Assessing The Casual Relationship Between FDI, Export, And Economic Growth In The BIMSTEC Countries

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ABSTRACT
Economic integration within regional trading blocs yields enormous benefits in increased economic growth, trade, and investment. This study aims to analyze the causality and cointegration between GDP, foreign direct investment (FDI), and export for BIMSTEC nations using time series data from 1997 to 2020. The VAR model-based Granger Causality test is used. The results show a bi-directional correlation between FDI and economic growth and unidirectional causality between FDI and economic growth to exports. The findings indicate that attracting FDI to BIMSTEC nations boosts economic growth and exports.

KEYWORDS: BIMSTEC, Panel Data, Regional Integration, Economic Growth.

1. INTRODUCTION

A substantial economic connection between partner economies demonstrates global economic interdependence and political and historical advancement, which gave analytical and policy concerns that allowed international economics to continue thriving in the modern world [1]. The South Asia Association of Regional Cooperation (SAARC), the Association of Southeast Asian Nations (ASEAN), the Economic Cooperation Organization (ECO), the Mekong-Ganga Cooperation (MGC), the Asian cooperation dialogue (ACD), the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), and the Gulf Cooperation Council (GCC), and the Shanghai Cooperation Organization are some of Asia's regional trading blocs (SCO). These trade blocs are essential to Asian countries' growth.

India, Nepal, Bhutan, Sri Lanka, Bangladesh, Myanmar, and Thailand are all members of BIMSTEC, an intercontinental association that unites a set of South Asian and South-East Asian countries. A regional corporation was formed in the 1990s to gain more significant economies of scale, specialization, enhanced competitiveness, and a larger export basket while decreasing the danger of relapse in terms of underused human, technological and natural resources. BIMSTEC was formed to combine Thailand's "Look West" policy with India's "Look East" policy. BIMSTEC may be thought of as a bridge connecting SAARC to ASEAN. The multi-sectoral approach of BIMSTEC sets it apart from other Asian blocs. The 14 major concern sectors escorted by associate countries in a voluntary approach are Environment and Disaster Management, Poverty Alleviation, Agriculture, Energy, Public Health, Transportation and Communication, Cultural Cooperation, People-to-People Contracts, Trade and Investment, Tourism, Technology, Fisheries, Climate Change, and Transnational Criminalities and Counter-Terrorism.

The Bay of Bengal has long been a source of geopolitical, commercial, and civilizational importance for India. BIMSTEC was created at a time when globalization was dominating the world. SAARC, the South Asian regional organization created in 1985, was unable to progress due to mutual disagreements and mistrust among fellow nations. After that, BIMSTEC was conceived and created in 1997. The dissolution of SAARC and the continued pace of liberalization of South Asian economies are both elements that contributed to the development of BIMSTEC. Thailand's goal to create a presence on the Indian subcontinent is another reason that may have influenced the development of this bloc. South Asian countries may use BIMSTEC to build and deepen a high-quality relationship with ASEAN countries. This aim to strengthen economic relations with ASEAN nations may be seen in the strategy used by South Asian countries in building contacts and increasing economic cooperation with the region.

The critical difference between BIMSTEC and other groupings is that it represents one of the world's most diverse regions in terms of language, religion, lifestyle, and culture. BIMSTEC has prominently recognized developmental issues and is devoted to 14 primary selected sectors, which span into various elements fit for development and general concern issues such as counter-terrorism and inter-continental crime. The first BIMSTEC Summit examined the seven new sectors. BIMSTEC has

emerged as a major economic development engine, accounting for a combined GDP of USD 3.8 trillion and 21.7 percent of the world population. BIMSTEC aims to promote economic and social success via equality to increase expected economic, social, and technological advantages. The expansion of industry, agriculture, trade, and investment, as well as Intra-regional assistance for training, research and development, communication and transportation enhancements, and partnership with other international organisations, are covered [2]. BIMSTEC is crucial in promoting trade and investment in the Asia Pacific. India has been a key player in integrating trade and investments to foster regional economic cooperation. By utilizing its geographical position, BIMSTEC can enhance trade between member nations. Previously, numerous steps aimed at intra-regional trade liberalisation among BIMSTEC members were implemented under bilateral and regional trade agreements. BIMSTEC represents both developed and developing countries. As a result, compared to their developed counterparts, they have more considerable tariff barriers on imports.

On the one hand, the special status was expected to allow the countries better access to each other's markets. Aside from tariff barriers, trade facilitation techniques were supposed to dramatically lower transaction costs, imposing a downturn on intraregional trade dimensions [3]. Considering the intricacies of BIMSTEC countries, this research aims to assess the empirical causation analysis between economic growth, FDI inflows, and exports. Existing research focused on political diplomacy, economic cooperation, trade and investment, and other theoretical aspects. However, studies on economic growth, FDI inflows, and exports in the BIMSTEC region are lacking. This paper is unique as it contributes to the existing literature by providing growth nexus to the BIMSTEC countries using recent data for the analysis.

2. REVIEW OF LITERATURE

This subsection summarizes previous research and explains the framework, focusing on the research methods. From 1977 to 2003, Stait [4] looked at Egypt's export-led economic pattern. Cointegration analysis, Granger causality tests (from now G-C test), unit root tests, and Vector Auto Regression (VAR) and Impulse Response Function (IRF) were used in the study. The link between exports and GDP was one-way, but there was no relationship between foreign direct investment and exports. Finally, the research emphasized the importance of economic changes implemented in 1991 and found substantial support for the theory of export-led growth in Egypt's economy. According to Clarke and Ralhan [5], the relationship between the economy's output and export in Sri Lanka and Bangladesh has both indirect and direct causation. The findings of the study indicated bidirectional causation between exports and economic growth. Dritsakis [6] attempted to investigate the causal link between FDI, exports, gross capital formation, and economic growth in Greece from 1960 to 2002 using an autoregressive model. Exports have a unidirectional causal link with gross fixed capital production, and foreign direct investments have a unidirectional causal relationship with economic growth.

In Botswana, Jordaan and Eita [7] found a connection between exports and economic growth from 1996 to 2007. The findings show that exports and economic growth are linked in bi-ways—the study supports both the export-led growth theory and reverse causality. The findings state that export-oriented policies should be encouraged to achieve high economic growth, and resources should be used to make exportable goods and services. Mehrara [8] studied the G-C test relationship between non-oil exports and economic development for 73 developing countries from 1970 to 2007. The study finds long-run bidirectional causality between export and GDP growth for emerging economies in all bi- and tri-variate models. No short-run correlation between variables for oil-exporting nations has been found.

Ray [9] explored the connection between economic progress and export growth in India using yearly data from 1972 to 2011. The cointegration test was used to analyze the study. The results revealed that the link between economic growth and exports was cointegrated in long-run equilibrium. The error correction predicted that export and GDP are correlated in the short run. According to the G-C test, there is bidirectional causation, economic growth leading to export growth. Ronit [10] used data from 1969 to 2012 to examine the association between export growth and the GDP of India. To illustrate the association between the variables, they employed a three-step approach that included a Vector Auto Regression model, a G-C model to test causality, and an Impulse Response Function. Export growth is positively related to GDP growth at a one-year lag. The G-C test demonstrated that GDP growth leads to increased exports in India. According to the Impulse Response Functions produced, export reactions to a change in GDP are substantially higher. Finally, it was determined that India supports the growth-led exports theory.

Sunde [11] examined South Africa's economic progress from 1990 to 2014. According to him, both FDI and exports stimulate economic growth. FDI has a one-way causality with economic growth and a two-way causality with export growth. Singh [12] found long-run cointegration between outward FDI, exports, and GDP in India while using outward FDI as the dependent variable. In addition, it finds a one-way causal relationship between exports and FDI and a two-way link between FDI and GDP and exports. According to the research findings, a causal connection between GDP and export drives FDI. Lee [13] established a bidirectional causation association between FDI, export, and economic development using a VECM Model to examine Vietnamese data from 1990 to 2015. Economic growth in the country is boosted by foreign direct investment and

exports. Trade, foreign direct investment (FDI), and economic growth in Turkey were studied by Alici [14]. They found a one-way correlation between exports and economic growth but no correlation between FDI and economic growth.

Ahmad [15] discovered that exports and FDI had unidirectional causalities in Pakistan between 1972 and 2001. Cuadros [16] found unidirectional causality between real FDI, exports, and GDP in Mexico and Argentina. Chowdhury [17] utilized 1969-2000 data, and they found a one-way correlation between GDP and FDI and two-way causality in Malaysia and Thailand. Sultanuzzaman [18] established bidirectional causality between FDI and economic development in Sri Lanka. Also identified a causal link between export and economic development. Using annual data from 1989 to 2013, Romero [19] found a bidirectional causal connection between FDI and GDP in Mexico.

Incorporating eight European and eight Asian underdeveloped countries. From 1986 to 2004, Hsiao [20] evaluated the causal links between GDP, export, and FDI in China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, the Philippines, and Thailand. According to their findings, direct and indirect FDI has a one-way impact on GDP. Jarra [21] identified the link between Ethiopian exports, economic growth, and domestic demand by employing time-series data from 1960 to 2011. The G-C test revealed a dynamic link between the variables, whereas the Johansen cointegration test suggested a long-run relationship. According to the study, domestic demand and exports remained critical determinants in economic development. From 1961–to 2006, Amiri [22] investigated linear and nonlinear G-C tests between imports, exports, and economic development in France using geostatistical models. Nonlinear and linear observations combined with a geostatistical method for causality analysis have yielded convincing results that GDP and trade are linked in a single direction. Kumari [23] studied export-led growth in India using cointegration and causality analysis on annual time series data on exports and GDP per capita from 1980 to 2012. Exports and economic growth have bi-direction in both the long and short run. According to the research, exports and GDP per capita do not pose a long-run equilibrium connection. The G-C test revealed that exports and GDP per capita are causally linked.

Aydin [24] explored the link between Turkey's GDP and exports. Results showed that GDP and export have a unidirectional causal connection. The study provided a better understanding of the effects of GDP on long-term export development. According to Travkina [25], export and GDP growth in Lithuania are caused by short-run or middle-run causation. From 2000 to 2015, the study examined the link between international commerce, mainly export, and economic development in Lithuania, as measured by GDP. Based on the G-C test, the study concluded that export–GDP supported the export-led growth hypothesis only in the short run in Lithuania.

From the evaluation of the present literature, it has been observed that earlier studies focused on the case of developed and developing nations, with the majority emphasizing that FDI has a considerable beneficial influence on economic growth when adjusted for other variables. However, none of these studies have examined the relationship between FDI and exports as it relates to the economic growth of the host region. A dearth of studies focused purely on the prospects of FDI and its causality and cointegration between GDP, foreign direct investment (FDI), and export for BIMSTEC nations. Against this backdrop, the study tries to fill these critical vacuums in the existing literature that both FDI and exports stimulate economic growth.

As a result, we have progressed in this direction and presented examples of export-led development and FDI-led growth. (The present study thus tries to explore new dynamics and prospects of) (In light of the preceding debate, it is essential to assess the impact) of FDI, exports, and economic development on regional integration for the BIMSTEC countries from 1997 to 2020.

3. METHOD(S)

The analysis was performed over 1997 to 2020 for seven countries of BIMSTEC. The panel is balanced. Variables under study are GDP for economic growth, FDI inflows, and exports from BIMSTEC countries. Data is used from the official source of the World Bank's development indicators. Table 1 shows the denotation of the variables in the study, their measure, and their source.

Table 1: Data description and sources.

Variables	Symbol	Measure	(Sources)
Economic Growth	GDP	GDP (constant 2015 US$)	World Development Indicators (WDI)
FDI Inflows	FDIN	Foreign direct investment, net inflows (BoP, current US$)	WDI
Exports of goods and services	EXP	Exports of goods and services (constant 2015 US$)	WDI

Source: The Authors.

This section uses panel data to examine the relationship between economic growth, FDI inflows, and exports for the BIMSTEC country. Panel data analysis is a significant advancement over previous research. Before examining the causation

relationships, we use the unit root test to ensure that each series is stable. In the estimate of a vector autoregression (VAR) model for the causality test, the Panel unit root test of LLC (Levin-Lin-Chu), IPS(Im-Pesaran-Shin), PP Fisher Chi-SQ, and ADF-Fisher chi-squire.

4. MODEL SPECIFICATION

The econometric model and G-C test are used to determine the impact of macroeconomic indices (GDP, FDI inflows, and exports) on the performance of BIMSTEC countries. It is based on the following assumptions of GDP, FDI inflows, and exports for BIMSTEC countries. Whether GDP, FDI inflows, and exports have a causal relationship for BIMSTEC countries and whether there is any long and short-run connection within the variables. Model specifications mention below as

$$GDP = f(FDIN, EXP)$$

Here, GDP stands for economic growth, FDIN for FDI inflows, and EXP for exports of BIMSTEC. The relationship between GDP, FDIN, and Exports for BIMSTEC nations can be written with the help of the model. The model assumed that all the other variables remained constant for the BIMSTEC nations for the 1997–2020 time period except FDIN and Export.

$$Y_{it} = \gamma_0 + \sum_{j=1}^{p} \gamma_j Y_{i,t-j} + \alpha_i + \beta_t + \varepsilon_{it} \ (i = 1,2, \dots, N, t = 1,2, \dots, T)$$

Vector autoregression (VAR) describes the temporal relationship between variables. A VAR model adds multivariate time series to a univariate autoregressive model. Each equation in the model indicates time to progress. This equation incorporates the variable with lagged (past) values, other variables' lagged values, and an error component. Unlike structural models with simultaneous equations, VAR models do not need significant knowledge of the influencing forces (see Asteriou [26]).

5. RESULTS AND DISCUSSION

The model was developed using panel data from seven nations in the BIMSTEC region. Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand are part of it. Data spans from 1997-to 2020 to examine the changing aspects between FDIN, export, and economic growth between BIMSTEC, including 168 observations. FDIN, EXP, and GDP. The study examines the long-term and causal dynamic relationships between export and GDP. The Unit Root Analysis, Cointegration, and (G-C test) techniques are applied in this study.

Table 2: Descriptive statistics.

Statistic	GDP	FDI	EXP
Mean	3.40E+11	5.67E+09	8.70E+10
Median	8.42E+10	9.33E+08	1.62E+10
Maximum	2.70E+12	6.44E+10	5.14E+11
Minimum	5.54E+08	-4.85E+09	1.76E+08
Sum	5.00E+13	8.34E+11	1.28E+13
Std. Dev.	5.89	1.17	1.32
Skewness	2.44	2.80	1.63
Kurtosis	8.34	10.57	4.59
Observations	147	147	147
Data Source	WDI	WDI	WDI

Source: Prepared by the researcher.

5.1 RESULTS OF PANEL UNIT TEST

Different panel unit root tests have been performed to examine the integration and unit root among the variables for panel cointegration. Based on Levin [27], henceforth LLC ADF t-test, the panel unit root test presupposes homogeneity in the dynamic panel of autoregression in all panel units. Individual unit root processes can be detected using the Im [28], henceforth, IPS test, Fisher-ADF, and PP tests. The tests are distinguished because they combine individual unit root tests to provide a panel-specific result, allowing considerable variability across all panel units. The tests, however, are based on the unit root null hypothesis. All variables in this model are converted into a log form for the easiness of calculation. These modified variables are stationary at the first difference, as observed in Stationary I (1). Results are discussed in Table 3.

Table 3: Results of Panel Unit Test for FSPs.

	Stationary I (0)				Stationary I (1)			
Variables	LLC	IPS	ADF CHI-SQ	PP Fisher Chi-SQ	LLC	IPS	ADF Fisher Chi-SQ	PP Fisher Chi-SQ
GDP	0.9987	0.9998	0.9582	0.9893	0.9999	0.1317	0.0451	0.0005*
EXP	0.6851	0.7386	0.3553	0.4596	0.0000*	0.0004*	0.0002*	0.0000*
FDIN	0.417	0.1229	0.2419	0.3655	0.0000*	0.0000*	0.0000*	0.0000*

Source: Prepared by the researcher. * Represents the stationarity of data at a 5% level of significance.
Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

5.2 RESULTS OF THE GRANGER CAUSALITY TEST

To assess non-causality for heterogeneous panel data from Xt to Yt, the Dumitrescu and Hurlin study [29] uses a non-causality test on time-fixed panel data. The Dumitrescu and Hurlin causality test detected variability of regression model and causal relationship from x to y. The first is based on NHC, which shows that x and y are not causally connected. When N causalities exist, y is expected based on past y and x knowledge [29].

The findings of the causality analysis suggest that foreign direct investment drives economic growth. Given that economic growth generates foreign direct investment, bidirectional causality exists. As foreign direct investment increases, so will economic growth and vice-versa. There is one-way causation that runs from economic growth to exports. It means that as the economy prospers, exports get boosted. The study also reveals unidirectional causation from FDI to exports. It suggests that an increase in foreign direct investment will result in a rise in exports. Results are shown in Table 4. For VAR results, see annexure.

Table 4: Pairwise Granger Causality Tests.

Null Hypothesis:		Observations	F-Statistic	Prob.
LFDI	does not Granger Cause LGDP	133	0.44765	0.0401*
LGDP	does not Granger Cause LFDI		5.46553	0.0053*
LEXP	does not Granger Cause LGDP	134	0.45538	0.6352
LGDP	does not Granger Cause LEXP		0.45969	0.0325*
LEXP	does not Granger Cause LFDI	117	0.18733	0.8294
LFDI	does not Granger Cause LEXP		0.23178	0.0935*

Source: Author (* represents data stationarity at a 5% significance level).

6. CONCLUSION

This study uses a VAR-based G-C test, i.e., Dumitrescu and Hurlin's [29] technique, to explore the link between economic growth, foreign capital inflows, and exports for BIMSTEC nations from 1997 to 2020. The heterogeneous panel non-causality methodology measures the dynamic causal link between the variables. The findings suggest bi-directional causality between FDI and economic growth and unidirectional causality running from FDI to exports and from economic growth to exports. This means that when BIMSTEC nations attract FDI, they experience more robust economic growth development as a result of increased export participation. With regard to the causality findings, several policy implications might be presented. Countries in the panels can boost and support economic growth by attracting FDI inflows, which can be achieved through establishing free trade zones and enhancing economic, political, and other security measures.

Furthermore, by boosting goods and service exports, nations in these panels might achieve stronger economic growth. It can be done by lowering export duties and trade obstacles, promoting industrial-based exports, and improving quality control and training programs. Aside from these approaches, the economic progress in the BIMSTEC must be managed with a specific end goal to stimulate FDI inflows through trade liberalization policies to boost economic growth.

This study selected macroeconomic variables for analysis; nonetheless, it is possible that institutional factors, in addition to macroeconomic variables, impact the link between FDI, economic growth, and exports. Future research on these variables can broaden the scope of the analysis.

AUTHOR CONTRIBUTIONS

Both authors contributed equally to this study.

CONFLICT OF INTEREST

None.

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