Nexus between Foreign Direct Investment and Trade Openness

Sushanta Kumar Tarai

PhD Research Scholar, Berhampur Univeersity, taraibu@gmail.com

ABSTRACT

Current research paper aims to investigate the intricate relationship between Foreign Direct Investment (FDI) and Trade Openness, shedding light on their mutual influence in the global economic landscape. FDI and trade openness have become pivotal components of contemporary economic development, prompting substantial interest in understanding their interplay and implications. Through a comprehensive regression analysis, this study seeks to unravel the extent to which FDI influences trade openness and elucidate the underlying mechanisms at play. Utilizing data from various countries and regions, we employ regression models to quantify the impact of FDI on trade openness, controlling for relevant economic and institutional factors. We also explore potential variations in the FDI-trade openness relationship across different contexts and time periods. The findings of this research hold significant policy implications, as they can guide policymakers, businesses, and investors in making informed decisions regarding FDI strategies and trade policies. A better understanding of this relationship can help foster international cooperation and economic growth while mitigating potential risks associated with globalization. Ultimately, this study contributes to the ongoing discourse on the globalization of economies, offering insights into the dynamics of FDI and trade openness, and providing a valuable resource for academics, practitioners, and policymakers alike.

Keywords: *Economic Impact, Foreign Direct Investment, Global Economy, Regression Analysis, and Trade Openness*

Foreign Direct Investment and Trade Openness: Regression Analysis

1. INTRODUCTION

This research paper, titled "Foreign Direct Investment and Trade Openness: Regression Analysis," endeavors to unravel the nuanced interplay between FDI and trade openness, with a primary focus on quantifying the impact of FDI on trade openness. Through regression analysis and the examination of comprehensive datasets, we aim to provide valuable insights into the magnitude and direction of this influence, while also considering contextual factors that may influence the relationship. As we embark on this exploration, we aim to contribute to the ongoing discourse on globalization and international economic relations, offering a foundation for evidence-based decision-making and policy formulation in an increasingly interconnected and interdependent global economy.

2. REVIEW OF LITERARTURE

Tariq et al. (2018) conducted an investigation into the potential ecological and economic consequences of Foreign Direct Investment (FDI) and Trade Openness in Pakistan and India. A significant aspect of their study was dedicated to exploring whether trade liberalization had adverse environmental implications in these two nations. To accomplish these objectives, the research utilized a Panel Auto-Regressive Distributed Lag (ARDL) model, considering both countries collectively. The empirical results reveal a positive association between FDI and CO2 emissions, suggesting that FDI in Pakistan and India may have detrimental environmental consequences. Over the long term, trade displays a negative connection with environmental factors, while in the short term, it exhibits a positive one. In conclusion, this study underscores the potential for FDI and trade liberalization to foster economic growth by generating employment opportunities. Nonetheless, it also emphasizes the adverse environmental effects associated with these factors in both Pakistan and India.

Zaman et al. (2018) employed Novel regression techniques to explore the linkage between trade openness and the influx of Foreign Direct Investment (FDI) in India, Iran, and Pakistan spanning the period from 1982 to 2012. Panel data analysis was used, employing Fixed Effect and Pooled Ordinary Least Squares (OLS) methodologies, to evaluate the unique country-specific effects, collective effects, and temporal influences while scrutinizing the connection between trade openness and FDI inflows. The study's results unveiled a substantial and positive influence of heightened trade openness on FDI inflows. Additionally, the outcomes demonstrated that FDI inflows were significantly shaped by conventional

determinants, including exchange rates, the consumer price index (inflation), and GDP per capita. Based on these findings, the author concludes that augmenting trade openness represents a favorable strategy for cultivating greater and enduring FDI inflows in the long run. This approach not only fosters increased foreign investment but also contributes to the overall prosperity of the populace

Saleem et al. (2020) investigated the dynamic causal relationships among foreign direct investment (FDI), gross domestic product (GDP), and trade openness (TO) in a selected group of five South Asian nations. To explore this, a novel bootstrap autoregressive distributed lags (ARDL) cointegration test was utilized to evaluate the long-term connections between FDI, GDP, and TO in these South Asian countries over the period from 1975 to 2016. Importantly, it was observed that economic growth (EG) displayed a significant correlation with TO in the cases of Bangladesh, India, and Sri Lanka, highlighting the central role of trade openness in propelling growth in these countries. The findings further indicate that, except for Bangladesh, all the countries exhibited a long-term cointegration between FDI, GDP, and TO, with FDI as the dependent variable. These results underscore the contributions of both FDI and trade openness to the economic growth of these selected South Asian nations. This research represents one of the initial endeavors to investigate the causal connections and analyze the short- and long-term dynamics among FDI, GDP, and TO in the context of five South Asian countries, specifically Bangladesh, India, Nepal, Pakistan, and Sri Lanka."

Zameer et al. (2020) delved into the complex network of causal relationships among foreign direct investment (FDI), gross domestic product (GDP), and trade openness (TO) within a carefully chosen group of five South Asian nations. To unravel these intricate connections, a novel bootstrap autoregressive distributed lags (ARDL) cointegration test was applied, covering the period from 1975 to 2016, to examine the enduring associations between FDI, GDP, and TO within this regional context. Notably, the research unearthed a significant correlation between economic growth (EG) and trade openness in the instances of Bangladesh, India, and Sri Lanka, underscoring the crucial role that open trade plays in driving economic growth in these specific countries. Furthermore, the results indicated that, barring Bangladesh, all the countries demonstrated a sustained cointegration between FDI, GDP, and TO, with FDI serving as the dependent variable. These findings emphasize the substantial contributions of both FDI and trade openness to the economic well-being of the selected South Asian nations. This study represents one of the initial efforts to investigate the causal relationships and

scrutinize the short- and long-term dynamics between FDI, GDP, and TO in the context of five South Asian countries, namely Bangladesh, India, Nepal, Pakistan, and Sri Lanka

Banday et al. (2020) enquired into the complex relationships of causality among foreign direct investment, trade openness, and gross domestic product across the BRICS countries, spanning the period from 1990 to 2018. To investigate these intricate connections, an auto-regressive distributed lag model was applied to analyze cointegration and perform the Dumitrescu and Hurlin Granger causality tests. Our empirical results indicate a lasting, positive influence of both foreign direct investment and trade openness on long-term economic growth. Additionally, our analysis reveals a persistent relationship between real effective exchange rates and gross capital formation with economic growth. Notably, the key outcomes of the causality analysis uncover bidirectional causality between foreign direct investment and economic growth, bidirectional causality between trade openness and foreign direct investment, and unidirectional causality from trade openness to foreign direct investment

Qamruzzaman & Karim (2020) explored whether the variations in economic stability within specific South Asian nations and their levels of trade openness have influenced the patterns of foreign direct investment (FDI) inflows over the period spanning from 1975 to 2019. To investigate this, a variety of nonlinear tests were employed, including unit root tests, ordinary least squares (OLS) analysis, autoregressive distributed lag (NARDL) testing, and causality analysis. The outcomes of the nonlinear unit root test indicated that the variables exhibited stationarity at the first deviation, signifying nonlinear systems. Additionally, the presence of nonlinearity in our empirical estimations was confirmed by nonlinear OLS and Brock Dechert Scheinkman (BDS) tests. Concerning the Wald test results within the framework of NARDL, we verified a persistent, asymmetric relationship between the variables under examination, with both long-term and short-term asymmetry observed across all empirical models. Furthermore, the research findings on directional causality and asymmetric patterns lend support to the feedback hypothesis as an explanation for the directional causality between regional economic volatility, trade openness, and FDI inflows.

Kumari et al. (2021) conducted an empirical examination of the persistent relationships and cause-and-effect links between foreign direct investment (FDI) inflows, trade openness, and economic growth within the specific context of India. The study employed annual time series data spanning from 1985 to 2018 and utilized the Johansen cointegration analysis along with the vector auto regression (VAR) model. The outcomes of the Johansen cointegration

analysis indicated the absence of a long-term relationship among these three variables. Furthermore, the results of the VAR Granger causality analysis demonstrated a two-way causal relationship between FDI and economic growth, signifying that FDI influences economic growth and vice versa. However, no bidirectional causality was found between trade openness and economic growth. These findings provide valuable insights for government decision-making, particularly concerning foreign investment, with a focus on enhancing trade openness. The study suggests that India, through a more open trade policy, can shape the direction and scale of FDI flows. The impulse analysis presented in the study equips researchers, policymakers, and government officials with information to make informed decisions regarding FDI inflows in the ten years following 2018. Notably, the study's most intriguing results, extracted from impulse functions, illustrate the expected trends in FDI inflows, trade openness, and economic growth over the coming decade, whether they are on an upward or downward trajectory.

Rakshit (2021) delved into the intricate relationships among trade openness, foreign direct investment (FDI), and economic growth in the specific context of India, focusing on the period from 1979 to 2017. This study also considered the impact of economic reforms both before and after these periods on these relationships. To investigate potential enduring connections between these variables, the authors applied the autoregressive distributed lag model. The Zivot-Andrew unit root test was used to identify any structural breaks in the data series, while the Toda-Yamamoto causality approach was employed to determine the direction of causality among these variables. The findings of this investigation indicated that trade openness negatively influences long-term economic growth. At the same time, FDI inflows were found to promote economic growth in the long term, although their short-term impact on growth was less apparent. In terms of causality, the results confirmed a one-way causal relationship, with FDI inflows and the labor force influencing per capita gross domestic product growth in India.

Current research primarily focuses on the economic aspects of trade openness, foreign direct investment (FDI), and economic growth. However, there is a research gap when it comes to investigating the environmental repercussions of these connections, particularly within emerging economies like India and Pakistan. Additionally, these existing studies tend to examine relatively short timeframes, such as the post-liberalization era or a specific decade. What's needed is research that covers longer periods to capture the evolving dynamics and alterations in these relationships over extended durations.

Although some studies briefly mention the influence of economic reforms, such as liberalization, there's an opportunity to conduct a more in-depth exploration of the specific policies and reforms that may have shaped these observed relationships. A more comprehensive analysis of policy impact is necessary. Furthermore, while a few studies suggest the existence of nonlinear relationships or structural breaks, there's a research gap when it comes to conducting more sophisticated analyses to explore and comprehend these nonlinear dynamics.

3. OBJECTIVE

This research paper is having the objective is to analyze the impact of FDI on Trade openness.

4. HYPOTHESES

I. **Hypothesis 1:** There is no statistically significant positive relationship between Foreign Direct Investment (FDI) and Trade Openness.

II. **Hypothesis 2:** FDI has no mediating effect on the relationship between other economic factors (e.g., GDP, exchange rates) and Trade Openness.

5. METHODODLOGY

In pursuit of our objective to analyze the impact of Foreign Direct Investment (FDI) on Trade Openness, we will employ a comprehensive methodology. This research will adopt a quantitative approach, utilizing data covering the period from 1990 to 2020. The following steps have been undertaken:

Data Collection: We have acquired data from reputable sources, including the World Bank, national statistical agencies, and relevant economic databases, to obtain historical information on FDI inflows, trade openness indices, and potential control variables.

Variable Definitions: Precise definitions and explanations of key variables, including FDI, Trade Openness, Gross Domestic Product (GDP), and other control variables, will be provided to ensure clarity.

Hypotheses: We have tested the hypotheses we've derived from our research objectives, which mainly focus on the relationships between FDI, trade openness, and potential mediating or moderating factors.

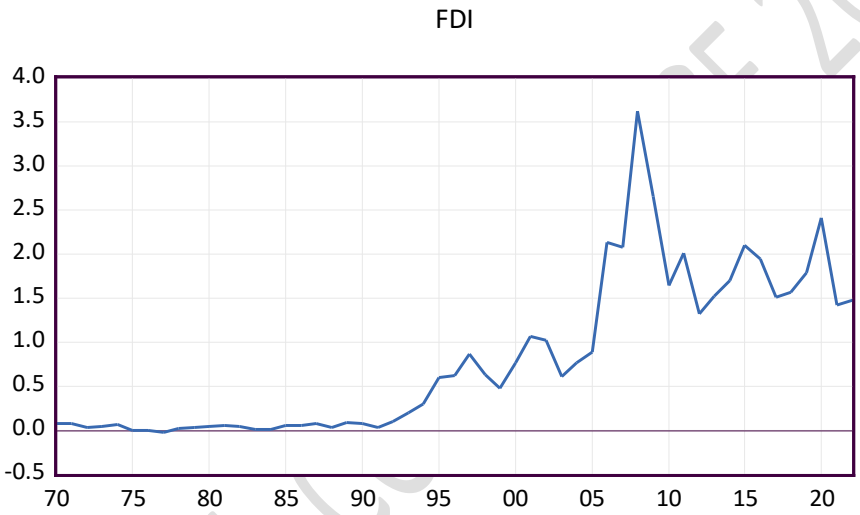
Data Analysis Techniques: We have employed econometric techniques, including regression analysis, panel data analysis, and possibly Granger causality tests, to examine the relationships.

Data Preprocessing: Data cleaning and preprocessing steps have been carried out to handle missing values, outliers, and apply necessary transformations.

Control Variables: Control variables, including GDP, exchange rates, and inflation, are included in the model to account for their potential effects on the relationship between FDI and trade openness.

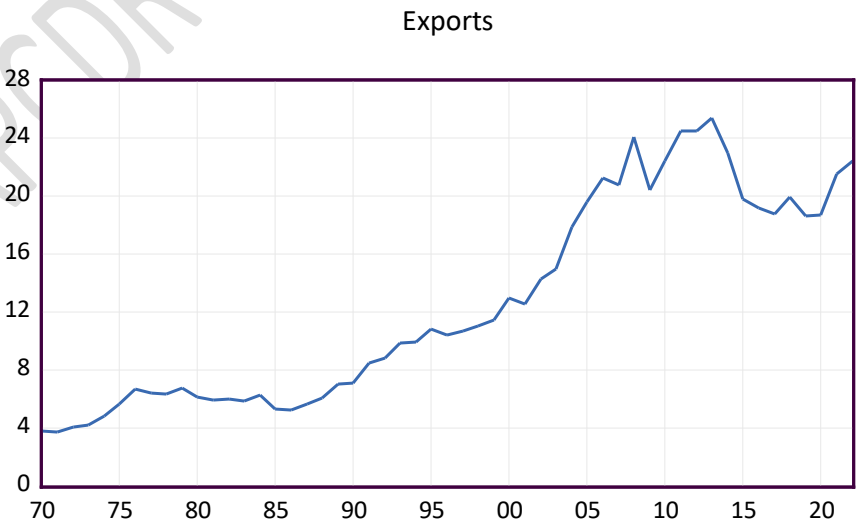
Our methodology provides a rigorous framework to investigate the impact of FDI on trade openness, producing meaningful insights and conclusions.

Figure-1: Foreign direct investment, net inflows (% of GDP)



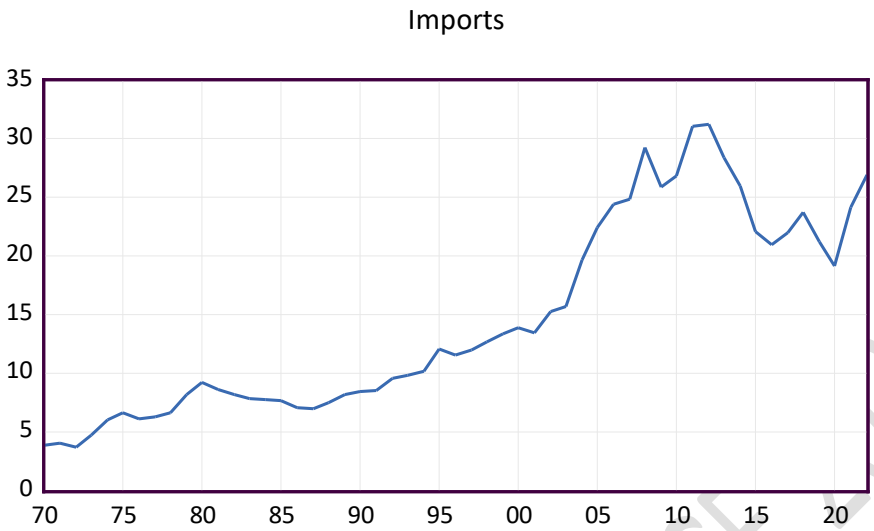
Source: Computed by Authors using Eviews

Figure-2: Exports of goods and services (% of GDP)



Source: Computed by Authors using Eviews

Figure-3: Imports of goods and services (% of GDP)



Source: Computed by Authors using Eviews

6. RESULT AND DISCUSSION

Table 1: Descriptive Statistics

	FDI	EXPORTS	IMPORTS
Mean	0.801211	12.59972	14.55485
Median	0.594986	10.69072	11.92867
Maximum	3.620523	25.43086	31.25929
Minimum	-0.029682	3.667205	3.708910
Std. Dev.	0.891007	7.082736	8.376309
Skewness	0.990593	0.381342	0.527509
Kurtosis	3.273203	1.609828	1.854377
Jarque-Bera	8.832757	5.552336	5.356340
Probability	0.012078	0.062277	0.068689
Sum Sq. Dev.	41.28245	2608.588	3648.453

Source: Computed by Authors using Eviews

Table 1 summarizes key descriptive statistics for the variables FDI (Foreign Direct Investment), exports, and imports in the dataset. The mean FDI is approximately 0.8012% of GDP, while exports and imports represent around 12.5997% and 14.5549% of GDP, respectively. The median values indicate that FDI is centered around 0.5950%, while exports and imports have medians of approximately 10.6907% and 11.9287%, respectively. The maximum FDI value is 3.6205%, the lowest is -0.0297%. For exports and imports, the maximum values are approximately 25.4309% and 31.2593%, respectively. Standard deviations reveal considerable variability: FDI's is 0.8910, exports' is 7.0827, and imports' is 8.3763. Skewness values suggest slight right-skewing in the distributions of all three variables.

Kurtosis values indicate heavy tails for FDI and lighter tails for exports and imports. Jarque-Bera tests show that all variables deviate significantly from a normal distribution, as indicated by low p-values.

Table 2: Result of Correlation

	FDI	EXPORTS	IMPORTS
FDI	1	0.89	0.88
EXPORTS	0.89	1	0.99
IMPORTS	0.88	0.99	1

Source: Computed by Authors using Eviews

Table 3: Result of Regression analysis

Dependent Variable: FDI
Method: ARDL
Date: 09/27/23 Time: 16:40
Sample: 1974 2022
Included observations: 49
Dependent lags: 4 (Automatic)
Automatic-lag linear regressors (4 max. lags): EXPORTS IMPORTS
Deterministics: Restricted constant and no trend (Case 2)
Model selection method: Akaike info criterion (AIC)
Number of models evaluated: 100
Selected model: ARDL(4,2,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FDI(-1)	0.366260	0.159144	2.301431	0.0267
FDI(-2)	-0.104918	0.206182	-0.508860	0.6136
FDI(-3)	-0.088514	0.195374	-0.453049	0.6530
FDI(-4)	-0.332570	0.158670	-2.095982	0.0425
EXPORTS	0.025314	0.062919	0.402320	0.6896
EXPORTS(-1)	-0.031353	0.069707	-0.449786	0.6553
EXPORTS(-2)	0.092232	0.050860	1.813439	0.0773
IMPORTS	0.042548	0.046712	0.910848	0.3678
C	-0.798486	0.179468	-4.449185	0.0001

R-squared	0.881465	Mean dependent var	0.862273
Adjusted R-squared	0.857758	S.D. dependent var	0.899770
S.E. of regression	0.339348	Akaike info criterion	0.840822
Sum squared resid	4.606271	Schwarz criterion	1.188300
Log likelihood	-11.60015	Hannan-Quinn criter.	0.972655
F-statistic	37.18175	Durbin-Watson stat	2.074027
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent test results do not account for model selection.
Source: Computed by Authors using Eviews

The ARDL result (Table 3) indicates that FDI in the previous year (FDI(-1)) has a significant positive impact on current-year FDI, signifying a strong predictive relationship. FDI from two and three years ago (FDI(-2) and FDI(-3)) is not statistically significant, while FDI from four years ago (FDI(-4)) has a significant negative effect. Lagged exports and imports have limited influence on current FDI. The overall model is highly significant ($p < 0.001$) and explains a substantial portion of FDI variance. The results suggest that previous-year FDI plays a pivotal role in determining current FDI levels, while exports and imports have less predictive power.

Table 4: Result of Pair Wise Granger Causality Test

Pairwise Granger Causality Tests
Date: 09/27/23 Time: 16:48
Sample: 1970 2022
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXPORTS does not Granger Cause FDI	51	8.44444	0.0008
FDI does not Granger Cause EXPORTS		7.84138	0.0012
IMPORTS does not Granger Cause FDI	51	6.45518	0.0034
FDI does not Granger Cause IMPORTS		6.75215	0.0027
IMPORTS does not Granger Cause EXPORTS	51	0.86032	0.4297
EXPORTS does not Granger Cause IMPORTS		3.49184	0.0387

Source: Computed by Authors using Eviews

The results reveal Granger causality relationships between the variables. Specifically, past values of exports, FDI, and imports provide predictive information about each other, with the exception of imports not Granger causing exports.

7. CONCLUSION

The empirical evidence presented in this study has offered valuable insights into the impact of FDI on trade openness and the broader economic landscape of India. Notably, our findings support the notion that FDI plays a pivotal role in fostering trade openness. The positive relationship we uncovered underscores the significance of FDI as a catalyst for greater trade integration, encompassing both exports and imports. This insight carries significant implications for economic policy in India and other developing nations seeking to leverage foreign investments for economic growth and international trade expansion.

Our research also emphasized the importance of considering long-term effects and lagged relationships in analyzing FDI's influence on trade openness. It revealed that the effects

of FDI may not be immediate but can become more pronounced over time, highlighting the need for a patient and sustained approach to reaping the benefits of foreign investments. Furthermore, the results of Granger causality tests showcased bidirectional causality between FDI and trade, indicating that these two economic components mutually influence each other. This understanding can guide policymakers in formulating strategies to attract more FDI, enhance trade openness, and achieve sustainable economic growth. This research paper contributes to the existing body of literature by offering a comprehensive analysis of the intricate relationship between FDI and trade openness in India. It underscores the pivotal role that FDI plays in shaping trade dynamics and economic growth. As India and other emerging economies continue to navigate the global economic landscape, these findings provide valuable guidance for designing effective policies that harness the potential of foreign investments for fostering greater trade openness and prosperity.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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