



COMPARATIVE ANALYSIS OF IMPACT OF FOREIGN DIRECT INVESTMENT, EXPORTS AND EMPLOYMENT ON GROWTH OF MANUFACTURING INDUSTRIES IN INDIA



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ABSTRACT

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In today's ever-changing environment of international trade and investments, each economy has been aiming towards attracting higher investments and enhancing exports. This makes it evident to investigate and analyze the relationship between Foreign Direct Investment and Growth in terms of output of each industry of the economy. A number of studies have been conducted for analyzing the relationship and impact of FDI on Growth of the aggregate economy with only a few for industry wise analysis. This paper aims at assessing the impact and relationship of FDI and Growth with each other at the industry level. The impact is examined through Panel co-integration test followed by Random effects model. Granger causality test is also applied to assess the causation of each of these. The results indicate that Growth and FDI impact each other significantly at the industry level.

Contribution/ Originality: This study is one of very few studies which have investigated sector specific analysis of FDI and its impact on growth and employment. This study contributes in the existing literature specifically for India to analyze sector specific FDI inflows and suggests policy for way forward.

1. INTRODUCTION

Economic reforms began in India in the year 1991 and have been a continuous process till date. The reforms in the Indian Economy have been implemented in a phase-wise manner which makes it easier to understand the deep-rooted implications of the reforms on long-term growth of the economy. The reforms are comprehensive and are there in the ease of doing business report published by the World Bank since 2003. Foreign Direct Investment (FDI) has also boomed in the post-reform era. To add to that the composition and type of FDI have changed considerably since India decided to open its market to the entire world. This has raised a debate among researchers that India can progress on the path of FDI led growth, and FDI might act as a catalyst to the growth trajectory of India. FDI as the process whereby residents of one country (the home country) acquire ownership of assets for the purpose of controlling the production, distribution and other activities of a firm in the foreign country (the host

country)¹. In the Indian context, FDI can be defined as investment by non-resident entity/person resident outside India in the capital of the Indian company².

The Stock of Foreign Direct Investment in India had grown from a little less than US\$ 2 Billion in 1991 when India decided to walk on the path of Economic liberalization to almost US \$60 Billion in 2017. A lot of policy makers in India give utmost importance to the inflow of Foreign Direct Investment. The deputy general Secretary at OECD mentioned at OECD India roundtable that improved investment climate in India has not only resulted in higher FDI inflows but also resulted in Higher GDP growth. This makes it very clear that policy makers in India are of a strong opinion that higher FDI causes higher Growth.

The Indian economy has gained fast pace over the last ten years, by achieving and sustaining an annual GDP increase of over 7 percent. This high growth rate can be attributed to the growing contribution of the export sector to the Indian economy in addition to various geo political reasons and internal changes which are driving growth. Exports from Indian economy have also improved drastically in recent years. Exports from India were responsible for earning the US \$ 125 Billion in the current fiscal year. The goods exported from India are mainly Agricultural product, Chemicals, Jewellery, Garments, Leather goods, Etc.

The objective of the paper is to identify sectoral growth variables which are most affected by FDI, Exports and Economic Reforms for manufacturing Industries to facilitate policy frameworks to improve those variables. The industries selected are Automotive, Chemicals, Pharmaceutical and Metallurgical for the time period 2007-2016.

1.1. Overview of Manufacturing Sector in India

The Indian manufacturing industry is expected to grow to US\$ 1 trillion by 2025³. Industry experts state the reason for the increasing demand of manufacturing units and the drift of setting up low-cost plants in India by MNCs for this futuristic development. Around 90 million domestic jobs will be created by 2025 along with the manufacturing segment contributing to almost 25-30% of India's GDP. India's fast-growing economy is giving home players as well as international entrepreneurs a variety of opportunities to venture into and grow their businesses. The Indian manufacturing sector has witnessed a relatively slower growth because of a decrease in the pace of investment. The national manufacturing policy suggests raising the percentage share of manufacturing in GDP to 25% so that 100 million jobs are created shortly. A public procurement policy has been suggested in the proposal consolidating technology with common facility centers; the Khadi Mark steps have been launched to promote Micro Small and Medium Enterprises (MSME).

The Index of Industrial Production (IIP) is prepared by the Central Statistics Office to gauge the level of activity in three industrial sectors; Manufacturing, Mining, and Electricity. It is the benchmark index that acts as a substitute to measure the growth of manufacturing in India since manufacturing alone has a weight of 77.63 percent in the index. The manufacturing component of the IIP showed 4.4 percent growth in 2017. The production levels are presumed to pick up the pace again as the Goods and Services Tax (GST) has finally been implemented.

In recent years, the manufacturing sector has gained attention from the Indian government. Realizing the extent of the manufacturing sector and the amount of employment it can generate; many initiatives have been undertaken by the current government to boost the growth of this sector. Having the positive of a large, educated population & skilled labor, there is an extravagant scope for the manufacturing sector to further bloom in the country. The 'Make in India' campaign started by the current government is one of the biggest initiatives taken by any government to captivate investment by foreign investors and start manufacturing process in India. The government is providing sufficient infrastructural facilities like electricity and strong network of roads and railways

¹IMF guideline has prescribed to include reinvestments and venture capital in the FDI flows

²Under Schedule 1 of FEMA (Transfer or Issue of Security by a Person Resident outside India) Regulations 2000

³ As per a research carried out by the global management consulting firm McKinsey and Company

to promote ease of transportation of goods and services for the manufacturers. In order to promote Make in India campaign and ensure that there is no adverse impact on environmental and industrial standards in manufacturing sector, a number of laws have been established to promote labor practices, proper practices of land acquisition and attracting foreign investors. In the last ten years it has been seen that the major industries in India which are on the rise are the Automotive industry, electronic & semiconductor industries, machinery, chemical, pharmaceutical industries and aviation industries (Dangayach and Radha, 2007; Vijayakumar, 2014; Kirti and Prasad, 2016).

On the policy front with respect to enhancing manufacturing activities in India, it is seen that the Make in India initiative was launched in 2014 to promote Indian as well as multi-national conglomerates to manufacture in India. In 2015, India became the most favored country globally for FDI inflows. Five industrial corridors are being made across the country which will act as supporting infrastructure to promote the growth of the manufacturing sector. National Manufacturing Policy was initiated in the year 2011. It focused to increase the percentage share of manufacturing sector in India's GDP to 25 percent and generate 100 million jobs in the sector by 2021. The policy was started to create an enabling policy framework and provide incentives for infrastructure development on Public Private Partnership (PPP) basis. Under the policy, National Investment and Manufacturing Zones (NIMZ's) have been proposed as big industrial townships managed by a Special Purpose Vehicle (SPV). SPV's would lead the planning of the zones, pre-clearances for establishing the industrial units and all the rest of specific functions. Fourteen NIMZ's have already been allotted 'in principle' approval while four of them have been given final approval. Central and State governments will provide exemptions, subject to completion of conditions suggested by the SPV, from compliance burdens for industries located in these zones. Exclusion from Capital Gains Tax on the sale of plant and machinery will be allowed in case of re-investment of the capital gain is used for the purchase of plant and machinery within the same or different NIMZ within three years of sale. A Technology Acquisition and Development Fund (TADF) has been established for acquiring appropriate technologies, the creation of a patent pool and for the development of domestic production of equipment for reducing energy consumption. In 2016, through the Delhi-Mumbai Industrial Corridor belt, eight NIMZ's were declared to be established. Other than these, by April 2017 14 NIMZ's have been granted 'in-principle approval,' while 3 of them have been granted final permission by the government to start operations. An amount of US\$ 1.4 million has been allotted to the Scheme for application of National Manufacturing Policy in Budget 2017-18.

The introduction of Goods and Services Tax (GST) is believed to give a huge boost to the manufacturing sector. It has relaxed various indirect taxes that were earlier applicable to manufacturers. Pre-GST Central taxes could not be netted against State taxes, and there was a cascading effect of taxes. With the introduction of GST, such problems get addressed as set-offs are allowed across the production and value chain. Exemption of entry taxes for inter-state transfers will lead to a reduction the cost of goods and services, thereby boosting demand. GST will also provide a single point registration, unlike the old regime in which each production facility had to be registered separately. Manufacturers can claim ITC on inputs which will have positive impacts on cash flows. This will eliminate the cascading effect of taxes. Another benefit would be the provision of a single Goods, and Services Tax Identification Number (GSTIN) instead of the multiple registrations required previously. Manufacturers will also be able to optimize their supply chain to increase business efficiency. Warehousing and location decisions would be taken by economic efficiencies such as costs and locational advantages instead of tax efficiency.

1.2. Sectoral Trends

For the current study, the main sectors which have been identified are Pharmaceutical, Chemicals, Metallurgy and Automotive. These sectors have been identified considering their share in FDI inflows and exports from India.

It can be seen in Chart-1, that exports for metallurgy and pharmaceutical did not witness growth continuously. The exports from these two sectors have risen steadily as compared to pharmaceuticals and Automotive. Major rise in exports can be seen from the year 2006 onwards.

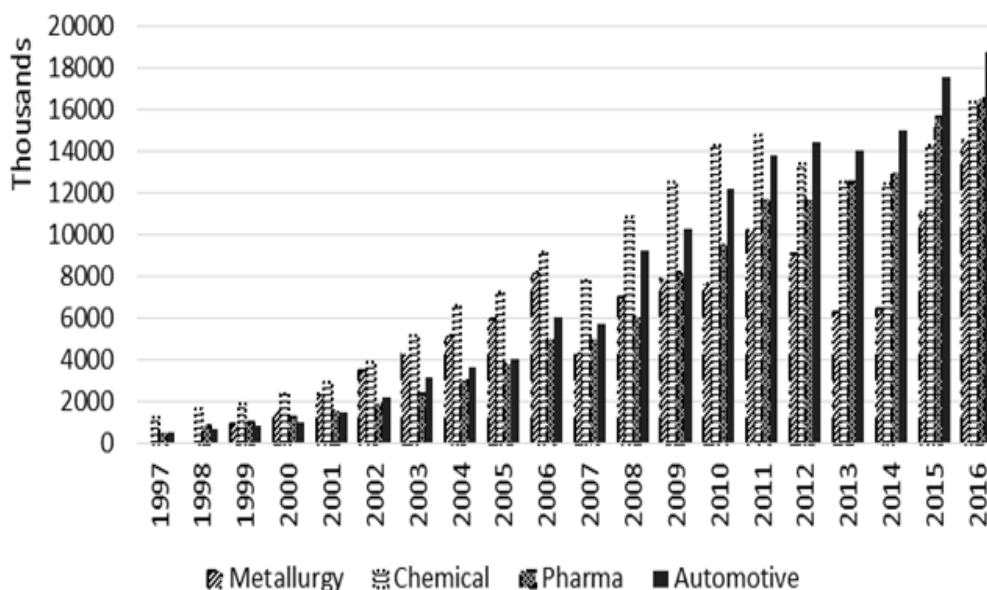


Chart-1. Sector wise Exports 1997-2016

Source: Calculated from WITS, UN Comtrade

In case of Chart-2, FDI inflows rose tremendously from 2006 onwards with a sudden surge in pharmaceuticals owing to regulatory conditions of allowing brownfield investments in the sector. FDI has been continuously rising in the chemical and Automotive sectors.

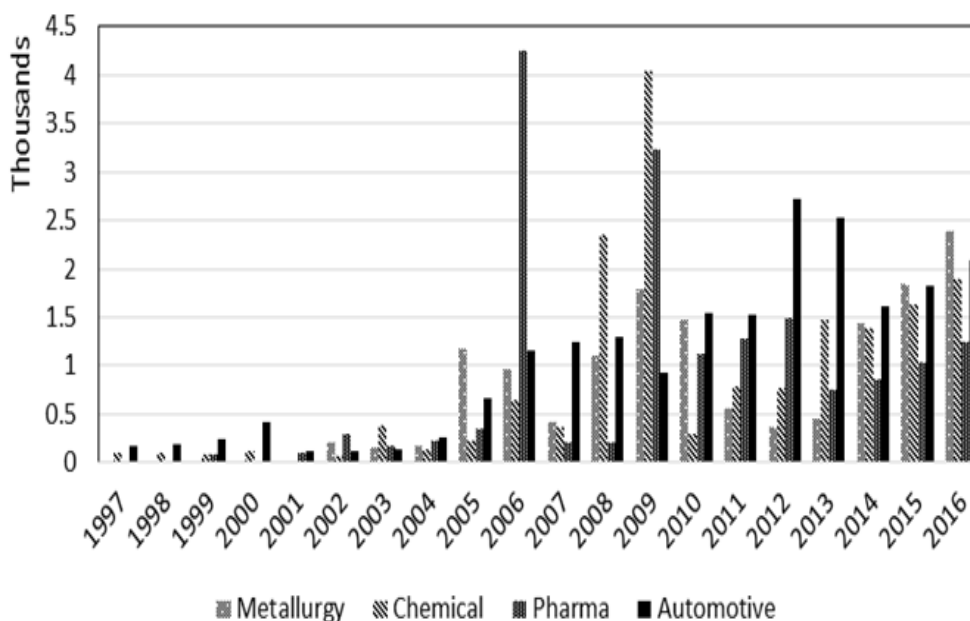


Chart-2. Sector wise FDI inflows 1997-2016

Source: Calculated from DIPP, Ministry of Commerce and Industries, Government of India

In case of Chart-3, it gives an assessment of the sector wise gross value added by each manufacturing sector chosen for the study.

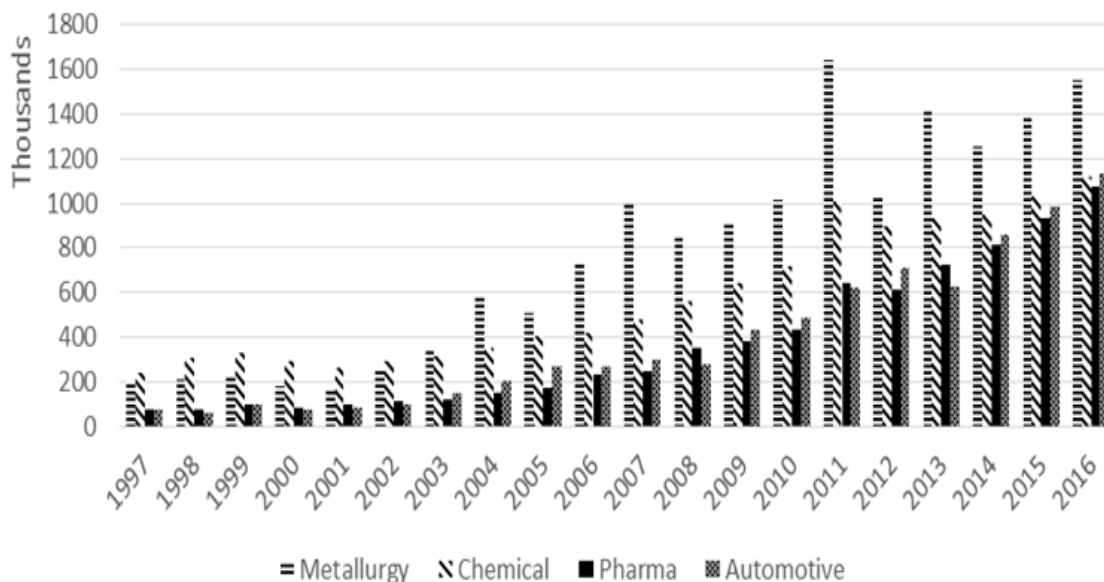


Chart-3. Sector wise Gross Value Added 1997-2016

Source: Calculated from Annual Survey of Industries, CSO

Gross value added being considered as a parameter of growth for the sector, has been maximum for the metallurgy sector in India. There has been a sudden growth in Pharma and automotive sector since 2012.

Chart-4 depicts the number of employees in each sector. The number of employees is considered equivalent to employment in the sector. It is seen that main employment-oriented sectors are metallurgy and chemicals with automotive sector generating employment since 2006. In case of number of factories, it is seen in Chart-5 that similar trend can be seen as that employment.

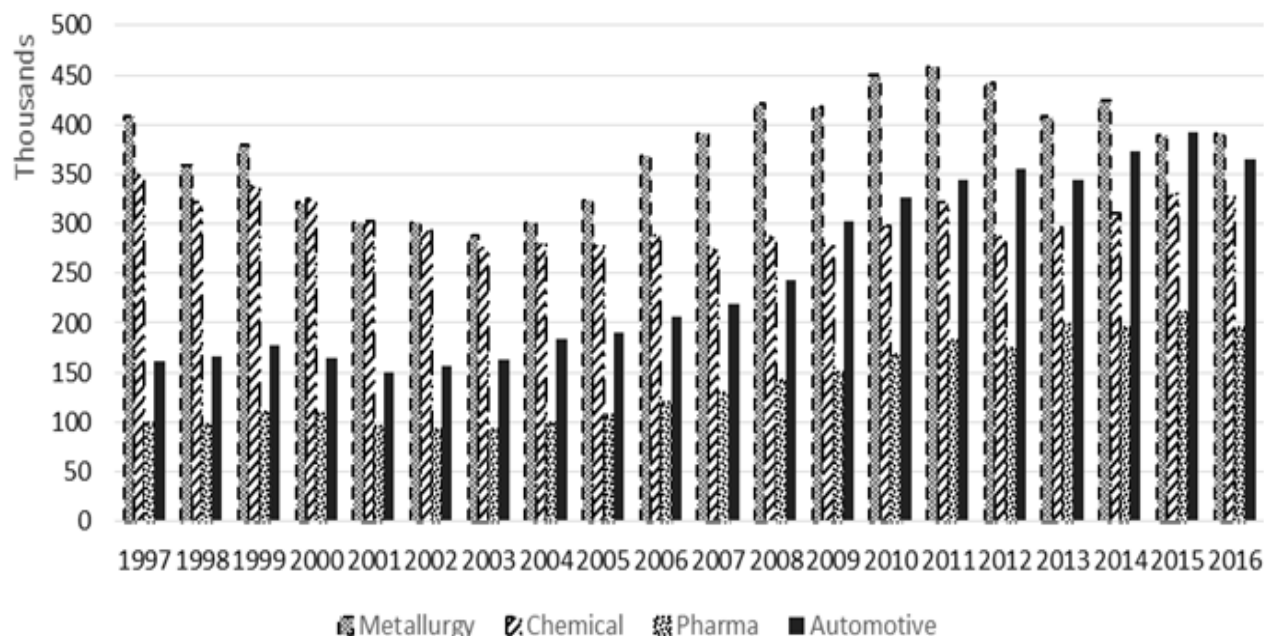


Chart-4. Sector wise Employment 1997-2016

Source: Calculated from Annual Survey of Industries, CSO

Metallurgy and Chemical sectors have higher number of factories with automotive sector also contributing since 2010.

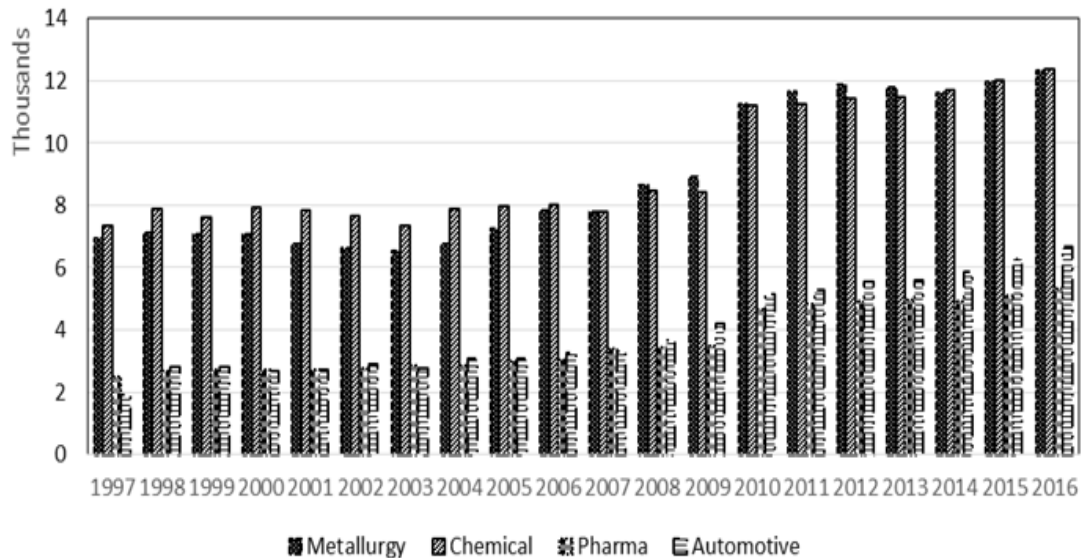


Chart-5. Sector wise Number of Factories 1997-2016
Source: Calculated from Annual Survey of Industries, CSO

India's pharmaceutical exports to the world were valued at US\$ 16.8 billion in 2016-17 and are expected to increase to 30 percent over the next 3 years to reach US\$ 20 billion by the year 2020, according to the Pharmaceuticals Export Promotion Council of India. While the Indian auto industry is amongst the largest in the world. The industry weighs almost 7.1 percent of the country's Gross Domestic Product (GDP). India is also a leading auto exporter and has high export growth aspirations in recent times. Overall Automotive exports grew at 13.01 per cent year-on-year between 3rd quarter of 2017-2018. The chemical sector in India has seen a growth of 13-14% in the last 5 years while petrochemicals have shown a growth of 8-9% over the same period. The major drivers of growth, behind India's chemical industry are Structural advantage, High domestic consumption, Diversified industry and Promising export potential.

Over the past few years, the rise in infrastructure development and automotive manufacturing are driving factors in the growth in the metals and mining sector in India. India has a significantly fair advantage in cost of production and conversion costs in steel and alumina. The Government of India has permitted 100 per cent FDI in the mining sector and exploration of metal and non-metal ores under the automatic route, which will increase the growth in the sector.

2. REVIEW OF LITERATURE

Investment in a country by its residents and investors from other countries is a vital part of international finance. This takes the form of Portfolio investment or Foreign Direct Investment (FDI). Foreign Direct Investment is a very important source of developmental financing which can be used by countries to better technology, expertise, and infrastructure. FDI has become one of the most prized commodities by nations across the world. It has become a driver for economic growth, Job Creation, and technological upgrade. Although there are few studies focusing on causality between the two, a clear relationship between the two remains in point of contention for most of the research scholars.

According to United Nations, the countries that attract a large amount of FDI inflows are those with good economic conditions along with high level of education, high level of macroeconomic and political stability, constructive growth prospect and good investment Environment. These are the economies which are considered as fast-growing economies. India and China over the years have been massive destinations for foreign direct investment. They have been able to attract large Foreign Direct Investment because of gainful growth potential. Further, it has added to the growth potential of both the economies.

Causality between Foreign Direct Investment and Economic Growth in various countries is seen to have a positive relationship. In case of India, Sundari (2014) a positive relationship between FDI and Economic Growth is witnessed. In case of Nigeria, Uwazie *et al.* (2015) based on the slow growth model show that FDI and Economic Growth supplement each other in the short run in Nigeria.

In case of five South Asian host countries, amongst which India figures prominently (Agrawal, 2005) FDI does not cause growth and inclusion of exports as a variable indicates that the impact of the growth of FDI could move through export promotion. On a similar note, Pradhan (2002) in case of India FDI inflows had almost no significant impact on growth. Most studies portray the fact that causation that goes both ways tends to suggest that higher growth leads to more FDI, rather than the opposite being true.

The two-way relationship between growth and FDI (Chakraborty and Basu, 2002) indicates that causality runs more from GDP to FDI. In the long run, FDI is positively related to the GDP and openness to trade. Plus, FDI plays no significant role in the short-run adjustment process of GDP. In case of India (Pradhan, 2002) FDI-growth relationship is found to be Granger neutral as the direction of causation is not stated.

Apart from assessing the cause and impact between FDI and growth, other variables like exports, labor and capital should also be examined. Including other significant determinants of FDI (Tiwari and Mutascu, 2011; Sarwar and Mubarik, 2014; Zomorodi and Zhou, 2017; Mokuolu, 2018) it is seen that both foreign direct investment and exports enhance the growth process. Also, labor and capital also play a significant role in the growth of Asian countries. Other significant determinants may also include human capital, learning by doing, exports, macroeconomic stability, and level of financial development, and public investment (Anwar and Nguyen, 2010). These are in extension to indicators like trade openness and inflation (Shahbaz *et al.*, 2010) which have positive effects on growth of the economy.

On the sectoral or industry specific front, there exist very few studies which have been carried out to examine the impact of FDI on growth for particular sectors. FDI inflows and productivity are mutually strengthening for manufacturing sector (Chakraborty and Nunnenkamp, 2008) however, the plot completely changes for a primary sector where there is no causal relationship. Further, the paper finds only transitory effects of FDI on output in the service sector.

At the industry level, it is seen that there is a long run association between Gross Domestic Product, FDI and Export (Sahoo and Mathiyazhagan, 2003). The same link is also confirmed when the Index of Industrial Production (IIP) replaces GDP. However, the positive elasticity coefficients between FDI, GDP, and FDI, IIP are smaller than the positive elasticity coefficient between EX, GDP and EX, IIP. It implies that EX plays a relatively better role in Indian economy's growth than FDI. The relationship between FDI, output, export and labor productivity at the industry level for the Indian economy is assessed during the time period from 1990-91 to 2000-01. It is indicated that FDI has led to a rise in output, labor productivity and export in a few industries which is not highly significant. The study also suggests opening up export oriented sectors in order to achieve higher growth of the economy through these sectors.

In case of drugs & pharmaceutical sector and telecommunication sector for India (Chodisetty and Babu, 2018) FDI inflows have a positive relation with the investments of Telecommunication and Drug and Pharmaceutical sectors. Drug and Pharmaceutical sector is expected to go up in near future. In India, there has been inequitable inflow of FDI in different sectors (Gupta and Pillai, 2017). There is a positive impact of FDI on growth. FDI facilitates growth in terms of higher exports, GDP and employment generation in the sector. FDI in India is concentrated in few industries thus, lack of diversification might be attributed for slower growth of other sectors.

2.1. Data and Methodology

The present study is an attempt towards examining the cause and impact relationship between FDI and growth in case of India at the sectoral level. Time series data for four sectors over the period 1997-2016 has been

taken into consideration. For this particular study, Gross Value Added of each sector is treated as an indicator of growth of the sector. The data has been extracted from Annual Survey of Industries, Central Statistics Organization, Government of India. FDI inflows into each sector have been extracted from Department of Industrial Policy and Promotion. In addition to the above variables, other important determinants of FDI which emerge from review of literature are exports, employment and number of factories. The data for exports has been extracted from UN Comtrade. While the data for other remaining indicators has been extracted from World Development Indicators published by the World Bank.

In the present study, availability of data is limited, and it has been suggested by econometricians to use panel estimates in such cases. It is expected that panel estimates handle issues of measurement bias and limited degrees of freedom efficiently. The current data series consists of 126 cross sections spread over 19 years. Thus, panel estimation method is suitable in our case.

This paper is primarily based on the model that FDI leads to growth in industries (Siddiqui and Ahmed, 2017). This relation is further strengthened by other factors like improving employment, infrastructure, domestic investment, exports and institutions.

The model has been modified to suit the present scenario of the Indian Economy based on the literature review. The relationship between FDI and growth along with other variables for panel estimation is expressed as:

$$\ln GVA_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 \ln EX_{it} + \beta_3 \ln EMP_{it} + \beta_4 \ln FAC_{it} + \varepsilon$$

for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$ (1)

where GVA is Gross Value Added or Growth at time t for i^{th} sector, FDI is FDI inflows, EX is Exports, EMP is Number of employees indicating employment levels and FAC is number of factories and ε is a disturbance term. In order to examine the impact of growth on FDI, the following relationship is examined:

$$\ln FDI_{it} = \beta_0 + \beta_1 \ln GVA_{it} + \beta_2 \ln EX_{it} + \beta_3 \ln EMP_{it} + \beta_4 \ln FAC_{it} + \varepsilon$$

for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$ (2)

All the variables have been transformed into natural logs in order to overcome the problem of heteroskedasticity.

Thus, to analyze the relationship, the methodology stated in Figure-II has been applied.

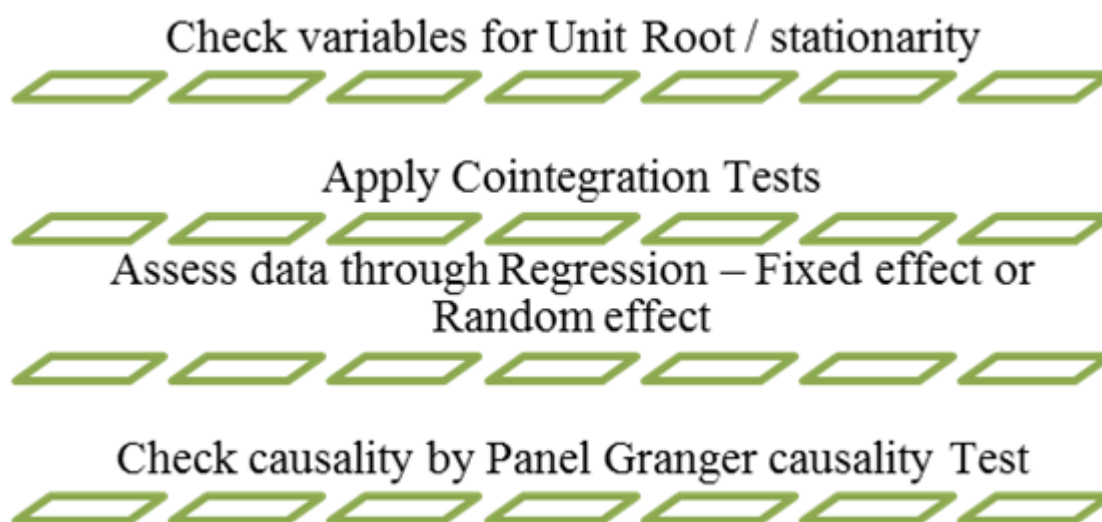


Figure-2. Methodology

It is important to understand that in case of a non-stationary series, the results and inferences from regression are spurious and hence meaningless. Thus, the data series are checked for stationarity through panel root tests.

Four panel root tests⁴ have been applied to check the robustness. The details have been summarized in the section on empirical analysis.

The Levin, Lin and Chu test is a panel based version of the ADF test. It is represented by equation (3) below

$$\Delta X_{it} = \alpha_i + \beta X_{i,t-1} + \sum_{j=1}^k \theta_{ij} \Delta X_{i,t-j} + \varepsilon_{i,t} \quad (3)$$

where, Δ is the first difference operator, X_{it} is the variable being tested and ε_{it} is the white noise disturbance at time t . In this test, β is identical across sectors and hence restrictive. It tests the null hypothesis $\beta=0$ and acceptance of null hypothesis implies non-stationarity.

In case of Im, Pesaran and Shin test, β varies across all sectors relaxing the assumption of Levin, Li and Chu test of identical first-order autoregressive coefficients. This test is based on mean group approach and can be represented as equation (4) below

$$\bar{Z} = \sqrt{N}[\bar{t} - E(\bar{t})] / \sqrt{\text{Var}(\bar{t})} \quad (4)$$

Where, $\bar{t} = \left(\frac{1}{N}\right) \sum_{i=1}^N t_{\beta_i}$, $E(\bar{t})$ and $\sqrt{\text{Var}(\bar{t})}$ are the mean and variance of t_{β_i} .

In this test, the null hypothesis which is tested is $\beta_1 = \beta_2 = \dots = 0$. The other two tests applied are ADF and Phillips Peron Chi square tests. In both these tests, the null hypothesis is same as the IM, Pesaran test but individual roots are tested by them.

In practice, non-stationary series are transformed by differencing into stationary series for empirically analyzing the series. In economic theory, questions are raised about the model after differencing. Engel and Granger are of the view that to analyze non stationary series at level, all the data series are integrated at same order and co-integrated. As per their study, in case of co-integrated series, long run equilibrium relationship may exist even in case of non-stationary data. Thus, panel co-integration tests are applied to the data series.

Kao test for assessing panel co-integration is applied to the data series. As per Kao test, the null hypothesis indicates that the residual series should be non-stationary if no co-integration exists. Kao's test is based on panel regression model and uses DF and ADF test statistic.

To estimate relationship between variables, fixed or random effect model is applied. The fixed effect model represented in equation (5) takes into consideration sector specific factors.

$$Y_{it} = \beta_1 X_{it} + \beta_2 Z_{it} + \eta_i + \varepsilon_i \quad (5)$$

Where, Y is the dependent variable, X and Z are independent variables for N units and T time period. Thus, the total number of observations are N times T . On comparing the Fixed effect model with the classical linear regression model, the error term is decomposed into two components i.e. unobserved factors varying across units but constant over time (η_i) and unobserved factors varying across units and time (ε_i). In case of fixed effects model, the unobservable factors which have a net effect on Y are constant and fixed, thus the model can re-have represented as equation (6).

$$Y_{it} = \beta_1 X_{it} + \beta_2 Z_{it} + \gamma_1 + \gamma_2 + \dots + \gamma_N + \varepsilon_i \quad (6)$$

⁴ Levin, Li and Chu t test for common unit root, Im, Pearson and Shin W -test, ADF -Fisher Chi Square and PP-Fisher Chi Square

In equation 6, η_i the error term has been replaced by $\gamma_1 + \gamma_2 + \dots + \gamma_N$ for each unit in the data set. These parameters represent unobserved heterogeneity and are called unobserved effects.

The random effects model is expressed as equation 5 with a slight modification in the representation of the error terms. In case of random effect model, $\eta_i = \alpha_0 + v_i$ for $i = 1, 2, 3, \dots, N$. Where, α_0 is the deterministic component and v_i the random component. The N intercepts in this case are random variables rather than being fixed parameters. The random effect model is based on the assumption that error is not correlated with the variables. Thus, the random effect model can be expressed as equation (7).

$$Y_{it} = \alpha_0 + \beta_1 X_{it} + \beta_2 Z_{it} + \mu_{it} \quad (7)$$

Where, $\mu_{it} = \eta_i + \epsilon_{it}$.

In order to assess the applicability of fixed vs random effect model, Hausman specification test is applied. This test examines η_i as represented in equation (6) and (7). It represents the unobserved factors varying across unit but constant over time. The model is based on the following hypotheses:

H_0 : η_i is not correlated with explanatory variables

H_1 : η_i is correlated with explanatory variables

If the unobserved factors are correlated with the explanatory variables, fixed effect model is considered appropriate and vice versa. As the test is based on Chi-square distribution with k degrees of freedom, a p-value of more than 0.05, rejects the null hypothesis.

Granger causality test for panel data is carried out to examine the causal relationship between FDI and growth. The granger causality test is carried out by running bivariate regression in the panel data as per equation (8) and (9).

$$y_{i,t} = \alpha_{0,i} + \alpha_{1,i} y_{i,t-1} + \dots + \alpha_{l,i} y_{i,t-l} + \beta_{1,i} x_{i,t-1} + \dots + \beta_{l,i} x_{i,t-l} + \epsilon_{i,t} \quad (8)$$

$$x_{i,t} = \alpha_{0,i} + \alpha_{1,i} x_{i,t-1} + \dots + \alpha_{l,i} x_{i,t-l} + \beta_{1,i} y_{i,t-1} + \dots + \beta_{l,i} y_{i,t-l} + \epsilon_{i,t} \quad (9)$$

Where t is the time period and I are the cross sections.

Panel Granger causality test has been performed by treating the panel data as a large stacked set and then performing Granger causality test with the exception of limiting the entry of data from one cross section into lagged values of data from the next cross section. It is assumed in this case that all the coefficients are same across all cross sections and is represented in equation (10)

$$\alpha_{0,i} = \alpha_{0,j}, \alpha_{1,i} = \alpha_{1,j}, \dots, \alpha_{l,i} = \alpha_{l,j}, \forall i, j$$

$$\beta_{1,i} = \beta_{1,j}, \dots, \beta_{l,i} = \beta_{l,j}, \forall i, j \quad (10)$$

For the present study, data across sectors exists at different standardization levels. In case of assessment of Gross Output, National Industries Classification (NIC 98, 04, 08) was seen as given by Annual Survey of Industries. In case of service sectors like Financial & Non-Financial Services, Telecommunication and Tourism data was obtained from various issues of Economic Survey of India.

In case of Exports, Harmonized System Classification was taken from the World Customs Organization. Whereas in case of FDI, definitions given by DIPP for each sector had to be assessed. While in case of Services, Telecommunication and Tourism there is no HS Classification. The data had to be collected on the basis of sectoral availability of Data.

The Table-2. summarizes the collection of Data and its mapping for the chosen sectors.

Table-2. Concordance of Data

Sector	NIC 08	NIC 04	NIC 98	HS Code	FDI as per DIPP
Metallurgy	24 & 25	26 & 27	26 & 27	26, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83	Sectoral Definition
Chemicals	20	24	24	28 & 29	Except Fertilizers
Drugs & Pharmaceutical	21	242	242	30	Sectoral Definition
Automotive	29	34	34	8702, 8703, 8704, 8705	Sectoral Definition

3. EMPIRICAL ANALYSIS

In empirical analysis, if the panel data series are non-stationary there is a risk of obtaining spurious results. Thus, the present study checks the stationarity of the data through individual and common tests. In view of this, the stationary properties of panel data are examined and transformation of non-stationary series into stationary series is undertaken. The log transformed data for FDI, gross value added (GVA), exports (EX), Employment (EMP) and number of factories (FAC) were tested for stationarity. The results are depicted in table-3. The results suggest that all the above stated variables have unit root at level and are non-stationary. While at the first difference level, none of the variables have a unit root and hence are stationary.

Table-3. Summary of Panel Root Test

Test		Levin, Li and Chu t test for common unit root	Im, Pesaran and Shin W-test	ADF -Fisher Chi Square	PP-Fisher Chi Square
Variable	Level	Statistic	Statistic	Statistic	Statistic
FDI	Level	-3.42*	-1.16	18.17	26.85*
	First Diff	-9.06**	-8.18**	63.36**	142.998**
Gross Value Added	Level	-2.20*	0.956	13.46	23.24
	First Diff	-7.77**	-7.97**	60.72**	67.36**
Exports	Level	-3.55*	-1.30	22.00	60.89*
	First Diff	-6.33**	-5.58**	41.45**	41.69**
Employment	Level	-3.62*	0.53	7.38	45.03*
	First Diff	-4.79**	-3.82**	29.78**	36.60**
Number of factories	Level	-5.24**	-1.77*	21.12	21.12
	First Diff	-6.40**	-7.07**	52.65**	50.69**

*Significant at 5 % level of significance

**Significant at 1 % level of significance

The data series are stationary at first order of integration and hence a need arises to test it for panel co-integration. The study employs Kao residual co integration test and the results obtained reject the null hypothesis. In other words, co-integration exists between the variables as shown in table-4 below.

Table-4. Kao residual cointegration test

	Null Hypothesis	Max. lag	t-Statistic	Prob.
All sectors	No cointegration	Automatic lag length selection based on AIC with a max lag of 1	-2.48629	0.0065

In the Kao test for co-integration it can be seen that the null hypothesis is rejected as the probability is less than 0.05 and hence, co-integration exists in the data set. It implies that FDI and sectoral growth has a long run equilibrium relationship. Thus, now it is advisable to use fixed or random effect models which are standard panel estimation methods to equation (1) and (2) for estimating the relationship FDI and growth. The fixed effects model, assumes that there exists correlation between sector specific factors with the explanatory variables. While in case of random effects model, there exists the assumption of non-correlation. To determine the applicability of fixed vs random effect model for the present study, Hausman specification test is carried out. The result depicted in table- V below indicate that the null hypothesis has been accepted and random effects model is preferred over fixed effects model.

Table-5. Hausman Specification Test Results-Fixed Vs. Random Effects Model

Direction of Impact (Variables)	Ho: difference in coefficients not systematic	
	Chi-Sq. Statistic	Prob.
Impact of FDI on Gross Value Added	0.0000	1.00
Impact of Gross Value Added on FDI	0.0000	1.00

The results of Random effects model for estimating the impact of Growth on FDI is presented in table-6. The results indicate that gross value added exerts a significant and positive impact on FDI for all the sectors chosen. A number of empirical studies like Romer (1986), Lucas (1993) indicate that as FDI increases, physical investment also increases thus leading to growth. Studies by Borensztein *et al.* (1995) and Lensink and Morrissey (2006) point towards the significant and positive impact of growth on FDI.

Exports and number of factories have a significant impact on FDI inflows. This result can be due to the fact that as investment rises more factories will be established. These sectors might be capital intensive and hence employment doesn't have a significant role in FDI inflows.

Table-6. Random Effects Model Results

Random Effects				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.2890	3.069	-1.3975	0.1664
GVA	1.6394	0.235	6.965	0.0000**
EXPORTS	0.2362	0.0782	3.020	0.0035**
EMPLOYMENT	0.1214	0.417	0.290	0.7721
NO. OF FACTORIES	-1.837	0.405	-4.526	0.0000**
R-squared	0.686			
Adjusted R-squared	0.669			
Prob (F-statistic)	0.000			

*Significant at 5 % level of significance

**Significant at 1 % level of significance

***Significant at 10 % level of significance

Though, growth has a positive impact on FDI, its relatively small size leads to the conclusion that growth is one of the factors for enhancing FDI inflows. Other factors can be level of exports and rise in physical investments leading to rise in number of factories for facilitating higher FDI inflows.

On examining the impact of FDI inflows on growth, the results obtained are presented in table- 7 below. The results indicate that FDI has a significant impact on growth of all the sectors chosen. Exports, number of factories and employment also have a significant and positive impact on growth of the sectors chosen. Rise in number of factories also indicate towards ease in economic reforms and also doing business leading to expansion of the sectors.

Table-7. Random Effects Model Results

Random Effects				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.027	1.182	-0.868	0.3879
FDI	0.239	0.034	6.965	0.0000**
EXPORTS	0.076	0.030	2.510	0.0142**
NO_OF_FACTORIES	0.919	0.139	6.604	0.0000**
EMPLOYMENT	0.268	0.156	1.709	0.0915***
R-squared	0.872			
Adjusted R-squared	0.866			
Prob(F-statistic)	0.000			

*Significant at 5 % level of significance

**Significant at 1 % level of significance

***Significant at 10 % level of significance

Apart from analyzing the impact of FDI on growth and vice versa, it is also important to examine causality between the two through Panel Granger Causality test. The results obtained through the panel causality test are presented in table 8 below.

Table-8. Panel Causality

Null Hypothesis	F-Statistic	Prob.
FDI does not Granger Cause EMPLOYMENT	4.85830	0.0107**
EMPLOYMENT does not Granger Cause FDI	1.34047	0.2686
GVA does not Granger Cause EMPLOYMENT	0.95645	0.3894
EMPLOYMENT does not Granger Cause GVA	1.83467	0.1676
FDI does not Granger Cause EXPORTS	12.9433	2.E-05
EXPORTS does not Granger Cause FDI	4.90402	0.0103**
GVA does not Granger Cause EXPORTS	34.3757	5.E-11
EXPORTS does not Granger Cause GVA	3.53188	0.0348**
GVA does not Granger Cause FDI	3.01304	0.0558*
FDI does not Granger Cause GVA	3.31917	0.0422**
NO_OF_FACTORIES does not Granger Cause FDI	0.11595	0.8907
FDI does not Granger Cause NO_OF_FACTORIES	11.9493	4.E-05
NO_OF_FACTORIES does not Granger Cause GVA	7.84195	0.0009**
GVA does not Granger Cause NO_OF_FACTORIES	6.13372	0.0036**

*Significant at 5 % level of significance

**Significant at 1 % level of significance

***Significant at 10 % level of significance

It can be inferred from panel causality test that FDI causes employment unidirectionally. While there is a bidirectional causality between FDI and Growth. Exports also cause FDI and growth.

4. CONCLUSIONS

It has been found through review of existing literature as well as empirically that FDI has an impact on growth and vice versa for either industries or countries. The present study examines the relationship between FDI and growth and vice versa for a few selected industries over the years 1997-2016. The sectors which have been chosen are Chemical, Metallurgy, Drugs & pharmaceuticals and Automobiles based on their contribution to FDI inflows, Gross Value added and exports from India. The chosen sectors are majorly labour intensive and export oriented.

The results obtained through empirical analysis indicate that FDI causes and impacts growth at the industry level and growth also causes and impacts FDI. For instance, the Automobile sector has high FDI inflows corresponding to high growth in the Indian economy. While the Metallurgy sector has high growth but low FDI inflows. Also in the Chemical and Drugs & Pharmaceuticals sector the FDI inflows are high as compared to their growth. Apart from FDI and Growth affecting each other at the industry level of Indian economy, other significant factors which effect FDI and growth are Exports and employment as inferred from literature as well as empirical analysis.

The study suggests that the Indian economy should focus on attracting FDI in various industries. It is also suggested that the policy measures should be taken to attract investments in infrastructure development of various industries. It is also found that exports have a significant impact on both growth and FDI, thus highlighting the importance of attracting FDI in export oriented industries. Employment plays a significant role in growth of the industries but not in case of investments. Thus, steps should be taken to skill India's existing labor force to attract investments and further lead to higher growth levels in each of the industries as well as the aggregate level for the Indian economy.

The paper is a significant contribution to the field of sectoral impact of FDI on growth for India. As very few studies have been carried out for sectoral analysis, this study will help in terms of devising policies for attracting higher FDI inflows in select sectors and also leading to employment generation and simultaneously growth of the sectors. These sectors emerge to be mainly export oriented sectors and thus there is a need to develop linkages between sectors for ensuring inclusive growth.

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