IMPACT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH OF INDIA: AN ANALYSIS OF SECTORAL AND REGIONAL ECONOMIC PROGRESS

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Abstract

The study aims to evaluate the impact of Foreign Direct Investment (FDI) on economic growth in India considering both sectoral and state level output using data from 2006 to 2021. Level of Gross Domestic Product (GDP), Sectoral Gross Value Added (SGVA) and Net State Domestic Product (NSDP) have been used as indicators of economic progress. While evaluating the impact of FDI on state level output, several control variables like availability of power, road and rail transportation, banking infrastructure, government expenditure and human capital have been used. Johansen cointegration result indicates no long run relation between FDI and GDP. However, FDI found to have a statistically significant positive impact on output of selected sectors and states.

Keywords: FDI; Economic Progress; Panel Data Models; Granger Causality;

JEL Classification: F21; O11; C23; C33; C32;

Introduction

Foreign Direct Investment (FDI) is a form of cross border investment where one country invests in another country by either taking full ownership of a business or expanding business operation of an existing company. With FDI, investors enjoy their rights in taking important managerial decision for the business in the host country (Rahaman & Chakraborty, 2015). In the globalization era, rapid expansion of FDI has resulted in a changing dynamic for global business. The increased inflow of cross border investment is viewed as an avenue of accelerating economic growth and development for less developed and emerging economies. Considering the potential impact of FDI on economic growth of emerging economies, several researches have been conducted to model to impact of FDI in promoting economic growth of the developing countries.

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The existing studies concluded a mixed impact of FDI on the host economy. The impact of FDI on economic growth varies with domestic investment, availability of human capital, infrastructural facilities, trade policies and macroeconomic stability (Forte & Moura, 2013). The ambiguity in existing studies related to the impact of FDI on economic growth of developing countries encouraged further research in this area.

Given a continuous influx of FDI since liberalization, current study explores impact of foreign investment on economic growth of India. The overall increase in foreign investment in India is the result of increase in investment across different sectors and different regions. Hence, it is also important to study the impact of FDI on sectoral and regional output. In addition to evaluating the impact of FDI on overall economic growth, the current research also evaluates impact of FDI on output across different sectors and states of India.

Existing Studies

Several empirical researches were conducted to examine the impact of FDI on the host country. Some of the important studies supporting positive impact of FDI were conducted by Gunaydin & Tatoglu (2005), Abbas et al. (2011), Agarwal & Khan (2011), Gaikwad (2013), Nistor (2014), Kisswani, Kein & Shetty (2015), Kirti & Prasad (2016) and Chaudhury, Nanda & Tyagi (2020). In contrast to studies indicating a significant positive association between FDI and economic growth, there are literatures concluding adverse or no impact of FDI on the host country. Researchers concluding adverse or no significant impact of FDI on economic growth included Mencinger (2003), Lensink & Morrissey (2006), Herzer & Klasen (2008) and Herzer (2012). The researches on FDI-led growth hypothesis are not limited to the impact of FDI on economic growth at aggregate level. Researchers have also attempted to evaluate the impact of FDI on sectoral output. Some important researches studying impact of FDI on sectoral output included studies by Chakraborty & Nunnenkamp (2008), Masron, Zulkafli & Ibrahim (2012), Iddrisu, Immurana & Halidu (2015), Siddiqui & Ahmed (2017) and Eze, Nnaji & Nkalu (2019). The current research adds to the existing studies by evaluating impact of FDI on overall economic growth of India while also analysing the impact of FDI on sectoral and regional output.

Research objectives, data and methodology

The primary objectives of the study are as follows:

i)   To examine if there is any significant impact of FDI on economic growth of India.

ii) To examine if there is any significant impact of FDI on sectoral output of different sectors of India.

iii) To examine if there is any significant impact of FDI on regional output of India.

To accomplish the mentioned objectives of the current research, data has been collected on FDI and aggregate output at national, state and sectoral level. Economic growth has been measured using Real Gross Domestic Product (RGDP) of India, Sectoral Gross Value Added (SGVA) and Net State Domestic Product (NSDP). The impact of FDI on output of different states has been evaluated by incorporating control variables such as availability of power, road and rail transportation, banking infrastructure, government expenditure and human capital. The data considered for power, road and rail infrastructure are per capita Installed Capacity, Length of Highways per Sq. Km. (includes both national and state highways) and Length of Railway Route per Sq. Km. For banking infrastructure, data has been collected for Number of Commercial Banks per Sq. Km. Data on per capita Capital Expenditure and per capita Social Expenditure have been collected to measure the impact of government expenditure on output. Gross Enrolment Ratio in Higher Education has been used as a proxy measure for level of human capital.

For conducting the research, data has been collected from different government websites - Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Statistics and Programme Implementation (MoSPI), Reserve Bank of India (RBI) and All India Survey on Higher Education (AISHE). The sample period considered for evaluating the impact of FDI on national and regional output is from 2006 to 2021. Depending on data availability for sectoral GVA, sectors considered for the study are Telecommunication, Hotel & Tourism, Service, Construction, Mining and Trading. Impact of FDI on sectoral output of different sectors have been considered for the period 2006-2020.

Time series analysis has been conducted for examining if there is any long-term relationship between FDI and real GDP of the nation. To check the level of stationarity of both the variables Phillips Perron (PP) test has been performed. After determination of level of stationarity for the variables, long-run relationship between FDI and GDP and direction of causality have estimated by conducting Johansen Co-integration test, Vector Autoregressive Model and Granger Causality test. For examining if there is any significant impact of FDI equity inflow on boosting output across different sectors and different regions, panel data analysis has been conducted through estimating fixed and random effect model. All the estimation has been performed taking logarithm of the variables.

Impact of Foreign Direct Investment on Economic Growth of India

To evaluate the impact of foreign investment on economic growth of India, time series analysis has been performed. Before developing any time series model, it is crucial to examine data generating process of the targeted variables. A reliable time series model can only be developed when data generating process of all the variables is stationary. For a stationary series, basic statistical properties such as mean, variance and autocorrelation remain constant over time. Hence, before modelling the impact of foreign investment on economic growth of India, stationarity test for the two targeted variables – FDI and GDP has been performed by conducting Phillips-Perron (PP) unit root test.

Output of PP unit root test for FDI and GDP have been summarized in Table 1.

Table – 1: Summary of the PP Unit Root Test Results

Variables	Null Hypothesis	p value		Decision	
		at level	at first difference	at level	at first difference
FDI	The series contains unit root and is not stationary	0.0782	0.0043	Non-Stationary	Stationary
GDP		0.9382	0.0133	Non-Stationary	Stationary

Source: Author's calculation

As presented in Table 1, both GDP and FDI are non-stationary at level. Stationarity for both the variables have been achieved at first difference. Therefore, both the series are integrated of order 1. As both FDI and GDP have same order of integration, there may exists a long run relation between two variables which can be examined through co-integration test. Johansen co-integration test has been performed to evaluate if the FDI and GDP series are co-integrated or not. Johansen cointegration test offers a statistical procedure for examining cointegration of several time series variables having integration of order 1. The Johansen cointegration test can be performed either using trace statistics or using maximum eigen value. For current study, trace statistics has been used to determine the number of co-integrating relation between FDI and GDP. The optimal lag length for performing Johansen co-integration test or any subsequent analysis for modelling impact of FDI on GDP is '1' as obtained from different information criteria (Appendix 1, Table 1)

Result of the Johansen co-integration test is presented in Table 2.

Table – 2: Result of the Johansen Co-integration Test

Maximum Rank	parms	LL	Eigenvalue	Trace Statistic	5% Critical Value
0	4	22.44064	.	11.3722	18.17
1	7	31.70408	0.5043	0.8453	3.74
2	8	32.12673	0.05479		

Source: Author's calculation

For rank 0, the trace statistics value is 11.3722. Corresponding to this, 5% critical value is 18.17. Since the trace statistics is less than the 5% critical value, this suggests acceptance of the null hypothesis of no cointegration between GDP and FDI. Therefore, FDI and GDP are not co-integrated implying there is no long run impact of foreign investment on economic growth of India.

Given no long run relation between FDI and GDP of India, the study further explores short run dynamics between the variable using Vector Autoregression (VAR) model. The two equations for the VAR model are as follows

$$lngdp_t = \alpha_1 + \beta_1 lngdp_{t-1} + \gamma_1 lnfdi_{t-1} + u_{1t} \dots \dots \dots \dots \dots \dots . (1)$$

$$lnfdi_t = \alpha_2 + \beta_2 lngdp_{t-1} + \gamma_2 lnfdi_{t-1} + u_{2t} \dots \dots \dots \dots \dots \dots . (2)$$

From the VAR result (Appendix 2, Table 2), for GDP equation (equation 1), the estimated coefficient for first lag of GDP is obtained as 0.908. The corresponding p value of the coefficient indicates that the coefficient is statistically significant at 1% level of significance (p value <0.01). Therefore, previous year's GDP has a statistically significant positive impact in boosting current year GDP. For the FDI equation (equation 2), the coefficient for first lag of GDP is positive (0.893) and statistically significant at 5% level of significance (p value <0.05). This suggests previous year's GDP has a positive significant impact in attracting foreign investment in current year. The coefficient of lag of FDI is statistically insignificant for both the equations meaning lag FDI does not have any significant impact either on current year GDP or FDI.

Further, to check robustness of the estimated VAR model, some diagnostic tests (autocorrelation, normality, stability) has been performed. Results of the VAR diagnostics tests (Appendix 3, Table 3) indicated the estimated VAR model is a robust model and therefore can be used to determine the short run relation between GDP and FDI.

Further, to examine the causal relation between FDI and GDP, Granger Causality test has been performed. Since, both FDI and GDP are non-stationary at levels,

Granger Causality test has been performed considering first difference of the variables.

Table – 3: Result of Granger Causality Test

Granger Causality Wald Tests				
Equation	Excluded	chi2	df	Prob > chi2
ln_gdp	ln_fdi	0.01335	1	0.908
ln_gdp	ALL	0.01335	1	0.908
ln_fdi	ln_gdp	2.3189	1	0.128
ln_fdi	ALL	2.3189	1	0.128

Source: Author's calculation

For both GDP and FDI equations, the probability value of chi square test statistics is greater than 5% significance value implying acceptance of null hypothesis of no causal relation between the variables. Therefore, there is no causal relation between foreign equity inflow and GDP of India.

Impact of Foreign Direct Investment on Sectoral Output of India

When FDI enters a sector, it brings some productive efficiency through technological advancement resulting in an efficient usage of available inputs and boosts sectoral output. Over the past three decades there has been a significant increase in FDI in different sectors of India. To examine if FDI has any significant impact in boosting sectoral output, data on FDI and sectoral Gross Value Added (GVA) of different sectors for a period of 15 years (2006-2020) have been considered and regression models have been estimated using panel data analysis. For this, first both Fixed Effect and Random Effect model have been estimated and then appropriate model has been selected using Hausman and Breusch and Pegan LM test.

Both Hausman test and Breusch and Pegan LM test indicates Random Effect Model is the most suitable panel regression to estimate the relation between FDI and sectoral GVA. Results of the Hausman test and Breusch and Pegan LM test have been summarized in Table 4.

Table – 4: Result of Hauman Test and Breusch and Pegan LM Test

Hausman Test	The preferred model for the given data set is the Random Effect Model	0.6602	Null hypothesis is accepted	Random Effect Model
Breusch and Pegan LM Test	The Preferred model for the given data set is Pooled OLS Model	0.0000	Null hypothesis is rejected	Random Effect Model

Source: Author's calculation

Table 5 presents the regression output for Random Effect Model

Table – 5: Regression output of Random Effect Model

Variables	ln_gva	p value
ln_fdi	0.069*** (0.0207)	0.001
Constant	14.892*** (0.448)	0.000
Observations	90	
Number of sectorid	6	
Wald chi2 (1)	11.24	
Prob > chi2	0.0008	
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Source: Author's calculation

The probability value of F statistics for the model is obtained as 0.0008. Since, the F statistics value is less than 0.05, the overall model is statistically significant at 5% level of significance. The coefficient of ln fdi is 0.0693. The coefficient is positive indicating FDI has a positive impact on sectoral GVA. The value of the coefficient suggests for 1% increase FDI, sectoral GVA increases by 0.06%. P value of the coefficient is 0.001. Since the p value is less than the significant value at 5%, this suggests the coefficient is statistically significant. Sectoral FDI inflow thus has a statically significant positive impact on boosting the output of the concerned sector.

The positive impact of FDI on sectoral output is evidenced from development of different sectors of India. Telecommunication is one of vital sectors attracting significant amount of foreign investment. The vast population of India and growing demand for connectivity attracted global investors to invest in Indian telecommunication industry. 100% foreign equity inflow via automatic route along with a favourable business environment encouraged different forms of FDI in the sector. Continuous FDI inflow contributed growth of the sector through bringing advanced technologies, boosting healthy competition and improving overall service quality. With help of the foreign investors, people in the country can now enjoy high speed networking such as 3G, 4G and 5G. FDI had a very vital role in infrastructural development of the Indian telecommunication sector (Shetty, 2024).

Hotel & Tourism industry is another attractive destination of foreign investors in India. Improvement in communication services, growth of inbound tourism, introduction of several new areas of tourism such as cultural tourism, eco-

tourism, adventure tourism and agricultural tourism and reforms in aviation sector led to a continuous increase in foreign investment in the sector. 100% FDI under automatic route is allowed in the sector. The inflow of FDI in the hospitality industry comes with the benefit of promoting trade, transferring skills and knowledge and brings advanced technology and efficient management (Boora & Dhankar, 2017). The brand value with foreign investors ensures stability and builds trust. The foreign capital also supports in infrastructural development like building hotels, airport and others. All these leads to an overall expansion of the sector.

Service sector accounts the highest share of FDI in India. FDI inflow in the sector has increased significantly after the economic reforms. Service sector covers the services such as financial and banking services, business services, insurance, research & development and outsourcing. The rapid increase in FDI inflow in the sector has contributed to employment generation for BPO and IT enabled services. Advanced technologies and infrastructural development because of foreign investment contributes to sectoral growth (Sutradhar, 2014). Foreign investment in the sector further opens the door for international market leading to a notable increase in service export of India.

Post liberalization different sectors in India experienced a rapid increase in FDI inflow. Most of the sectors are benefited from FDI through skill enhancement, technology transfer, infrastructural development and access to global market. The positive impact of FDI on sectoral output in India thus can be explained by the positive spill over effects from foreign investment.

Impact of Foreign Direct Investment on Regional Output
For evaluating the impact of FDI on output of different states along with availability of Power, Rail, Road Transportation, Banking Infrastructure, Government Expenditure and Gross Enrolment in Higher Education different, six different models have been estimated using panel regression analysis. The final model has been estimated by step wise elimination of statistically insignificant variables from the model. For all the six panel models, the most appropriate model has been selected using Hausman and Breusch and Pagan LM test. The most insignificant variable has been dropped from each model to derive the best model for explaining regional output.

The regression output of all the six models has been summarized in Table 6

Table – 6: Regression output of the six different panel model

Independent Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coeff.	p value	Coeff.	p value	Coeff.	p value	Coeff.	p value	Coeff.	p value	Coeff.	p value
ln_fdi	0.0136** (0.0053)	0.011	0.0143*** (0.0053)	0.007	0.014*** (0.0050)	0.006	0.014*** (0.0049)	0.005	0.014** (0.0046)	0.004	0.014** (0.0046)	0.003
ln_power	0.0448* (0.0260)	0.084	0.0468* (0.0263)	0.075	0.0373 (0.0245)	0.128	0.0339 (0.0241)	0.159	0.0270 (0.0225)	0.231		
ln_highways	-0.0105 (0.0213)	0.620										
ln_railway	-0.0680 (0.0669)	0.309	-0.0693 (0.0666)	0.298	-0.0728 (0.0643)	0.258	-0.0737 (0.0640)	0.250				
ln_bankinginfrastructure	0.376*** (0.0538)	0.000	0.3650*** (0.0536)	0.000	0.422*** (0.0533)	0.000	0.439*** (0515)	0.000	0.498*** (0.0503)	0.000	0.516*** (0.0481)	0.000
ln_capitalexp	-0.0317 (0.0305)	0.299	-0.0302 (0.0341)	0.316	-0.0225 (0.0281)	0.424						
ln_socialexp	0.285*** (0.0419)	0.000	0.2873*** (0.0420)	0.000	0.276*** (0.0378)	0.000	0.251** (0.0240)	0.000	0.222** (0.0245)	0.000	0.226** (0.0242)	0.000
ln_ger	0.0327 (0.0324)	0.313	0.0325 (0.0328)	0.322								
Constant	13.279*** (0.3768)	0.000	13.2326*** (0.3731)	0.000	13.499*** (0.391)	0.000	13.58*** (0.3904)	0.000	14.241*** (0.3362)	0.000	14.216*** (0.336)	0.000
Observations	272		272		272		272		272		272	
Number of stateid	17		17		17		17		17		17	
Standard errors in parentheses												
*** p<0.01, ** p<0.05, * p<0.1												

Source: Author's calculation

In Table 6, the most insignificant variable for each model has been highlighted in red. The most insignificant variable for the first model (Model 1) is Highways followed by Gross Enrolment Ratio in higher education (Model 2), per capita Capital Expenditure of the government (Model 3), Length of Railways (Model 4) and availability of power (Model 5). The final model (Model 6) has three explanatory variables (FDI, banking infrastructure and per capita social expenditure of the government) having significant influence on regional output.

For model 6, The coefficients for FDI, Banking Infrastructure and Government's Social Expenditure are 0.014, 0.516 and 0.226 respectively. All the coefficient is positive signifying that all the associated variables have a positive impact on NSDP. That is with increase in foreign investment, number of scheduled commercial banks and government's social expenditure output of the concerned state increases and vice versa. For FDI, banking infrastructure and government's social expenditure the corresponding p values are less than 5% significance value indicating that all the three variables have a statistically significant positive impact on boosting regional output.

From the regression result, three positive significant determinants of NSDP are obtained as FDI, banking infrastructure and government's social infrastructure.

Foreign investment helps to increase output of a state by increasing stock of capital, developing infrastructural facilities, creation of job opportunities, fostering innovation and skill enhancement. All these led to economic growth of the region.

The banking infrastructure is measured through the number of commercial banks per sq. km of the state. Banking infrastructure plays an important role in boosting output growth by providing necessary capital and financial services to support an economic activity. Availability of a larger number of banks increases the availability of loans and funds which are vital for establishing new operations or expanding the existing ones. Interest rates on loans and quality of different banking services depend on the competitive landscape of the banking industry. Competition among the banks lead to a decrease in interest rate and better banking services which encourage investors to take loans for making productive investment.

Government social expenditure includes expenditure incurred by government in various social services such as education, healthcare, family welfare, housing, urban development, labour and employment, social security and other social services. Higher government spending in social services help in human capital development, infrastructural improvement and brings social stability. All these have a positive impact on productivity leading to a higher output.

Conclusion

The study aims to evaluate the impact of FDI on economic growth of India. Apart from examining the impact of FDI on overall economic growth of India, the study also examines growth effect of FDI across different sectors and different regions of India. Result of the Johansen co-integration test indicated that there is no long run relation between FDI and economic growth of India. Given no long run relation between FDI and economic growth of India, short run relation between the two variables has been estimated through VAR model. From the VAR model, the first lag of GDP found to have a positive significant impact on both current year FDI and GDP. However, FDI does not have any significant impact of GDP of the nation. The regression result indicated that FDI has a statistically significant positive impact on both sectoral and regional output. In addition to FDI, banking infrastructure within states and government's social expenditure also have a positive significant impact on the regional output.

Therefore, from the findings of the statistical analysis, it can be concluded that though FDI failed to have any significant impact on economic growth of India either in the short run or in the long run however, for sectoral and regional output FDI played an important role in boosting the output. This underlines the need for

states to provide a conducive environment for industrial investment in general and FDI in particular if they want to achieve faster economic growth.

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Appendix

Appendix: 1

Table – 1: Result of Different Information Criteria for Optimal Lag Selection

Selection Order Criteria								
Sample: 2009-2021						Number of Observations: 13		
lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	3.29267				0.002812	-0.198872	-0.216737	0.111957
1	29.9296	53.274*	4	0.000	.000088*	-3.68148*	-3.73507*	3.42073*
2	31.2085	2.5577	4	0.634	0.000143	-3.26284	-3.35217	2.82827
3	31.7796	1.1422	4	0.888	0.000287	-2.73532	-2.86037	2.12691
Endogenous: ln_gdp ln_fdi								
Exogenous: _cons								

Appendix: 2

Table – 2: Result of VAR model

Sample: 2007 - 2021				Number of Observation = 15	
Log likelihood = 31.910				AIC = -3.454725	
FPE = .0001				HQIC = -3.45774	
Det (Sigma_ml) = .00005				SBIC = -3.17151	

Equation	Parms	RMSE	R-Square	chi2	P>chi2
ln_gdp	3	0.037754	0.9842	748.9	0.000
ln_fdi	3	0.256969	0.6156	19.22	0.000

	Coefficient	Std. Err.	z	P>z	[95% Confidence Interval]	
ln_gdp						
ln_gdp_L1.	0.9076842	0.0563088	16.120	0.000	0.7973209	1.018047
ln_fdi_L1.	0.0288348	0.037785	0.760	0.445	-0.0452225	0.1028922
_cons	1.479409	0.7794397	1.900	0.058	-0.0482645	3.007083
ln_fdi						
ln_gdp_L1.	0.8929766	0.3832563	2.330	0.020	0.1418081	1.644145
ln_fdi_L1.	0.109653	0.2571775	0.430	0.670	-0.3944056	0.6137116
_cons	-7.73681	5.305123	-1.460	0.145	-18.13466	2.66104

Appendix: 3

Table – 3: Result of VAR diagnostic test (Autocorrelation, Normality and Stability Test)

Lagrange-multiplier test			
lag	**chi2**	**df**	**Prob > chi2**
1	0.7329	4	0.9472
H_0: No autocorrelation at lag order			

Jarque-Bera test			
Equation	**chi2**	**df**	**Prob > chi2**
ln_gdp	5.173	2	0.07529
ln_fdi	1.096	2	0.57812
ALL	6.269	4	0.17995
dfk estimator used in computations			

Eigenvalue stability condition	
Eigenvalue	**Modulus**
0.938741	0.938741
0.07859621	0.078596
All the eigenvalues lie inside the unit circle.	
VAR satisfies stability condition.	