

RELATIONSHIP BETWEEN FDI AND ITS DETERMINANTS: A CASE STUDY OF INDIA

Dr. Harmandeep Kaur

Department of Social Sciences, Khalsa College, Punjab, India

Email: hdeep30@gmail.com

Abstract

The present study attempts to highlight the causal relationship between FDI and its determinants within Indian Economy. The study courses the period from 1990-91 to 2021-23 and secondary data was collected from various sources of RBI. In order to analysis the data, 37 independent variables have been divided in to eight determinants viz. market size, human capital, opener, natural resources intensity, infrastructure and communication, exchange rates, economic growth and economic stability. By applying Augmented Dickey Fuller (ADF). Test and Granger's causality Theorem, the outcomes designate that for India, there exists a dire need to increase FDI inflows in India via proper channels by investing more in infrastructural facilities. Which can further help to modernize the economy. However, the Government of India (GOI) should event those policies which help to enhance international trade, transfer of knowledge and skill development.

Capital is described as a catalyst for growth. This assertion has acquired more significance in recent years. Historically, the primary sources of money in developing nations were foreign assistance or loans from international banks. Currently, official development aid flows are consistently diminishing. In addition to other sources, FDI has become more noteworthy in recent years.

FDI refers to a kind of investment where foreign investors own ownership of capital and exert influence over the income-generating activities inside the host country. Consequently, it entails both the transfer of cash and the transfer of management and expertise.

Developing nations, developing economies, and transitioning countries see FDI as a catalyst for modernization, job creation, and economic advancement. These nations have liberalized their foreign direct investment policies to entice capital. FDI is often associated with productive investment and promotes the transfer of technology, management expertise, and marketing abilities, which may significantly impact productivity and growth. FDI induces technological spillovers, facilitates human capital development, enhances international trade integration, and fosters a more competitive corporate climate.

Considering this, Indian Government adopted a liberal outlook towards FDI. FDI inflows inside India rose from US \$1657 million in 1990 to US \$16339 million in 2000 and further to US \$1940000 million in 2022. Moreover, India's share within world FDI flows had also rose from 0.008 percent in 1990 to 0.219 percent in 2000 and further to 0.987 percent in 2022. While comparing India's share with all developing countries (44.9 percent in 2011) and developed countries (49 percent in 2022), its share is still low.

Thus, considering the increased FDI inflows in the country, this work is an attempt to explore the relationship across FDI along with its determinants in India. Keeping in view the above discussion, secondary data have been used for the current study for the period (1990-91 to 2021-2022). Data have been collected from different sources like RBI, Report on Currency and Finance (Various Issues), and RBI Bulletin (Various Issues), Finance India (Various Issues), along with RBI Annual Report (Various Issues), Economic Survey (Various Issues) etc. To analyse the data, we have derived eight determinants of FDI viz. market size, human capital, openness, natural resource intensity, infrastructure and communication exchange rates, economic growth and economic stability. For these determinants, 37 variables have been used which are as under: -

1. **Market Size**

- Real GDP at Factor Cost (right at Current Prices) (GDP_{cu})
- Real GDP at Factor Cost (directly at Constant Prices) (GDP_{co})
- Tax Revenue as a GDP Percentage (TAX/GDP)
- Domestic Credit to Private Sector as a GDP Percentage (CREDIT/GDP)

2. **Human Capital**

- Primary Education Enrolment Ratio as a Population Percentage (PRI/EDU)
- Secondary Education Enrolment Ratio as a Percentage of Population (SEC/EDU)
- Higher Education Enrolment Ratio as a Population Percentage (HIGH/EDU)
- Employment in Private Sector (in Thousands) (EMP/Pr)
- Employment in Public Sector (in Thousands) (EMP /Pb)
- Total Employment (in Thousands) (EMP /total)

3. **Openness**

- Trade as a GDP Percentage (TRADE/GDP)

4. **Natural Resource Intensity**

- Ores and Metals Exports as a Merchandise Exports Percentage (ORES)
- Consumption of Crude Oil (Thousand Barrels Per Day)(CRUDE OIL)

5. **Infrastructure and Communication**

- Paved Roads as a Percentage of Total Roads (ROADS)
- Telephone Lines Per Hundred People (TELEPH)
- Internet Users Per Hundred People (INTERNET)
- Mobile Cellular Subscription Per Hundred People (MOBILE)
- Fixed Broadband Internet Subscriber Per Hundred People(BROADBAND)
- Air Transport Freight (being million ton km) (FREIGHT)
- Air Transport Passengers transported Per Sq. Km (PASSENGERS)
- Civil Aviation: Passenger km flown (AVIATION)
- Per Capita Consumption of Electricity (kwh) (ELEC)
- Railway Density Per Hundred Sq. km of Area (RAIL DEN)

6. **Exchange Rates**

- Indices of Real Effective Exchange Rate (REER)- Export Based Weights of all commodities (REER)

7. Economic Growth

- Gross Domestic Saving as a GDP Percentage (S/GDP)
- Developmental Expenditure as a GDP Percentage (EXP/GDP)
- Urban Population as a Percentage of Total (URBANISATION)
- Total Expenditure of the Central Government as a GDP Percentage (EXP /GDP)
- Industrial Value Added as a GDP Percentage (INDUS/GDP)
- Gross Domestic Capital Formation as a GDP Percentage (GDCF /GDP)
- GDP Growth Rate (Annual Percentage) (GDPgr)

8. Economic Stability

- Whole Sale Price Index (Annual Average) (WPI)
- Money and Quasi Money (M2) as a GDP Percentage (M2/GDP)
- Ratio of External Debts to Exports (D/EXPORTS)
- Foreign Exchange Reserves as a GDP Percentage (FER/GDP)
- Fiscal Deficit as a GDP Percentage (DEF/GDP)
- Exchange Rate: in Rupee per currency (US\$). (ER)

Prior to gauging the causal link across FDI and its drivers, the trend stationarity—a fundamental assumption in time series data analysis—was assessed utilising the ADF test. This test involves including the lagged dependant variable values and entails estimating the regression equation as

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-1} + \epsilon_t$$

For examining causal relationship FDI and its determinants (37 variables), Granger’s causality analysis (1969) was done. Per Granger’s causality theorem, a time series {Yt} is considered to be influenced by a time series {Xt} if predictions of variable Y, utilising the lagged Y values along with the lagged variable X values, are more accurate than those derived just from the previous values of Y. If previous values of Y enhance the predictions of X while accounting for prior values of X, then Y happens to be Granger cause X. The assessment entails the evaluation of these two equations:

$$Y_t = \sum_{i=1}^p \alpha_i \Delta X_{t-1} + \sum_{j=1}^p \beta_j Y_{t-j} + \mu_1 t \dots\dots\dots(1)$$

$$Y_t = \sum_{i=1}^q \alpha_i \Delta X_{t-1} + \sum_{j=1}^q \beta_j Y_{t-j} + \mu_2 t \dots\dots\dots(2)$$

Wherein the disturbance terms, which are u1t and u2t, are presumed to be stochastically independent.

Unit Root Test

The results of the Table 1 show that out of 38 variables, 6 variables namely FDI/GDP, INTERNET, MOBILE, GDPgr, D/EXPORTS and ER are stationary at level 1. The p value for FDI/GDP, INTERNET, MOBILE, GDPgr, D/EXPORTS is less than α (0.05) whereas p value of ER is less than α (0.01). Therefore, null hypothesis (NH) happens to be rejected for all the variables and the series are stationary for above mentioned variables.

Similarly, 19 variables are stationary at First Difference on intercept. FDI/GDP, PASSENGERS, S/GDP, and URBANISATION have p value less than (0.01), PRI/EDU, SEC/EDU, CRUDE OIL, ROADS, BROADBAND, FREIGHT, AVIATION, ELEC, REER, EXP/GDP, EXP/GDP, GDCF/GDP, WPI and DEF/GDP have p value under (0.05) whereas p value of RAIL DEN is found to be less than (0.10) in ADF test. This proposes that NH (Ho) is rejected for all the variables.

While the remaining 14 variables are stationary at Second difference on intercept again. The p value for seven variables viz. GDPcu, GDPco, TAX/GDP, CREDIT/GDP, SEC/EDU, EMP/total and FDI/GDP is less than α (0.01) whereas the other seven variables i.e. FDI/GDP, EMP/Pr, EMP/Pb, TRADE/GDP, ORES, TELEPH, M2/GDP having p value under (0.05). Thus, all the variables are stationary because of the rejection of NH. Consequently, the inability to reject alternative hypothesis demonstrates the series are stable.

Granger's Causality Test

Statistics along with probability values constructed right under the NH of non-causality are reported within the Table 2. It shows that out of 37 variables, causality has been found unidirectionally from FDI/GDP to four variables i.e. CRUDE OIL, INTERNET, EXP/GDP and D/EXPORTS while one way causality has also existed from three variables viz. PRI/EDU, HIGH/EDU, TRADE/GDP to FDI/GDP. Bidirectional causal relationship has also been found between FDI/GDP and WPI.

Results depict that causality exists from FDI/GDP to CRUDE OIL, since probability value (0.0611) is under (0.10). So, the NH is rejected. Therefore, with the increase of FDI inflows in the economy, consumption of crude oil also increases which puts accelerating impact on natural resource intensity. One-way causal relationship has also been found from FDI/GDP to INTERNET and it is noteworthy at 5% level because its probability value (0.0111) is under (0.05). So, NH is rejected and puts stimulating impact on the development of communication facilities. It has also observed that there exists unidirectional causal relationship from FDI/GDP to EXP/GDP. Its probability value (0.0932) is less than (0.10) i.e. it is noteworthy at 10% level. So, the NH is rejected which depicts that higher inflows of FDI has led to stimulate the developmental expenditure of the Government which further helps to pave the way for economic growth. Furthermore, the outcomes demonstrate one way causality from FDI/GDP to D/EXPORTS. Since it is noteworthy at 5% level as its probability value (0.0014) is under (0.05). Therefore, the NH is rejected. It implies that FDI/GDP affects the economic stability of the economy.

Moreover, our discoveries highlight one-way causality exists from PRI/EDU to FDI/GDP. As the probability value (0.0119) is under (0.05), the NH is rejected. Therefore, development of PRI/EDU has led to raise FDI inflows of the economy which further puts impacts on development of human capital. Similarly, unidirectional causality exists from HIGH/EDU to

FDI/GDP. In this relationship, NH is rejected as its probability value (0.0279) is less than (0.05) showing that with the enhancement of HIGH/EDU, also encourages FDI inflows in the economy. TRADE/GDP has also put its noteworthy impact on FDI/GDP. It depicts one-way causal relationship between them and is noteworthy at 5% level as its probability value (0.1146) is less than (0.05). Its NH is rejected and shows the openness of a nation affects FDI inflows. Bidirectional causality also exists between FDI/GDP and WPI which implies that causality exists from FDI/GDP to WPI and also from WPI to FDI/GDP. Both the directions are noteworthy at 5% level as their probability values are less than (0.05). Therefore, NH for both the directions are rejected and shows that this relationship put impact on the economic stability of the country.

Conclusion and Policy Implications

As a conclusion, FDI has continued to play a noteworthy role in the Indian economy. Through the empirical outcomes, the analysis shows out of 37 variables, that is a strong causal relationship in respect of the ten variables namely FDI/GDP, PRI/EDU, HIGH/EDU, TRADE/GDP, CRUDE OIL, INTERNET, GDP_{gr}, EXP/GDP, WPI and D/EXPORTS. While causality has not been found among the remaining variables namely GDP_{cu}, GDP_{co}, TAX/GDP, CREDIT/GDP, EMP/PRI, EMP/PUB, EMP/total, ORES, ROADS, TELEPH, MOBILE, BROADBAND, FREIGHT, PASSENGERS, AVIATION, ELEC, RAIL DEN, REER, DM_S/GDP, URBANISATION, EXP/GDP, INDUS/GDP, GDCF/GDP, M2/GDP, FER/GDP, DEF/GDP and ER. So, there is a dire need to increase FDI inflows in the economy through proper channels. The government must prioritize foreign direct investment to facilitate economic progress. The economic growth of a nation may be facilitated by promoting more FDI, which can provide additional job opportunities inside the country. Furthermore, advanced technology in manufacturing will cultivate a more competent workforce; thus, it will augment productivity. There is dire need in depth to concentrate on infrastructural facilities by providing technological skills which can help to modernize the economy. However, Government of India should make those policies which help to facilitate international trade, and transfer of knowledge, along with skills and technology.

Table -1: Results of Unit Root Test

Variables	Unit Root				
	At Level 1	At 1 st Difference		At 2 nd Difference	
		Intercept	Trend and Intercept	Intercept	Trend and Intercept
FDI/GDP	0.0216**	0.0001*	-	0.0113**	-
GDP _{cu}	-	-	-	0.0004**	-
GDP _{co}	-	-	-	0.0004**	-
TAX/GDP	-	-	-	0.0001*	-
CREDIT/GDP	-	-	-	0.0001*	-
PRI/EDU	-	0.0015**	-	-	-
SEC/EDU	-	-	-	0.0000*	-
HIGH/EDU	-	0.0031**	-	-	-

EMP/pr	-	-	-	0.0148**	-
EMP/pb	-	-	-	0.0017**	-
EMP/total	-	-	-	0.0006**	-
TRADE/GDP	-	-	-	0.0000*	-
ORES	-	-	-	0.0070***	-
CRUDE OIL	-	0.0499**	-	-	-
ROADS	-	0.0173**	-	-	-
TELEPH	-	-	-	0.0018**	-
INTERNET	0.0050**	-	-	-	-
MOBILE	0.0258**	-	-	-	-
BROADBAND	-	0.0316**	-	-	-
FREIGHT	-	0.0112**	-	-	-
PASSENGERS	-	0.0000*	-	-	-
AVIATION	-	0.0146**	-	-	-
ELEC	-	0.0021**	-	-	-
RAIL DEN	-	0.0071***	-	-	-
REER	-	0.0162**	-	-	-
S/GDP	-	0.0000*	-	-	-
EXP/GDP	-	0.0043**	-	-	-
URBANISATION	-	0.0000*	-	-	-
EXP/GDP	-	0.0412**	-	-	-
INDUS/GDP	-	-	-	0.0000*	-
GDCF/GDP	-	0.0040**	-	-	-
GDPgr	0.0262**	-	-	-	-
WPI	-	0.0194**	-	-	-
M2/GDP	-	-	-	0.0022**	-
D/EXPORTS	0.0022**	-	-	-	-
FER/GDP	-	-	-	0.0000*	-
DEF/GDP	-	0.0026**	-	-	-
ER	0.0001*	-	-	-	-

*, **, *** Significant at 1%, 5% and 10% level of Significance respectively.

Table-2: Results of Granger's Causality Test

Sr. No.	Null Hypotheses	Observations	F-Statistics	Probability
1.	D(FDI/GDP,2) does not Granger Cause D(GDPcu,2)	18	0.02887	0.9716
	D(GDPcu,2) does not Granger Cause D(FDI/GDP,2)		0.12478	0.8837
2.	D(FDI/GDP,2) does not Granger Cause D(GDPco,2)	18	0.01386	0.9862

	D(GDPco,2) does not Granger Cause D(FDI/GDP,2)		0.12224	0.8859
3.	D(FDI/GDP,2) does not Granger Cause D(TAX/GDP,2)	18	0.62927	0.5485
	D(TAX/GDP,2) does not Granger Cause D(FDI/GDP,2)		0.07615	0.9271
4.	D(FDI/GDP,2) does not Granger Cause D(CREDIT/GDP,2)	18	0.64672	0.5398
	D(CREDIT/GDP,2) does not Granger Cause D(FDI/GDP,2)		0.08845	0.9159
5.	D(FDI/GDP) does not Granger Cause D(PRI/EDU)	19	0.90528	0.4268
	D(PRI/EDU) does not Granger Cause D(FDI/GDP)		6.17774	0.0119**
6.	D (FDI/GDP,2) does not Granger Cause D(SEC/EDU,2)	18	0.96011	0.4084
	D(SEC/EDU,2) does not Granger Cause D(FDI/GDP,2)		2.15455	0.1555
7.	D(FDI/GDP) does not Granger Cause D(HIGH/EDU)	19	0.01141	0.9887
	D(HIGH/EDU) does not Granger Cause D(FDI/GDP)		4.67136	0.0279**
8.	D(FDI/GDP,2) does not Granger Cause D(EMP/pr,2)	18	0.28460	0.7569
	D (EMP/pr, 2) does not Granger Cause D(FDI/GDP,2)		0.23686	0.7924
9.	D(FDI/GDP,2) does not Granger Cause D(EMP/pb,2)	18	0.80622	0.04677
	D(EMP/pb,2) does not Granger Cause D(FDI/GDP,2)		1.63899	0.2319
10.	D(FDI/GDP,2) does not Granger Cause D(EMP/total,2)	18	1.10121	0.3616

	D(EMP/total,2) does not Granger Cause D(FDI/GDP,2)		0.34400	0.7152
11.	D(FDI/GDP,2) does not Granger Cause D(TRADE/GDP,2)	18	0.17688	0.8399
	D(TRADE/GDP, 2) does not Granger Cause D(FDI/GDP,2)		2.57045	0.0114**
12.	D(FDI/GDP,2) does not Granger Cause D(ORES,2)	18	0.94263	0.4147
	D(ORES,2) does not Granger Cause D(FDI/GDP,2)		0.00857	0.9915
13.	D(FDI/GDP) does not Granger Cause D(CRUDE OIL)	19	3.43587	0.0611***
	D(CRUDE OIL) does not Granger Cause D(FDI/GDP)		0.07753	0.9258
14.	D(FDI/GDP) does not Granger Cause D(ROADS)	19	0.57727	0.5742
	D(ROADS) does not Granger Cause D(FDI/GDP)		0.58807	0.5685
15.	D(FDI/GDP,2) does not Granger Cause D(TELEPH, 2)	18	0.52057	0.6061
	D(TELEPH,2) does not Granger Cause D(FDI/GDP,2)		0.263756	0.1093
16.	FDI/GDP does not Granger Cause INTERNET	15	7.29474	0.0111**
	INTERNET does not Granger Cause FDI/GDP		0.65653	0.5396
17.	FDI/GDP does not Granger Cause MOBILE	15	0.05890	0.9431
	MOBILE does not Granger Cause FDI/GDP		5.17315	0.0287
18.	FDI/GDP does not Granger Cause BROADBAND	11	2.31290	0.1800

	BROADBAND does not Granger Cause FDI/GDP		1.55514	0.2857
19.	D(FDI/GDP) does not Granger Cause D(FREIGHT)	19	0.19362	0.8261
	D(FREIGHT) does not Granger Cause D(FDI/GDP)		1.49802	0.2573
20.	D(FDI/GDP) does not Granger Cause D(PASSENGER)	19	0.04204	0.9590
	D(PASSENGER) does not Granger Cause D(FDI/GDP)		0.20242	0.8191
21.	D(FDI/GDP) does not Granger Cause D(AVIATION)	19	1.47429	0.2624
	D(AVIATION) does not Granger Cause D(FDI/GDP)		0.49845	0.6179
22.	D(FDI/GDP) does not Granger Cause D(ELEC)	19	0.11069	0.8960
	D(ELEC) does not Granger Cause D(FDI/GDP)		0.51774	0.6068
23.	D(FDI/GDP) does not Granger Cause D(RAIL DEN)	19	0.99347	0.3949
	D(RAIL DEN) does not Granger Cause D(FDI/GDP)		0.40311	0.6757
24.	D(FDI/GDP) does not Granger Cause D(REFR)	19	0.06902	0.9536
	D(REFR) does not Granger Cause D(FDI/GDP)		2.15542	0.1527
25.	D(FDI/GDP) does not Granger Cause D(S/GDP)	19	0.06480	0.9375
	D(S/GDP) does not Granger Cause D(FDI/GDP)		0.37299	0.6953
26.	D(FDI/GDP) does not Granger Cause D(EXP/GDP)	19	2.82434	0.0932***

	D(EXP/GDP) does not Granger Cause D(FDI/GDP)		0.03292	0.9677
27.	D(FDI/GDP) does not Granger Cause D(URBANISATION)	19	0.49646	0.6190
	D(URBANISATION) does not Granger Cause D(FDI/GDP)		0.54906	0.5894
28.	D(FDI/GDP) does not Granger Cause D(EXP/GDP)	19	1.11133	0.3565
	D(EXP/GDP) does not Granger Cause D(FDI/GDP)		0.12332	0.8849
29.	D(FDI/GDP,2) does not Granger Cause D(INDUS/GDP,2)	18	0.08112	0.9225
	D(INDUS/GDP,2) does not Granger Cause D(FDI/GDP,2)		0.02755	0.9729
30.	D(FDI/GDP) does not Granger Cause D(GDCF/GDP)	19	0.32422	0.7284
	D(GDCF/GDP) does not Granger Cause D(FDI/GDP)		0.13001	0.8791
31.	FDI/GDP does not Granger Cause GDPgr	20	0.29256	0.7505
	GDPgr does not Granger Cause FDI/GDP		4.37733	0.0318**
32.	D(FDI/GDP) does not Granger Cause D(WPI)	19	9.12362	0.0029**
	D(WPI) does not Granger Cause D(FDI/GDP)		4.02724	0.0415**
33.	D(FDI/GDP,2) does not Granger Cause D(M2/GDP, 2)	18	1.07594	0.3695
	D(M2/GDP,2) does not Granger Cause D(FDI/GDP,2)		0.00093	0.9991
34.	FDI/GDP does not Granger Cause D/EXPORTS	20	10.5525	0.0014**

	D/EXPORTS does not Granger Cause FDI/GDP		0.45634	0.6421
35.	D(FDI/GDP,2) does not Granger Cause D(FER/GDP,2)	18	1.32054	0.3005
	D(FER/GDP,2) does not Granger Cause D(FDI_GDP,2)		1.74898	0.2125
36.	D(FDI/GDP) does not Granger Cause D(DEF/GDP)	19	0.08129	0.9224
	D(DEF/GDP) does not Granger Cause D(FDI/GDP)		1.19239	0..3325
37	FDI/GDP does not Granger Cause ER	20	0.94118	0.4120
	ER does not Granger Cause FDI/GDP		1.95429	0.1761

*, **,*** Significant at 1%, 5% and 10% level of Significance respectively.

REFERENCES

- Ahmed , S.(1990). “Foreign Capital Inflow and Economic Growth : A Two- Gap Model for the Bangladesh Economy”, The Bangladesh Development Studies , Vol. XVII, No.1, March, pp.55-71.
- E-Borensztein , J. D. Gregorio and J-W Lee.(1997) . “How Does Foreign Direct Investment Affect Economic Growth?”, Journal of International Economics, Vol.45, pp. 115-135.
- Economic Survey of India (Various Issues)
- Finance India (Various Issues)
- Mausmi Duttaray , Amitawa Krishan Dutt and Kajal Mukhopadhyay (2003). “ The Relation Between Foreign Direct Investment and Growth : Causality and Mechanism”, Economic and Political Weekly, Vol. LXXXIII, No. 330, pp.1550-1558.
- RBI Bulletin (Various Issues)
- Report on Currency and Finance (Various Issues)
- Rudra Prakash Pradhan (2005). “Impact of Foreign Direct Investment on Indian Economy : An Empirical Analysis “,Indian Economic Journal, Vol.53, No.1 , pp. 87- 95.
- Kaur and Singh (2011). “Liberalisation in Foreign Direct Investment and Its Determinants in Developing Countries”, The Indian Economic Journal, Special Issue 2011, pp.163-179.