



Pratidhwani the Echo

A Peer-Reviewed International Journal of Humanities & Social Science

ISSN: 2278-5264 (Online) 2321-9319 (Print)

Impact Factor: 6.28 (Index Copernicus International)

UGC Approved, Journal No: 48666

Volume-VII, Issue-IV, April 2019, Page No. 249-260

Published by Dept. of Bengali, Karimganj College, Karimganj, Assam, India

Website: <http://www.thecho.in>

Foreign Direct Investment, Trade Openness and Growth in India

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Abstract

This article investigates the causal relationship among foreign direct investment, trade openness and economic growth in India taking the period of post-liberalisation covering 1991–2017. The Augmented Dickey Fuller (ADF) test for unit root, Johansen Cointegration methods and short run causality tests in Vector Error Correction Model (VECM) framework are used to investigate the relationships. ADF test for unit root result shows all variables to be integrated of order one, i.e. they are stationary after first differenced. Johansen Cointegration Trace and Max-Eigen Value test shows the existence of cointegration which implies long run relationship among the variables. The normalised long run estimate shows foreign direct investment (FDI) and trade openness (TOP), on average, to have asymmetric effects of FDI and TOP on economic growth. The results of short run causality test based on a stable VECM support a unidirectional causality running from growth to foreign direct investment and bidirectional causality between trade openness and economic growth. Therefore, the study concludes by recommending more trade openness in terms of encouraging exports and inflow of FDI through the creation of enabling and friendly environment to do business for output growth dynamics in India.

Keywords: Economic growth, FDI, domestic investment, trade openness, causality, India.

1. Introduction: In the era of globalisation and liberalisation, trade openness and foreign direct investment (FDI) have emerged as major impetus to economic growth and development in developing economies. FDI serves as an important source of supply funds for domestic investment thus, promoting capital formation in the host country (Omisakin et al. 2009). Besides FDI, trade openness has played a crucial role in shaping the stages of economic development over many years in developing countries. Investment Policy for Sustainable Development by United Nations Conference on Trade and Development (2012) quoted FDI is a driver of sustainable development while trade openness was highlighted by World Trade Organization as another driver for sustainable development especially for developing countries. According to World Investment Report by the United Nations Conference on Trade and Development (2012) and World Trade Organization, the roles of

FDI and trade openness have expanded to include not just the effect on growth but also on income distribution and environmental quality which are the three main pillars of sustainable development set by the Commission on Sustainable Development of the United Nations.

The endogenous growth theory of the 1980s considered technological progress and FDI to have permanent growth effect in the host country through technology transfer and spillover (Jayachandran & Seilan, 2010). In an increasingly globalized economy, FDI and international trade, especially through exports and imports, enhances competition in the international markets and technology transfer and thus promote economic growth (Grassman and Gelpman, 1991, Frankel and Romer, 1999). Conversely, growth also has effects on trade (Rodriguez and Rodrik, 2000). Export expansion brings greater economies of scale, productivity and removes foreign exchange constraints, thereby providing greater access to international markets (Dritsaki, et al., 2004) while FDI can add-on knowledge and technology transfer and increase job opportunities thus, boosting overall growth in the host country.

The purpose of this article is to investigate and evaluate the impact of FDI and trade openness on economic growth within the multivariate framework in India taking the period after post-liberalization. The study of FDI inflows and trade openness and their impact on economic growth and development is important, given its relevance in explaining growth dynamics in India and other developing economies. Since the start of economic liberation policy in the 1990s, volume of trade and FDI inflows have been on the increase the extent to which they affect economic growth of India. The following figure-1 shows the growth trend of FDI, export and import as percentage of GDP for the period 1991-2017. In the figure-1 it is demonstrated that FDI inflows in 1991 was very low- it was around 0.03 percent of GDP which increase to 1.07 percent in 2001 and then peaked to 3.66 percent in 2008. The rate of growth of FDI inflows has decreased thereafter and reached to 2.09 percent in 2015 and further decline to 1.54 percent in 2017. Similarly, the rate of growth of export shows increasing trend, thus export rate increased with fluctuations from 8.58 percent in 1991 to 13.13 percent in 2000 as percentage of GDP. The growth rate of export continues to rise and reached highest at 25.43 percent in 2013 and then decline to 19.05 percent in 2017. Furthermore, the import growth rate is also observed similar trend as that of export; thus, the percentage of import increases from 8.59 percent in 1991 to 29.50 percent in 2008 and reached the peak at 31.25 percent in 2012 and decline to 21.60 percent in recent year.

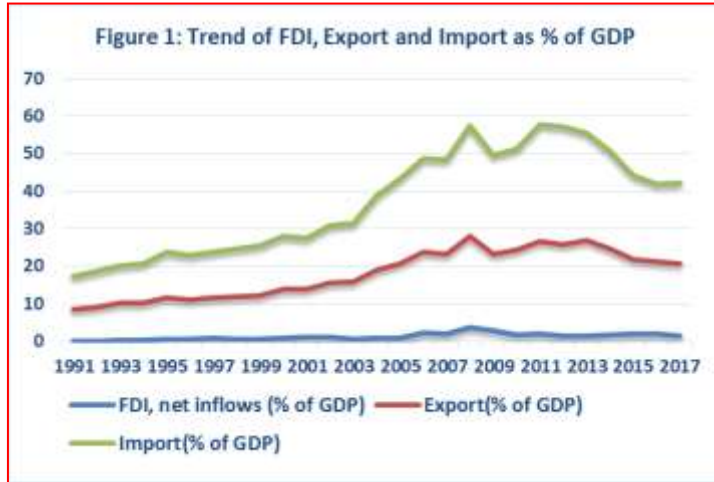
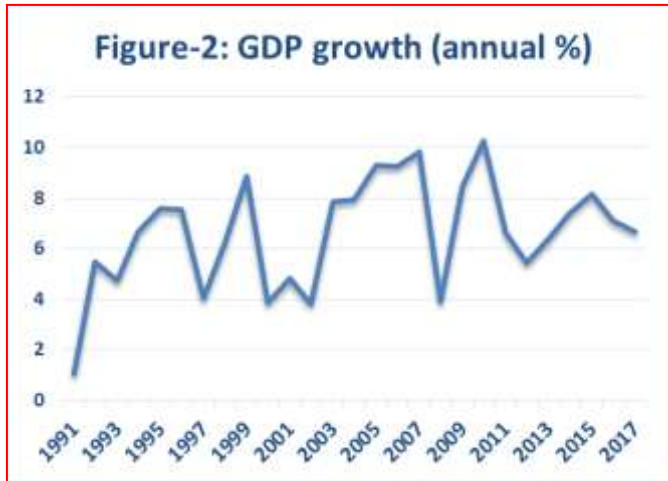


Figure-2 reflects the annual percentage growth rate of GDP during the period of post-liberalisation. It demonstrates that India had a lowest GDP growth rate in the initial period of reform- around 1.06 percent in 1991. But thereafter, it has increased considerably. The annual growth rate increased to 8.85 percent in 1991 and then decline to 3.80 percent in 2002 and attained highest growth of 10.26 percent in 2010. Then the average annual growth rate was 6.83 percent till the recent year. Overall the average annual growth was 6.64 percent during the reform period.



With robust economic growth, India has become one of the fastest growing economies in the world in recent years. In relation to this, many argue FDI and trade (export plus import), inter alia, play a significant role in achieving growth and development. As FDI and trade represent the most important variables in explaining growth dynamics, understanding the causal connections between these phenomena is important for development strategies in India and other developing countries. Therefore, this study is guided by the following specific research objectives:

- i. To examine the causal interrelationship among FDI, trade openness and economic growth in India.
- ii. To estimate the long run relationship and short run dynamics of FDI, trade openness and economic growth in India using recent econometric technique.

The rest of the article is structured as follows: Section 2 is a brief overview of Literature Review and Section 3 includes brief overview of FDI, domestic investment and economic growth in India. Section 4 deals with data source and methodology. Section 5 shows the main empirical findings of the study while the last Section 6 is concluding part of this study.

2. A brief overview of Literature Review: Over the last three decades, there have been different strands of theoretical and empirical studies aimed at investigating the relationship among macroeconomic variables including variables FDI and openness to trade. Extensive theoretical literature on international trade advocates that trade contributes positively to the long-term growth prospects of a country (Van den Berg & Lewer, 2015). The new growth theories indicate that trade openness increases economic growth by enhancing the scale of spillover (Romer 1990). There is also accumulated empirical evidence suggesting that trade openness has led to the increased efficiency, productivity, technology, and growth in both developed and developing countries (Bhagwati 1978; Markusen et al., 1995; The World Bank, 2015).

Similarly, literature has suggested that FDI may lead to the transfer of technology, economic transformation, technological progress and human capital development (Borensztein, et al., 1998; de Mello 1999). Furthermore, the literature reflects FDI inflows to be particularly important for developing countries as it provides productive capital necessary for performing economic activities (UNCTAD, 2016). Thus, FDI complements the domestic capital stock and enhances the production capabilities of the national economy in the long-run (Omisakin et al. 2009; Tang, et al., 2008). It aids to overcome shortage of capital in host countries through the flows of FDI fund to high risk areas or new industries that are with limited domestic investment (Noorzoy 1979). There may arise other possible positive spillovers when multinational enterprises (MNEs) have vertical inter-firm linkages with domestic firms or have subnational cluster of interrelated activities, resulting in increased domestic entrepreneurship in a host economy. Besides the above channels, FDI can also contribute to economic growth through increased exports from the host country when MNEs locate in the host-country for export activity.

There are many empirical studies investigating the long-run relationships among economic openness, trade and growth based on a time-series framework and co-integration analysis. For example, Gries and Redlin (2012), using a large sample of 158 countries over the period 1970-2009, conclude that there is a significant positive causal long-term effect running from trade openness to economic growth and vice versa.

Yanikkaya (2003) finds using various trade liberalization indices for 120 countries over the period 1970-1999 that trade has a positive impact on real GDP per capita while Kim (2011) used the data of 61 countries, and finds that greater trade openness is positively

related to economic growth and real income in case of develop countries but it is negatively linked to economic growth in case of developing countries.

Above and beyond trade openness, there are studies that also examine explicitly the long run causal relationship between FDI and growth. More specifically, the empirical evidence points out that in Southeast Asian countries FDI contributes significantly to GDP growth (Choong & Liew, 2009). Besides, the studies that included trade-related measures and FDI simultaneously to investigate long-run growth effects reveal the presence of intricate interrelationships (Sothan, 2016). It indicates that different patterns and causality relations can arise. For instance, FDI might cause trade (exports and imports), which causes economic growth without a direct growth effect of FDI, or FDI and exports both having only direct effects on growth, or other interdependencies.

Dutta, et al. (2017) examined the causal relationship among foreign direct investment, domestic investment, trade openness and economic growth in Bangladesh over the period 1976–2014. The results found a unidirectional causality running from foreign direct investment to growth, domestic investment to trade openness, growth to trade openness and bidirectional causality between domestic investment and growth and foreign direct investment and domestic investment.

Several studies have attempted to explore the interrelationship between FDI, trade openness and economic growth in India and the evidence has been mixed (Keshava 2008; Hye and Lau, 2015). Sharma (2000) have noted that FDI bear statistically no significant impact on export performance in India although the coefficient of FDI has a positive sign and therefore, conclude that any linkage effect through export-promotion channel is perhaps weak in the Indian context.

Hye and Lau (2015) examine the link between trade openness and economic growth in India and find negative and unstable impact of trade openness index on economic growth throughout the sample in the long run. Ved and Sudesh (2007) examine the relationship between trade openness and economic growth in the case of India and found bidirectional causality among economic growth and trade openness indicators.

Thus, the literature shows that the results of the FDI inflows and trade openness impact on economic growth have been quite varied and inconclusive. The major factors responsible for these contradictions in the empirical studies include, *inter alia*, variances in data used, countries, data measurement and definitions, methodological approaches (Omisakin et al. 2009). The varied views on the nexus between the variables indicates a literature gap, allowing us to develop more interest to further explore the relationship between FDI, trade openness and economic growth where few studies have been conducted. Specifically, not many studies have been attempted to identify long-run co-integrated relationship between FDI, trade and economic growth in the context of India. Therefore, the paper contributes to the existing literature using recent data and the relationship between the above variables in multivariate form by examining India as a developing country.

3. Data and Methodology: To explore the main objective through examining the relationship among foreign direct investment, trade openness and economic growth, this study employs the Indian annual time series from 1991-2017. The data set on the variables, FDI and trade openness (TOP) are sourced from World Development Indicators (WDI, 2019) and Gross Domestic Product (GDP) data series is extracted from the Reserve Bank of India, 'The Handbook of Statistics on Indian economy', (RBI, 2019). The variable trade openness is proxied by export plus import as percentage of GDP, economic growth is proxied by GDP and FDI is net inflows (BoP, current US\$).

The study has adopted the Vector Error Correction Model (VECM) to examine the relationship among the variables. The Augmented Dickey Fuller (ADF) test for unit root is applied to test for stationarity of the series and when they were found to be integrated of order one, the Johansen Cointegration test was applied to examine the long run association among the variables, and the VECM was employed to identify the long run and short run relationship among the variables after cointegration was established. Statistical tests like t-test and F-test are applied to when necessary to examine the significance of the estimated results.

In order to examine the relationship between the variables, the model is specified as:

$$\text{GDP}_t = \beta_0 + \beta_1 \text{FDI}_t + \beta_2 \text{TOP}_t + \epsilon_t \quad (1)$$

Where,

GDP = Gross Domestic Product, proxy for economic growth.

FDI = Foreign Direct Investment Inflows

TOP= Trade openness, i.e., export plus import as percentage of GDP.

A system of VAR equations will consist of as many equations as there are variables in the model (which is three in this study) while the number of lags is determined by statistically testing for the best fitting model. The VAR Specification of the Model with p-lags is specified as:

$$\text{Y}_t = \text{C} + \Pi_1 \text{Y}_{t-1} + \Pi_2 \text{Y}_{t-2} + \dots + \Pi_p \text{Y}_{t-p} + \epsilon_t \quad (2)$$

Where $\text{Y}_t = (\text{Y1}_t \text{Y2}_t \text{Y3}_t)'$ is a three vector variable with $\text{Y1}_t = \text{GDP}$, $\text{Y2}_t = \text{TOP}$, $\text{Y3}_t = \text{FDI}$; C is the 3×1 vector of intercepts; Π_i is the 3×3 matrix of coefficients associated with the i th lag of the variable i.e. Y_{t-p} ; p is the total number of lags that is empirically determined and is dependent on the sample so that the residual term (ϵ_t) is a vector of error term.

The Vector Error Correction Model (VECM) is specified as:

$$\Delta \text{Y}_t = \text{C} + \sum_{i=1}^k \Gamma \Delta \text{Y}_{t-i} + \lambda (\text{U}_{t-1}) + \epsilon_t \quad (3)$$

Where,

Γ = Short run coefficient matrices

λ = Error correction term/ speed of adjustment

Δ = Short run operator

U_{t-1} = One lag of long run cointegrating equation

ε = vector of error term.

5. Results and Discussion:

This section demonstrates the main findings of the study. The analysis of the findings are as follows:

5.1 Stationarity Test of the Variables: We have applied Augmented Dickey-Fuller (ADF) unit root test to check whether the variables are stationary or not. The results of the test are given in Table 1. In time series analysis, stationarity is highly important and a variable is supposed to be stationary if the ADF test statistic is greater than the critical ADF value. A glance at the table 1 reveals that all the variables are non-stationary at their level. When the test procedure is run on first differenced of the variables, they become stationary. Therefore, we conclude that the all variables are integrated of order one, I(1) because they were non-stationary at level, but rather at first difference (Table 1).

Table 1: ADF test for Stationarity

Variable	Level			First differenced		
	No intct. & no Trend	Intercept	Incpt. & trend	No intct. & no Trend	Intercept	Incpt. & trend
GDP	3.638	2.063	-0.160	-3.340*	-4.097*	-5.053*
FDI	0.353	-0.702	-2.499	-5.049*	-5.286*	-5.188*
TOP	0.700	-1.416	-0.400	-4.186*	-4.305*	-4.532*

Source: Author's own calculation; H_0 : Series is non-stationary; * indicates rejection of H_0 (non-stationary) at 5% level of significance.

5.2 Testing for Cointegration of Variables: The ADF test verified that all our variables have the same order of integration, i.e., at first differenced, I(1). Therefore, the long-run relationship among the variables can be examined through Johansen cointegration test using Akaike's (AIC) and the Schwarz's Bayesian (SBIC) information criterion processes. A model with 4 lags is chosen based on Akaike's (AIC) and the Schwarz's Bayesian (SBIC) information criterion processes in determining optimal lag lengths for the Johansen's procedure. The results of rank Johansen cointegration test are presented in Table 2. The null hypotheses that, there is no co-integrating equation, are rejected if the test statistic is greater than the 5 percent critical value. A perusal of the table 2 reveals that both the Trace test statistic as well as Maximum Eigenvalue statistics confirms the presence of three cointegrating relationship among the variables. Therefore, we can conclude that there exists a long-run relationship among the three variables (Table 2).

Table 2: Johansen Cointegration Test Results

Null Hypothesis	Alternative Hypothesis	Trace statistic	5% Critical Value
$r = 0$	$r = 1$	64.39*	29.68
$r \leq 1$	$r \geq 2$	20.60*	15.41
$r \leq 2$	$r \geq 3$	0.15	3.76
Null Hypothesis	Alternative Hypothesis	Max-Eigen statistic	5% Critical Value
$r = 0$	$r = 1$	43.79*	20.97
$r \leq 1$	$r \geq 2$	20.45*	14.07
$r \leq 2$	$r \geq 3$	0.15	3.76

Source: Author's Calculation

Note: r is the co-integration vector; * indicates rejection of null hypothesis at 5% level of significant.

In the long run, the independent variables-FDI and trade openness- are found, one average, to have asymmetric effects on GDP. Thus, FDI has a positive impact while trade openness has a negative impact on GDP in the long run. The coefficients are statistically significant at the one percent level (Table 3).

Table 3: Johansen normalization restriction imposed

BETA	COEFFICIENTS	STD. ERR.	Z	P> Z
_CE1				
GDP	1			
TOP	95.27347	15.18631	6.27	0.000
FDI	-84.0984	13.78722	-6.10	0.000
_CONS	-1693.562			

Source: Author's calculation

5.3 Vector Error Correction Model (VECM): The Johansen co-integration test confirmed that the time series data of economic growth, FDI, and TOP has three co-integrating vector which implies a long-run relationship among the variables. Hence, the long-run relationship has been found by applying the VECM mechanism. The table 4 reports that R^2 value indicates that the estimated VECM performs quite well and explains about 82 per cent of the dependent variable (Δ GDP) by the explanatory variables. The short run dynamics of the model and error correction coefficient are summarised in Table 4.

Table 4: Short Run Estimation

Variables	Coefficients	T- Statistic
ECT	-18.21	-4.68**
TOP(-1)	-44.72	-5.87**
TOP(-2)	-21.58	-3.09**

FDI(-1)	15.91	4.35**
R-square	0.82	

** indicates statistical significance at 1%.

A perusal of the table 4 indicates the error correction term (ECT) showing the speed of adjustment towards long run equilibrium following a shock in the economy. The coefficient -0.18 indicates that about 18 percent correction towards long run equilibrium is completed in a year. The findings suggest that first and second period lag of trade openness have negative short run relationship with GDP, while one period lag of FDI has a positive short run relationship with GDP.

5.5 Short Run Causality based on VECM: The short- and long-run relationships are established among the variables in above and therefore causality test is estimated in this section. The results of causality test based on the estimated stable VECM with three lags have been reported in Table 5. A perusal of the table 5 shows a unidirectional causality between economic growth and FDI running from GDP to FDI, since the estimated F-values are statistically significant at 1 percent level. But, there is bidirectional causal relationship existed between economic growth and trade openness. There is no causality between FDI and trade openness. Thus it can be concluded that economic growth causes increase in both foreign direct investment and trade whereas economic growth has been significantly caused by trade and insignificant way by FDI as the value is found positive.

Table 5: Results of causality test based on VECM

Variable	F- Statistic		
	Δ GDP	Δ TOP	Δ FDI
Δ GDP	-	34.63*	26.74*
Δ TOP	33.42*	-	2.62
Δ FDI	1.01	2.24	-

Source: Author's own calculation

* indicates statistical significance at 1% level

Some diagnostic tests are performed to check whether the model is free from econometric problems. The following table 6 reports the VECM diagnostic tests. The table 6 suggests that the null hypothesis of no serial residual correlation cannot be rejected at lag order of LM (Lagrange Multiplier) test. Hence, it is confirmed that no autocorrelation problem exist in the model. Further, the normality test is performed by employing Jarque–Bera test for normality. The test result of normality supports that the residuals are normally distributed. The VECM result has been found to be stable and free from econometric problems (Table 6).

Table 6: VECM Model Diagnostic Test

Serial residual correlation test for the model	Normality test for the model
Null hypothesis, H_0 : No serial correlation; Alternative hypothesis, H_1 : Serial correlation LM (lag1), $\chi^2 = 6.34$, p-value= 0.71 LM (lag2), $\chi^2 = 8.90$, p-value= 0.45 LM (lag3), $\chi^2 = 5.97$, p-value= 0.74	Null Hypothesis, H_0 : Residuals are multivariate normal; Alternative hypothesis, H_1 : Residuals are not multivariate normal Jarque–Bera; D_gdp, $\chi^2 = 0.24$, p-value = 0.88 D_TOP, $\chi^2 = 0.55$, p-value = 0.76 D_FDI, $\chi^2 = 0.39$, p-value = 0.82 All variables, $\chi^2 = 1.183$, p-value = 0.98

Source: Author's own calculation

6. Conclusion and Policy Implications: This article investigated the causal relationship among foreign direct investment, trade openness and economic growth in India for the period 1991–2017. The results indicated that ADF test for unit root of time series showing all variables non-stationary at level while integrated of order one I (1), i.e. they are stationary after first differenced. Johansen Cointegration Trace and Max-Eigen Value test indicates the existence of cointegration implying long run relationship among the variables. The normalised long run estimates showed foreign direct investment (FDI) and trade openness (TOP), on average, to have asymmetric effects with positive impact of FDI while negative impact of TOP on economic growth. The results of short run causality test based on a stable VECM support a unidirectional causality running from growth to foreign direct investment and bidirectional causality between trade openness and growth. Based on the findings, this study concludes by recommending more trade openness in terms of encouraging exports and inflow of FDI through the creation of enabling and friendly environment to do business for output growth dynamics in India.

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