps lower pollution levels (Shahbaz et al., 2013). On the other hand, research on India, one of Asia's top receivers of foreign direct investment, suggests a more nuanced link. Mukherjee (2010) study examined data from 1985 to 2008 and discovered that although foreign direct investment (FDI) has boosted economic growth, it has markedly increased carbon dioxide emissions.

The energy-intensive sectors that account for the majority of FDI in India are blamed for this rise. However, the report also points out that areas receiving more foreign direct investment tend to enact stronger environmental laws, eventually lowering pollution (Mukherjee, 2010). Cross-countries are also excellent sources of information where the FDI affected the environment in newly industrialized countries from 1971 to 2007. According to the report, FDI has considerably raised pollution levels due to polluting companies moving to new locations. However, these consequences are beginning to be lessened with the introduction of more stringent environmental regulations and more environmentally friendly technologies (Hossain, 2011). The diverse empirical data emphasizes the intricate relationship between FDI and Asian pollution. It emphasizes that how foreign direct investment (FDI) affects pollution depends on several variables, such as the industries luring FDI, the state of environmental laws in place, and the host nation's economic progress. Asian policymakers must strike a balance between the need to preserve and enhance environmental quality and lure in foreign direct investment. To guarantee that foreign direct investment (FDI) has a beneficial impact on sustainable development, it is imperative to reinforce environmental legislation, promote the adoption of clean technologies, and cultivate green industries.

Conclusion

Using annual data from 1980 to 2020, this study empirically investigates the effects of foreign direct investment on pollution in Bangladesh, India, Nepal, Pakistan, and Sri Lanka, 5 South Asian nations. Although there has been a lot of research on the connection between FDI and pollution in certain developing nations, this study compares the data from five South Asian nations to draw plausible conclusions. Using a vector autoregression model based on variance decomposition, it specifically explored how foreign direct investment affects pollution.

Because of this, the impact of foreign direct investment on pollution may vary based on each country's economic situation. A wide range of public policies can impact every country's economic circumstances. Public efforts to enhance capital goods, education, health, and infrastructure are essential for reducing pollution and attracting foreign investment. Additionally, the success of foreign investment and, by extension, economic progress depends on establishing the rule of law and sound administration. All these infrastructural upgrades, a stronger human capital base, a better business climate, and the absence of corruption require the government's cooperation. The markets are one of many ways to solve these problems.

Public policies that encourage public investment in public health and education, better governance, an efficient tax system, equitable tax burden sharing, and fostering public institution

trust are critical. Thus, the correlation between foreign investment and pollution is more evident in countries with efficient public administration. Therefore, improved transparency and governance are essential for a positive relationship between growth and foreign investment. Also, it is better to promote capital products than consumer goods to attract foreign investment. It is critical to assess the impact of foreign investment inflow on pollution by controlling governance or transparency and using data on the composition of foreign direct investment.

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