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RELEVANCE OF ENVIRONMENTAL FACTOR ON SUSTAINABLE FDI INFLOWS: EVIDENCE FROM BIMSTEC COUNTRIES

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Abstract:

This study analyzes the impact of environmental, institutional, social, and economic factors on sustainable foreign direct investment (FDI) inflows in the BIMSTEC countries (Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand) from 2000 to 2019. The data used in this research was obtained from the World Development Indicator, World Bank, World Governance Indicator of the World Bank, and UNCTAD. The study covers the social, economic, environmental, and institutional factors that affect sustainable FDI inflows. The panel data analysis was carried out using a random effect model, and the dataset was checked for autocorrelation, multicollinearity, and heteroscedasticity. The results of the study demonstrate that economic, social, and environmental factors play a significant role in attracting sustainable FDI to a country.

Keywords: BIMSTEC, sustainable FDI, world bank, environmental

INTRODUCTION:

The Bay of Bengal Initiative for Multi- Sectoral Technical and Economic Cooperation (BIMSTEC) connects two major high- growth and trading regions of developing Asia - South Asia and Southeast Asia. BIMSTEC countries are Bangladesh, India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal. “BIMSTEC is an opportunity for combining the complementary strengths of South Asia and SouthEast Asia,” High Commissioner Harsh Vardhan Shringla said in Dhaka. “BIMSTEC’s major strength comes from the fact that it represents 1.6 billion people, an overwhelming majority of which are young. The region has countries with the fastest-growing economies in the world,” he said at a conference marking the 20th anniversary of the organisation. BIMSTEC connects South Asia with Southeast Asia and serves as a platform for inter-regional cooperation between SAARC and ASEAN member countries.The BIMSTEC region accounts for 21 percent of the world population and has massive potential for trade. But intra-BIMSTEC trade is very low, which experts say is mostly due to the low level of economic integration within the region and a dearth of infrastructure, especially transport connections, within the member countries. In spite of the solid foundation of geographical contiguity, shared history and cultural ties, BIMSTEC has yet to make visible progress in advancing concrete cooperation among the member states.

FDI is a major source of external finance, meaning that countries with limited capital can receive finance beyond national borders from wealthier countries. Foreign direct investment (FDI) is investment directly into production in a country by a company located in another country, either by buying a company in the target country or by expanding the operations of

an existing business in that country. It refers to cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest in an enterprise (the direct investment enterprise) that is resident in a country other than that of the direct investor.

It comprises three components: equity, reinvested earnings and other capital. Equity FDI is further subdivided into: Greenfield investment and M&A. Reinvested earnings mean the difference between the profit of a foreign company and its distributed dividend. Other capital represents the intercompany debt transactions of FDI entities. According to WTO, "*Foreign direct investment (FDI) occurs when an investor based in one country (the home country) acquires an asset in another country (the host country) with the intent to manage that asset".*

The Rationale of the study:

Most of the studies have ascertained the determinants of FDI inflows, but few studies have discussed the Sustainable FDI inflows in the BIMSTEC countries. Sagarik (2015) explored GDP, infrastructure, trade openness, Political stability and labor cost. Lee (2013) examined the relationship between FDI inflows and environment variables. Sha and shi (2006), Talukdar and Meisner (2001), OECD (1999), Pao and Tsai (2011), Shehzad et al. (2020), Saifraz et al (2019), Sarfraz et al. (2019 (a)) show compliance with environmental standards by using the trade data of china's 20 industries. Liu and Yan (2011) negative effect on CO_2 emissions and Zhu et al. (2016) suggested that the impacts of FDI inflows on emissions are negative and become significant.

Therefore, the above studies showed FDI inflows with different variables but more studies showed the effect of environmental factors on sustainable FDI inflows in the BIMSTEC countries. This study covers the social, economic, environmental, and institutional factors that affect sustainable FDI inflows. This Paper focuses on relevance of relationship between CO_2 and sustainable FDI inflows in the BIMSTEC countries.

Objectives of the Study:

1. To study Socio-Economic factors between India and Bay of Bengal initiative for

Multi- Sectoral Technical and Economic Cooperation (BIMSTEC) nation.

2.To analyze need of environmental factors for sustainable FDI inflows between India and

BIMSTEC countries.

3.To assess challenges of sustainable FDI inflows between India and BIMSTEC Countries.

LITERATURE REVIEW:

Foreign Direct Investment (FDI) has appeared to be the most important source of external flow of resources to developing countries and started expanding their business operations out of their borders with gain after exploiting resources. FDI becomes an integral part of capital formation even though they have a small share globally (Kumar and Pardhan, 2002). FDI is dynamic in nature and an important aspect of economic growth globally which provides benefits to related countries. FDI helps in providing capital, foreign exchange, technology, competition and also provides markets to host countries (Crespo and Fontura, 2007).

FDI is more attractive as it provides growth and development to developed and developing nations. FDI not only provides capital to the country but also generates employment, transfer knowledge and skill & development, technology and innovation & domestic investment (Brooks and Sumulong, 2003). The developing countries that are facing problems like low saving rate, low per capita income growth rate and low investment may get relief through capital invested from outside countries in the form of FDI (Hayami, 2001). The changing scenario of FDI inflow shows that developing countries attracted because of their positive implications where at global ranking 20 top host developing countries and on the other side 3 developing countries were top five countries at largest FDI recipients of the world (UNCTAD, World Investment Report 2011). FDI in developing nations is small but greater as compared to developed countries. The world economy is increasing, which indicates that interconnection of economic activities at global extension is also increasing.Foreign Direct Investment plays an important role for developed countries by generating greater benefits as compared to developing countries where it provides economic growth. According to the report of (UNCTAD, 2008), FDI inflows creates employment opportunities, increasing productivity, transferring skills and technology, boosting exports and continuing the long-term economic growth and overall development of developing countries. Therefore, FDI is the largest source of external financing for developing countries. (ADB, 2016), The current account balances may shore up with the help of import growth and reflect the domestic demand weakness across developing Asia, also complicating the challenge of sustaining economic growth momentum beyond tepid export growth. Hasan. Rita and Kim. (Kyungho, 2014), The concern of foreign direct investment (FDI) has been more in developing countries like Nepal because the economic development of these countries mostly depends on the establishment of multinational enterprises (MNEs). On the other side host countries are having certain challenges to make a favorable investment climate for foreign investors. Now it is important for developing countries to offer lucrative investments and benefits for attracting inward FDI. (Hossain.I. Mohammad, 2015), South Asian economic integration required a liberation programme to expand and promote FDI flows and regional trade in this area. Jain.Palakh and Bimal. Samridhi (2014) Policy regime is one of the important factors that helps in flow of foreign investment. JBICI (2002), The developing countries are more open for foreign investment in FDI and play an important role for transfer of capital, knowledge and technology. Lejour.Arjan and Salfi.Maria (2015**),** The bilateral investment treaties for FDI inward are more of lower middle and lower income countries i.e East Asia

and middle & Eastern Europe from 1985 until 2011.Padmanabhan. A (2012), There are several empirical studies which show there is no significant correlation sign between two countries BITS and FDI inflows but there are other factors also that affect FDI inflows. Sachs. E. Lisa and Sauvant P. Karl (2009), FDI inflows involve inflows or stocks. FDI inflows refers foreign investors and affiliates in the form of equity, loans, reinvestment earnings and FDI stocks foreign investment total value of owned assets for particular time. Sahoo. Pravakar(2006), This study finds that FDI has a positive impact on mostly South Asian countries. There are certain factors like exports, gross domestic capital formation infrastructure and governance but these south asian countries do not have adequate infrastructure facilities and governance. Singh.Jitender(2014), The major determinants for inflows of FDI of any country are market size, business environment and bilateral investment treaties. The driving force of economic globalization is FDI. Tobin. Jennifer and Ackerman Susan Rose (2003), The general framework for bilateral investment treaties signed between investor countries and host countries for FDI deals negotiations and protecting the interest of foreign investors. UNIDO (2005**),** The foreign investment is private equity between FDI and portfolio investment in South Asia. Denision V., 2010, discussed in his theory of FDI helps to understand economic behavior and financial growth both at micro and macro level. According to Estrin and Meyer (2004), The emerging economies are the major beneficiary of FDI and Multinational Corporations (MNCs) have extend business by expolited different opportunities by using cheap labor, raw materials availability etc.

Studies with a focus on economic and Social Aspect:

Mishra, B.R. and Jena, P.K. (2019) The research work examines FDI flows with of developed and developing countries by using gravity model with determinants distance, common language, common border and also institutional & infrastructural factors, telecommunication, degree of openness, index of globalization and index of economic freedom for investors. Saini, N. and Singhania, M. (2018) research author investigates with determinants GDP growth, trade openness, freedom index, gross fixed capital formation (GFCF), and efficiency variables by using GMM model on 20 developed and developing countries. Kumari, R. and Sharma, A.K. (2017) Identify FDI with variables market size, trade openness, infrastructure, inflation, interest rate, research and development and human capital using two models: fixed effect and random effect model using Panel data on 20 developing nations from south and southEast Asia.

Aregbeshola, R.A. (2018) the supported determinants of FDI used the role of market size, infrastructural development, Inflation and exchange rates.The various econometric approaches included fixed effects models, LM test, generalized least squares regression. This study unveils impacts and explanatory power of each of the variables and compares the results of some emerging markets in Asia, Eastern Europe, and South America to some selected countries in Africa. The FDI is important to alleviate poverty and also for institutional functionality.

Nasreen. S, Fazal. U, Pirzada. S, Khanam. F, Tariq. S (2014),"Economic Performance and economic growth of a country is influenced by several factors for example import/export, foreign direct investment, taxation system, law and order, government policies employment level and inflation.In this study, by using time series analysis we investigated the impact of foreign direct investment on economic growth of Pakistan.

Sagarik (2015) explored that GDP, infrastructure, trade openness, political stability, and labor cost had a positive and significant impact on the FDI inflows in ASEAN countries but the reason for the reverse relationship between FDI inflows and labor cost is that investors are ready to pay a high cost for high productivity. Hoang & Bui, (2015) identified that GDP, trade openness, labor productivity, exchange rate, infrastructure, political stability, wage cost, and human capital have positive and significant influences on the FDI inflows and inflation have a negative impact on FDI inflows.Kumari & Sharma, (2017) examined that GDP and human capital (school enrolment in the secondary sector) has direct and significant impact on FDI inflows on the other hand, infrastructure (electric power), inflation, and interest rate has negative and significant effect on the FDI inflows. Vi Dund et al., (2018)summarised that GDP, infrastructure, and foreign industrial agglomeration had a positive and significant impact on the FDI of Vietnam. Ifandi (2019) stated that GDP growth rate and human capital, and gross fixed capital formation had a positive and significant impact on the FDI inflows in ASEANCountries. Gopala (2019) declared GDP per capita and exchange rate had positive and significant impact on the FDI inflows in ASEAN countries**.** Gopala (2019) had taken economic and governance factors of FDI inflows. Ullah & Khan, (2017) had constructed a governance index as variable for SAARC, the Central Asian region and ASEAN and also GDP, domestic investment, labor force, and governance index, had a significant impact on the FDI inflows of ASEAN, the Central Asian Region, and SAARC. Liu & Pitprapha, (2018) showed positive and significant effect on FDI inflows by taking variables like GDP, distance and relative R&D, trade openness, and bilateral treaties in Thailand. Relative exchange rate, global financial crisis, and relative wage rate have a negative and significant impact on the FDI inflows in Thailand.Ho & Rashid, (2016) concluded that significant impact on FDI inflows by using variables like trade openness, Consumer income, infrastructure, employment, and skill and Knowledge on Indonesia economic growth.

Pao & Tsai, (2011) concluded that there is bi-directional relationship between FDI and carbon emission as both have a halo effect and scale effect which means countries that have weak environmental standards must be concerned about benefits and side effects of FDI inflows. This explains the relationship between FDI and carbon emission from the period of 1980-2007 for the BRICS countries. They conclude that there is a bi-directional relationship between FDI and Carbon emission therefore countries with the weak environmental standards should examine the benefits and side effects of the FDI inflows as they have both the halo effect and scale effect. Lee,(2013) examined relationship between FDI inflows and environment variables taking 19 nations of the G20 for the period from 1971 to 2009 and applied cointegration and fixed model effect after taking Independent variables Co2 emission,

energy use per capita and percentage of clean energy used. The result showed there is no significant impact of environmental variables on FDI inflows and only economic growth has positive and significant impact on FDI inflows. Sha and Shi (2006) FDI had a significant negative impact on China's ecological environment by using China's panel data for the 1999–2004 period. Talukdar and Meisner (2001) found that FDI has promoted CO2 emission reduction in private departments of 44 developing countries from 1987 to 1995. The Organization for Economic Cooperation and Development (OECD, 1999) in its report showed that FDI could improve the environmental quality of the host nation. FDI has show compliance with environmental standards by using Green and environment-friendly technologies and effective management technologies of the host country than local enterprises (Shehzad et al., 2020; Sarfraz et al., 2019; Sarfraz et al., 2019b).Jiang and Liu (2011) expanded that FDI has no obvious significant impact on the environmental Kuznets curve (EKC) inverted U-shaped curve. Li and Lu (2010) explains the International trade impact and some other factors on the CO2 emissions of China's industries by using the trade data of China's 20 industries with G7 and OECD developed countries based on an environmental input-output model and net import analysis. The empirical results showed that international trade can lower the total CO2 emissions of industries and economic output of China. China does not become a "pollution industry heaven" of developed countries as based on International trade. Liu and Yan (2011) based on an analysis of China's data from 1952 to 2007 had concluded that trade opening had a negative effect on CO2 emissions. H. Yanyan, C. Fuzhong, Wei.H, Xiang. J, Xu. Z, Akram. R(2022) In this paper it shows that FDI is positively related to carbon emission and economic development and regulatory quality negatively contributes. It implies that FDI flows responsible for carbon emissions in more likely those countries in which higher levels of economic development. several studies indicate a nonlinear relationship between FDI inflows and carbon emissions (Shahbaz et al., 2015; Alshubiri and Elheddad, 2019) . Several studies provide evidence that FDI inflows increase carbon emission to support the pollution-haven effect (Cole, 2004; Cole et al., 2011; Kheder and Zugravu, 2012; Rahman et al., 2019).). FDI led economic activities increase carbon emission in host countries (Grimes and Kentor, 2003; Mahadevan and Sun, 2020).Zhu et al. (2016) suggested that the impacts of FDI inflows on emissions are negative and become significant at higher quantiles in Indonesia, Malaysia, Philippines, Singapore, and Thailand. Furthermore, Acharyya (2009) argued that FDI inflows have a large beneficial effect on carbon emissions by increasing output in the long run in the case of India. . FDI can be less severe in high income countries as compared in low- income countries, it means opposite relationship of FDI inflows (Shahbaz et al., 2015).

Literature Review based on Education dimension:

FDI flow to the south asian countries started in the 1990s and have gathered further momentum in the past few years but could not become attractive investment destinations because of their restrictive attitude towards foreign investments Aggarwal (2008). FDI in education will improve knowledge, technical knowhow and technology spillover by boosting capital stock and instigating domestic production and consumption (Feenstra and

Markusen,1994). Stijns (2001,2006) FDI can have a lasting effect on a country's per capita income through a higher human capital stock. Beugelsdijk et all (2008) Highlighted horizontal benefits and vertical benefits, vertical efficiency seeking FDI and its effect Cheap low qualified labor little incentive to local population to participate into higher education. Horizontal or market seeking FDI its effect increases market share in the host country and competing directly with the local firms will increase competition, technological upgrading and human capital accumulation**.** MNEs with FDI responsible for R & D activities are human capital intensive which show that mostly Greenfield R&D projects in developing countries suggest FDI should boost skilled labor demand and participation into higher education (UNCTAD,2004). Pravakar Sahoo (2006) FDI has a positive and significant impact on growth for four South Asian Countries, and factors that contribute to growth are exports, gross domestic capital formation and infrastructure. After analyzing the above literature undertaken so far on higher education in South Asian Countries,It raised so many questions that need to be analyzed in detail so as to provide a comprehensive view of the topic proposed and thereby fill the void. Taajobi.M (2012), "Education Index works as an indicator which has an impact on development taking in many variables. It shows that a high level of education has a positive impact on a country's economy by providing low levels of unemployment rates but in this research that sometimes education index does not always lead to decrease unemployment. The skill and expertise may help to increase the unemployment rate. The macroeconomic variables are more affected by unemployment than education.

Studies on Good Governance on FDI

Mengistu and Adhikary (2011) investigates the effect of six components of good governance on FDI in 15 Asian countries between 1997-2007 using a fixed effects model for panel data. Law and control of corruption are key sources of FDI but political stability and absence of violence, government effectiveness, rule of law and control of corruption are also key factors of FDI inflows. Similarly, Gangi et al. (2012) examined the same government indicators effect (political stability, control of corruption, rule of law, regularity quality, voice and accountability and government effectiveness) on (FDI) flows to 50 African countries by using a fixed and random effects model. Bellos and Subasat (2012a & 2012b) explained poor governance has attracted transition Latin American countries. Bellos and Subasat (2013) further investigate by using a gravity model the impact of certain institutional factors of FDI for 18 Latin American countries but results suggest not only FDI but that poor governance intensifies Latin America also. Simona Semenas (2020), studies six indicators of governance to examine the role of FDI inflows in emerging economies by using panel gravity models hosted on 26 host countries in the period 2002– 2019. Good governance is important to define the investment environment and also for favorable conditions for economic growth (Butkiewicz and Yanikkaya, 2006). The World Bank (2020) has published the important role of countries in shaping economic growth by using six major factors for good governance.

Research Methodology

There is a significant amount of literature available on the influence of foreign direct investment (FDI) in Bimstec countries. However, only a few studies have discussed the sustainable FDI inflows of these countries. As far as our knowledge goes, this is the first study that focuses on sustainable FDI inflows in Bimstec countries.

In this section of the research methodology, we will describe the sample used in the study, the data sources and sample period, the definition of the variables considered, and the panel data regression analysis. We will also address the problems of multicollinearity, heteroscedasticity, and autocorrelation that were encountered in the panel data set.

Sample period, Sample description and Data Sources

The study's sample period is limited to the years 2000 to 2022 as data beyond this range is not available. The years 2020 have been excluded due to outliers in the data set caused by the Covid-19 pandemic. The study focuses on the Bimstec countries, which includes Sri Lanka, Bangladesh, Thailand, Bhutan, India, Myanmar, and Nepal. Data for all the variables have been sourced from the World Development Indicator, World Bank, except for political stability and Sustainable FDI inflows. Political stability was obtained from the World Governance Indicator of the World Bank, while FDI inflows were gathered from UNCTAD.

Data Description

The current study has covered six independent variables and one dependent variable in the functional form of the model which is given below.

FDI= f (GDP, PCAP,TO,CO2,SCHOOLT,PS)

Where

FDI= Sustainable FDI inflows

GDP= Gross domestic product

PCAP= GDP per capita

TO= Trade openness

CO2= Carbon dioxide emissions

SCOOLT= school enrollment Ratio in tertiary education

PS= Political stability

Dependent Variable

The dependent variable of the study is sustainable FDI inflows. Kapuria and Singh(2019) and Marwah and Neha(2023) have considered FDI inflows as a proxy for sustainable FDI inflows due to the unavailability of the data.

According to the World Investment Report, UNCTAD (2007), " Foreign direct investment is defined as an investment reflecting a lasting interest and control by a foreign direct investor, resident in one economy, in an enterprise resident in another economy(foreign affiliates). FDI inflows comprise capital provided by a foreign direct investor to foreign affiliates, or capital received by a foreign direct investor from a foreign affiliate."

Explanatory Variables

1 Gross domestic product(GDP)

It refers to the total goods and services produced in the economy by all the residents of the country it includes all taxes and excludes all subsidies.

Expected relationship

GDP is expected to have a positive relationship with sustainable FDI inflows as the GDP of the country shows the market size of the country. If the market size of the countries is higher then higher sustainable FDI inflows are expected. Companies want to invest in those countries where the market size of a country is higher as a higher market size can help them in earning high profits by capturing higher market share.

ADD REF

H0: GDP has no impact on sustainable FDI inflows.

H1: GDP has a positive on sustainable FDI inflows.

2. GDP per capita(PCAP)

The ratio of GDP to the mid-year population of the country is known as GDP per capita

Expected relationship

GDP per capita is also expected to have a positive relationship with sustainable FDI inflows as it shows the purchasing power of the people in the host country. Higher the purchasing power of the people in host countries then higher sustainable FDI inflows are expected to come in the host country.

ADD REF

H0: GDP per capita has no impact on sustainable FDI inflows.

H1: GDP per capita has a positive on sustainable FDI inflows.

3. Trade openness

Trade openness is estimated by taking the ratio of total imports and exports of goods and services to the GDP of the country.

Expected relationship

Trade openness shows the openness in the economy which acts as a positive signal for the foreign investor to invest in the host country therefore positive relationship between the trade openness and sustainable FDI inflows is expected, in other words higher the trade openness higher the sustainable FDI inflows in the host country.

ADD REF

H0: Trade openness has no impact on sustainable FDI inflows.

H1: Trade openness has a positive on sustainable FDI inflows.

4. Carbon dioxide emissions

Carbon dioxide emission is the total of carbon dioxide emitted in the economy from different sources like the burning of fossil fuels, manufacturing of cement in the environment, and burning of solid liquid and gas.

ADD REF

H0: Carbon dioxide emissions have no impact on sustainable FDI inflows.

H1: Carbon dioxide emissions have a positive on sustainable FDI inflows.

5. School enrollment ratio in tertiary education

The enrollment ratio tertiary sector is the ratio of the total number of students enrolled to students enrolled in tertiary education irrespective of their age.

Expected relationship

School enrollment ratio in tertiary education is expected to have a direct relationship with sustainable FDI inflows in the host country as school enrollment shows the quality of human capital in the host country which is also important for the foreign investor as it Impacts labour productivity and cost of labour in the production.

ADD REF

H0: School enrollment has no impact on sustainable FDI inflows.

H1: School enrollment has a positive on sustainable FDI inflows.

6. Political stability

Political stability measures the awareness of the people regarding political instability, politically driving violence and terrorism.

Expected relationship

Political stability is expected to have a positive relationship with sustainable FDI inflows as it shows the stability of the government in the host country. Political stability in the host country increases the chances of stable government policy for foreign companies which attracts investment in the country.

ADD REF

H0: Political stability has no impact on sustainable FDI inflows.

H1: Political stability has a positive on sustainable FDI inflows.

Table 1. Description of the variables

S.no	Variable Name	Expected Sign	Data Source	Code
1	Gross Domestic Product	+	WDI,World Bank	Gdp
2	GDP Per Capita	+	WDI,World Bank	Pcap
3	Carbon Dioxide Emission	+	WDI,World Bank	CO2
4	Trade Openness	+	WDI,World Bank	TO
5	Political stability	+	WGI,World Bank	PS
6	School enrollment	+	WDI,World Bank	SCHOOLT

Panel data Regression

For our study, we utilized panel data analysis which is considered to be the best method as it provides the advantages of both cross-sectional data and time series data. Under panel data analysis, we can use either a fixed effect model or a random effect model.

a) Fixed effect model

Gujarati,(2003) stated, "Under fixed effects model the intercept in the regression model is allowed to differ among individual in recognition of the fact that each individual or cross-sectional unit may have some special characteristics of its own."

b) Random effect model

Gujarati,(2003) stated, "In the random effect model, it is assumed that the intercept of an individual unit is a random drawing from a much larger population with the constant mean value."

To determine which model is appropriate, we conduct the Hausman test.

H0- Random effect is more appropriate

H1-Fixed effect is more appropriate.

However, before applying the Hausman test, we need to check for possible issues such as autocorrelation, heteroscedasticity, and multicollinearity. To check the problem of multicollinearity, we performed pairwise correlation among explanatory variables. To check for autocorrelation, we used the Wooldridge test, and for heteroscedasticity in the dataset, we employed the log-likelihood ratio test.

Results and Analysis

Problem of Multicollinearity

To address the issue of multicollinearity, we calculated the correlation between independent variables. The results are presented in Table 2 below. As we can see in Table 2, all correlation values are less than 0.9, indicating that there is no multicollinearity problem among the explanatory variables.

Problem of Heteroscedasticity

We used the likelihood ratio test to check for heteroskedasticity in the dataset. The results of the test are presented in Table 3. Table 3 shows that the P-value is almost zero, indicating the presence of heteroskedasticity in the dataset.

Problem of Autocorrelation

We have used the Wooldridge test of autocorrelation to investigate the issue of autocorrelation in the dataset. The results of the test are presented in Table 4. From Table 4, it is evident that the P-value is almost zero, indicating that there is an autocorrelation problem in the dataset.

Hausman Test

Hausman test was conducted to determine whether the fixed effect model or the random effect model is appropriate. The results are presented in Table 5. We can observe from Table 5, that the P-value is not highly significant at a one percent level of significance. Therefore, it can be concluded that the random effect model is appropriate in this case.

Table 2 Pair-wise correlation among the explanatory variables.

	gdp	**pcap**	**schoolT**	**TO**	**ps**	**CO2**
gdp	1.0000					
pcap	-0.0784	1.0000				
schoolT	0.2179	0.8256	1.0000			
TO	-0.1543	0.7248	0.6205	1.0000		
ps	-0.1937	0.2941	-0.0622	0.5034	1.0000	
CO2	0.7874	0.1113	0.3851	0.1630	-0.0305	1.0000

Table 3 Estimate the Autocorrelation

Wooldridge Test for Autocorrelation in panel data
H0-no first-order autocorrelation F(1,5) =6.527 Prob>F=0.0510

Table 4 Estimate the Heteroscedasticity

Likelihood-ratio Test
LR chi( )= Prob>chi2=0.0000

Table 5: Hausman Test

H0: Difference in coefficients not systematic
Chi2(5)= 3.63 Prob>chi2=0.6020

Regression Analysis:

$$Y_{it}=\beta_{1i}+\beta_2 GDPi+\beta_3 PCAPi+\beta_4 TOi+\beta_5 CO2i+\beta_6 indexinstii+\beta_7 educationindexi+\mu_{it}$$

In this model, "i" represents cross-sectional units or countries, with i=1, 2, 3...10 as we have ten cross-sectional units. The intercept is β1i, and the other β values are assumed to be constant across ASEAN countries.

Table 6. Robust Standard Error Results of **Sustainable FDI**

Dependent Variable: FLOWS				
Method: Panel EGLS (Period random effects)				
Sample (adjusted): 2000 2019				
Periods included: 19				
Cross-sections included: 7				
Total panel (unbalanced) observations: 99				
White period standard errors & covariance (no d.f. correction)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1985.447	699.9481	-2.836564	0.0056
GDP	2.02E-08	8.75E-10	23.09475	0.0000
PCAP	-0.337158	0.216824	-1.554984	0.1234
TO	4682.508	2231.799	2.098087	0.0386
PS	-434.9573	401.3032	-1.083862	0.2813
CO2	-5498.965	1689.659	-3.254483	0.0016
SCHOOLT	55.55079	27.44657	2.023961	0.0459
Weighted Statistics				
R-squared	0.894935	F-statistic		130.6079
Adjusted R-squared	0.888083	Prob(F-statistic)		0.000000

According to Table 6, the model has an R-square value of 89% and an adjusted R-square

value of 88%, indicating a good model fit. The p-value of the F statistics is highly significant at a one percent level of significance, indicating that all the variables in the model jointly explain the dependent variable. The variables GDP, trade openness, and school enrollment ratio in the tertiary sector have a positive relationship with sustainable FDI, while carbon emission has a negative relationship with sustainable FDI.

The Gross Domestic Product (GDP) of a country indicates its market size, with larger market sizes expected to attract higher levels of Foreign Direct Investment (FDI) inflows. As we anticipated, we found a positive relationship between GDP and FDI inflows. Our analysis indicated that GDP is a significant factor at a 1% level of significance.

Trade openness indicates the degree of openness in the economy. We anticipated a positive correlation between trade openness and FDI inflows and found that it is highly significant at a 5% level of significance.

It was expected that the enrollment of students in tertiary education would have a positive correlation with the inflow of foreign direct investment (FDI), as it serves as an indicator of the quality of human capital in the country. A higher quality of human capital is likely to attract more FDI inflows to the host country. The statistical analysis showed that there is a positive relationship between the enrollment in tertiary education and FDI inflows with a significance level of 5%.

A negative relationship was found between carbon emissions and FDI inflows even though a positive relationship was expected. Carbon emissions were found to be negative and significant at a 1% level of significance.

Conclusion and policy implications

All countries require funds for their development, and many believe that the best way to obtain these funds is through Foreign Direct Investment (FDI), which is why countries try to attract more FDI inflows. This study examines the impact of environmental, institutional, social, and economic factors on sustainable FDI inflows in the Bimtech countries from 2000 to 2019. A random effect model was used for panel data analysis, and the data set was checked for autocorrelation, multicollinearity, and heteroscedasticity. The results show that economic, social, and environmental factors are significant in attracting sustainable FDI to a country.

To attract more FDI, countries should focus on increasing their GDP, trade openness, and school enrolment ratio in tertiary sector, as these factors have a positive and significant relationship with sustainable FDI. However, carbon emissions have a negative and significant relationship with sustainable FDI inflows, so governments should enact laws to control carbon emissions. Companies are more interested in countries with lower carbon dioxide emissions, so countries should consider shifting to renewable sources of energy.

Scope for future research

In the future, a study should be conducted to examine the impact of environmental variables on sustainable foreign direct investment (FDI) in a specific industry. This will help in creating industry-specific policy implications to attract higher sustainable FDI inflows in the country. Additionally, the study should also be conducted for other regional blocks to analyze the impact of environmental variables on sustainable FDI in those blocks.

REFERENCES:

Acharyya, J. (2009). FDI, Growth and the Environment: Evidence from India on CO2 Emission during the Last Two Decades. J. Econ. Dev. 34 (1), 43–58. doi:10.35866/caujed.2009.34.1.003

ADB (2016),” What Drives Foreign Direct Investment in Asia and the Pacific?”, Asian Economic Integration Report, Philippines, Pp 15-44.

Adhikary, B. K., & Mengistu, A. A. (2011). Does good governance matter for FDI inflows? Evidence from Asian economies. Taylor & Francis. https://www.tandfonline.com/doi/abs/10.1080/13602381003755765

Aggarwal (2008), Regional Economic Integration and FDI in South Asia: Problems and Prospects , *Working paper no 214* by Indian Council for Research on International Relations.

Alshubiri, F., and Elheddad, M. (2019). Foreign Finance, Economic Growth and CO2 Emissions Nexus in OECD Countries. Ijccsm 12 (2), 161–181. doi:10.1108/ IJCCSM-12-2018-0082

Aregbeshola, R.A. (2018), "The machination of foreign direct investment flow to emerging markets – a focus on Africa", *African Journal of Economic and Management Studies*, Vol. 9 No. 4, pp. 430-448. https://doi.org/10.1108/AJEMS-12-2017-0313

Bdnews24.com (2018),”India sees BIMSTEC an ‘opportunity’ for the Bay of Bengal region”, 2018-03-21 00:56:18.0 BdST

Bellos, S., & Subasat, T. (2012a). Corruption and foreign direct investment: A panel gravity model approach. Bulletin of Economic Research. https://doi.org/10.1111/j.14678586.2010.00370.x

Bellos, S., & Subasat, T. (2012b). Governance and foreign direct investment: A panel gravity model approach. International Review of Applied Economics. https://doi.org/10.1080/02692171.2011.587110

Butkiewicz, J. L., & Yanikkaya, H. (2006). Institutional quality and economic growth: Maintenance of the rule of law or democratic institutions, or both? Elsevier. https://www.sciencedirect.com/science/article/pii/S0264999306000368

Cole, M. A., Elliott, R. J. R., and Zhang, J. (2011). Growth, Foreign Direct Investment, and the Environment: Evidence from Chinese Cities. J. Regional Sci. 51 (1), 121–138. doi:10.1111/j.1467-9787.2010.00674.x

Cole, M. A. (2004). Trade, the Pollution haven Hypothesis and the Environmental Kuznets Curve: Examining the Linkages. Ecol. Econ. 48 (1), 71–81. doi:10.1016/ j.ecolecon.2003.09.007

Denision V., 2010, Foreign Direct Investment Theories: An Overview of the Main FDI Theories, European Journal of Interdisciplinary Studies, issue 3, page 53-59.

Feenstra and Markusen (1994) "Accounting for growth with new inputs",*International Economic review*,Vol.35

Filippini.C and Molini.V(2003),"The determinants of East Asian trade flows: A Gravity equation approach", JAsaian Econ, 14(5): 695-711.

Grimes, P., and Kentor, J. (2003). Exporting the Greenhouse: Foreign Capital Penetration and CO2 Emissions 1980–1996. Jwsr 9 (2), 261–275. doi:10.5195/jwsr.2003.244

Hayami, Yujiro (2001) Development Economics: From Poverty Alleviation to the

Hossain.I. Mohammad(2015), "Intra Regional Trade, Intra Regional FDI and Economic Integration: The south Asian Perspective", International Journal of Economics, Commerce and Management, Vol. III, Issue 5,Page 203-228.

Hasan. Rita and Kim. Kyungho(2014)," Revisiting Foreign Direct Investment in Nepal : Problems and Prospects" ,International Journal of Development Research Vol. 4, Issue, 11, pp. 2372-2381.

H. Yanyan, C. Fuzhong, Wei.H, Xiang. J, Xu. Z, Akram. R(2022)," The impacts of FDI inflows on Carbon Emissions: Economic development and Regulatory Quality as Moderators." Front. Energy Res., Sec. Sustainable Energy Systems Volume 9 - 2021 https://doi.org/10.3389/fenrg.2021.820596

Jain.Palakh and Bimal.Samridhi(2014)," Enhancing India-Pakistan Economic Cooperation: Prospects for Indian Investment in Pakistan" Indian Council for Research on International Economic Relations, working Paper 274.Pp 9-11

Jiang, W., and Liu, M. (2011). Foreign Direct Investment and Environmental Kuznets Curve: A Spatial Econometrical Analysis Based on Chinese Cities. Appl. Stat. Manag. 30 (4), 752–760

JBICI (2002), "Foreign Direct Investment and Development: Where Do We Stand?", Japan Bank for International Cooperation (JBIC), Research Paper No. 15, Pp 40-48.

Kumari, R. and Sharma, A.K. (2017), "Determinants of foreign direct investment in developing countries: a panel data study", *International Journal of Emerging Markets*, Vol. 12 No. 4, pp. 658-682. https://doi.org/10.1108/IJoEM-10-2014-0169

Lejour.Arjan and Salfi.Maria (2015),” The Regional Impact of Bilateral Investment Treaties on Foreign Direct Investment”, CPB Discussion Paper,298, Netherlands Bureau for economic Policy analysis, ,Pp 1-36.

Li, X., and Lu, X. (2010). International Trade, Pollution Industry Transfer and Chinese Industries’ CO2 Emissions. Economic Research Journal 1 (1), 15–26.

Liu, H. J., and Yan, Q. Y. (2011). Trade Openness, FDI and China’s Carbon Dioxide Emissions. The Journal of Quantitative & Technical Economics 3, 21–35.

Mahadevan, R., and Sun, Y. (2020). Effects of Foreign Direct Investment on Carbon Emissions: Evidence from China and its Belt and Road Countries. J. Environ. Manage. 276, 111321. doi:10.1016/j.jenvman.2020.111321

Mishra, B.R. and Jena, P.K. (2019), "Bilateral FDI flows in four major Asian economies: a gravity model analysis", *Journal of Economic Studies*, Vol. 46 No. 1, pp. 71-89. https://doi.org/10.1108/JES-07-2017-0169

Nasreen. S, Fazal. U, Pirzada. S, Khanam. F, Tariq. S (2014), “Impact of Foreign Direct Investment (FDI) on Economic Growth of Pakistan “, Journal of Economics and Sustainable Development www.iiste.org ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.5, No.11.

OECD (1999). Environmental Labelling, Innovation and the Toolbox of Environmental Policy. Govena: OECD.

Penaloza.R(2012),”Measurement of education as an ordinal variable: towards a measure of human development based on the capability approach”, Conference : KDI school- Korea development Institute, KGLF Program at Seoul, South Korea.

Padmanabhan. A (2012),” Relationship between FDI inflows and Bilateral Investment Treaties / International Investment Treaties in developing economies: An Empirical Analysis”, International Journal of Economic Sciences Vol. I (No. 1), Pp 65-84.

Rahman, Z. U., Chongbo, W., and Ahmad, M. (2019). An (A)symmetric Analysis of the Pollution haven Hypothesis in the Context of Pakistan: A Non-linear Approach. Carbon Manag. 10 (3), 227–239. doi:10.1080/ 17583004.2019.1577179

Sachs. E. Lisa and Sauvant P. Karl (2009), “BITs, DTTs, and FDI flows: An Overview “ The Effect of Treaties on Foreign Direct Investment: Bilateral Investment Treaties, Double Taxation Treaties and Investment Flows, Oxford University Press.

Sahoo , 2006, "Foreign Direct Investment in South Asia: Policy, Trends, Impact and Determinants" ADB institute discussion Paper no.43.

Sahoo. Pravakar(2006) "Foreign Direct Investment in South Asia: Policy, Trends, Impact and Determinants", ADB Institute Discussion Paper No. 56, Pp 19-25

Saini, N. and Singhania, M. (2018), "Determinants of FDI in developed and developing countries: a quantitative analysis using GMM", *Journal of Economic Studies*, Vol. 45 No. 2, pp. 348-382. https://doi.org/10.1108/JES-07-2016-0138

Shahbaz, M., Nasreen, S., Abbas, F., and Anis, O. (2015). Does Foreign Direct Investment Impede Environmental Quality in High-, Middle-, and LowIncome Countries? Energ. Econ. 51, 275–287. doi:10.1016/j.eneco.2015.06.014

Shehzad, K., Xiaoxing, L., Sarfraz, M., and Zulfiqar, M. (2020). Signifying the Imperative Nexus between Climate Change and Information and Communication Technology Development: a Case from Pakistan. Environ. Sci. Pollut. Res. 27, 30502–30517. doi:10.1007/s11356-020-09128-x

Sha, W., and Shi, T. (2006). Environment Effect of Foreign Direct Investment. World Econ. Stud. (6), 76–81. doi:10.3969/j.issn.1007-6964.2006.06.013

Shukla. L (2013),"Foreign Direct Investment & Developing Countries: Its Impact & Significance", Journal of Business Management & Social Sciences Research (JBM&SSR) ISSN No: 2319-5614 Volume 2, No.5, May 2013

Simona Semenas (2020),"Governance and foreign direct investments A Panel gravity approach on emerging markets", Bachelor Thesis in Economics, sUMEA university, diva-Portal.org

Singh.Jitender(2014)," Do Bilateral Investment Promotion & Protection Agreements (BIPAs) attract Foreign Direct Investment (FDI) Inflows into India?", BIPA Research Study, Pp 2-24.

Stijns,2001, " Natural Resource Abundance and Economic growth revisited",*Development and comp systems*,Number 0103001,Econ WPA

Taajobi.M (2012),"Effect of the education index on employment in countries with very high HDI and High HDI" International journal of multidisciplinary research, vol.2 Issue 1, PP- 1-12

Talukdar, D., and Meisner, C. M. (2001). Does the Private Sector Help or Hurt the Environment? Evidence from Carbon Dioxide Pollution in Developing Countries. World Dev. 29, 827–840. doi:10.1016/S0305-750X(01)00008-0

Tobin. Jennifer and Ackerman Susan Rose (2003)," Foreign Direct Investment and the Business Environment in Developing Countries: The Impact of Bilateral Investment Treaties"

William Davidson Institute Working Paper Number 587, Pp 1-67.

UNCTAD (2008) World Investment Report: Transnational Corporations and Infrastructural Challenges, New York: United Nations. UNCTAD (2011) World Investment Report: NonEquity Modes of International Production and Development, New York: United Nation

UNIDO (2005),” Foreign Direct Investment in Southeast Asia: Experience and Future Policy Implications for Developing Countries, Report of UNIDO Expert Group Meeting (EGM), Bangkok, Thailand, Pp 11-15.

Worldbank. (2020). Worldwide Governance Indicators. World Bank. https://info.worldbank.org/governance/wgi/

Zhu, H., Duan, L., Guo, Y., and Yu, K. (2016). The Effects of FDI, Economic Growth and Energy Consumption on Carbon Emissions in ASEAN-5: Evidence from Panel Quantile Regression. Econ. Model. 58, 237–248. doi:10.1016/ j.econmod.2016.05.003