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IMPACT OF FOREIGN DIRECT INVESTMENT ON INDIAN ECONOMY: A SECTORAL LEVEL ANALYSIS[1]

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Abstract

The main objective of this paper is to examine the long-run relationship of Foreign Direct Investment (FDI) with the Gross Output (GO), Export (EX) and Labour Productivity (LPR) in the Indian economy at the sectoral level by using the annual data from 1990-91 to 2000-01. The study uses the Panel co-integration (PCONT) test and the results demonstrate that the flow of FDI into the sectors has helped to raise the output, labour productivity and export in some sectors but a better role of FDI at the sectoral level is still expected. Results also reveal that there is no significant co-integrating relationship among the variables like FDI, GO, EX and LPR in core sectors of the economy. This implies that when there is an increase in the output, export or labour productivity of the sectors it is not due to the advent of FDI. Thus, it could be concluded that the advent of FDI has not helped to wield a positive impact on the Indian economy at the sectoral level. Thus, in the eve of India's plan for further opening up of the economy, it is advisable to open up the export oriented sectors so that a higher growth of the economy could be achieved through the growth of these sectors.

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1. Introduction

Foreign Direct Investment (FDI) inflow into the core sectors is assumed to play a vital role as a source of capital, management, and technology in countries of transition economies. It implies that FDI can have positive effects on a host economy's development effort (Caves, 1974; Kokko, 1994; Markusen, 1995; Carves, 1996; Sahoo, Mathiyazhagan and Parida 2001). On this line, it has been argued that FDI can bring the technological diffusion to the sectors through knowledge spillover and enhances a faster rate of growth of output via increased labour productivity in India. There were also few evidences demonstrate that there is a long-run relationship between Gross Domestic Product, FDI and export in India (Sahoo and Mathiyazhagan, 2003). In fact, many countries like India have offered incentives to encourage FDI to their economies. India is also opened up its economy and allowed MNEs in the core sectors such as Power and Fuels, Electrical Equipments, Transport, Chemicals, Food Processing, Metallurgical, Drugs and Pharmaceuticals, Textiles, and Industrial Machinery as a part of reform process started in the beginning of 1990s. In this context, it is imperative to assess the impact of FDI inflows in to these core sectors in India. It is also motivated by recent political developments in India following the opening of sectors like insurance and telecommunication with increased financial gap for the private players. In particular, the left parties, who are main coalition partner of the present government in India is not in favor of increased financial gap to the private players in the sectors of insurance and telecommunication and also disinvestment of public enterprises. An empirical analysis could offer a basis for the further opening up the economy if FDI inflows into the core sectors set a positive spillover in the economy in India.

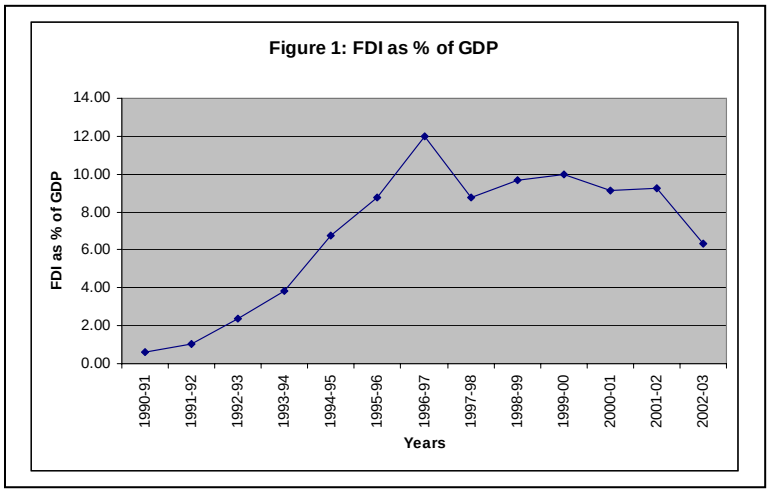
Finally, the analysis is also motivated by the current worldwide trend towards assessing the impact of FDI on the core sectors of the economy in transition countries. The evidence to date on this issue is mixed. The positive merits of the FDI inflows in the host economy in practice have begun to be questioned. It has been argued that Multinational Enterprises (MNEs) in the name of FDI may drive out the local firms because of their oligopolistic power, and also, the repatriation of profit may drain out the capital of the host country. Hanson (2001) argues that evidence that FDI generates positive spillovers for host countries is weak. In a review of micro data on

spillovers from foreign-owned to domestically owned firms Gorg and Greenwood (2002) conclude that the effects are mostly negative. Lipsey (2002) takes a more favorable view from reviewing the micro literature which argues that there is evidence of positive effect. He also argues that there is need for more consideration of the different circumstances that obstruct or promote positive spillovers. On this line, this paper is set to analyze the impact of FDI inflows into the core sectors of the Indian economy.

The rest of the paper contains six sections. The section two presents different dimensions of FDI flows to India, which includes size and growth, sources and sectoral distribution of FDI inflows. The third section covers the theoretical background relating to FDI and Economic Growth. It also gives a theoretical model, showing growth rate of an economy as a function of FDI along with other variables. The empirical studies that relate the FDI and economic growth are reviewed in the fourth section. The fifth section explains the empirical analysis in terms of framework, data and estimation. The empirical results, policy implications and discussions are placed in the last section.

2. Dimensions of FDI in India

The dimensions of the FDI flows into India could be explained in terms of its growth and size, sources and sectoral compositions. The growth of FDI inflows in India was not significant until 1991 due to the regulatory policy framework. However, under the new policy regime, it is expected to assume a much larger role in catalyzing Indian economic development. It could be observed that there has been a steady build up in the actual FDI inflows in the post-liberalization period (Table 1). Actual inflows have steadily increased from Rs. 3,514.30 million (US $ 143.6 million) in 1991 to Rs. 143,009.40 million (US $



3,108.9) in 2003. This results in an annual average growth rate close to 6 per cent (Figure 1). However, the pace of FDI inflows to India has definitely been slower than some of the smaller developing countries like Indonesia, Thailand, Malaysia and Vietnam (WIR, 2005). In fact, India has registered a declining trend of FDI inflows and the FDI- GDP ratio (Figure 1) especially in 1998 and 2003 could be attributed to many factors, including the US sanctions imposed in the aftermath of the nuclear tests, the East Asian melt-down and the perceived Swadesh image of the Bharathi Janatha Party, which was ruling government during this period in India. It is also important to note that the financial collaboration has out numbered the technical collaboration over the years.

The analyses of the origin of FDI inflows to India show that the new policy has broadened the source of FDI into India. There were 86 countries in 2000 which increased to 106 countries in 2003 as compared to 29 countries in 1991 whose FDI was approved by the Indian Government. Thus, the number of countries investing in India has increased during the period of reform. Nevertheless, still a lion's share of FDI comes from only a few countries. Table 2 shows the actual investment flows of top ten countries (and percentage to the total FDI) during the period January 1991 to December 2003. The FDI stock for the period of 1991-1999 from Mauritius is the largest (30.12%) even though the US alone accounted for nearly a quarter (20.19%) of the total FDI inflows. The other top eight countries viz., Japan, UK, Netherlands, Germany, South Korea, Singapore, France and Switzerland collectively shared 35.79 per cent of the total actual FDI inflows to India for a decade. It implies that these top ten countries accounted for well over 86 per cent of the FDI inflows during the above period. Nevertheless, the geographic concentration of FDI inflows in the reform period is lower than in the pre-reform period (Sahoo and Mathiyazhagan, 2003). In 1990, only six countries, viz. the US, UK, Germany, Japan, Italy and France were responsible for over two-thirds of the total FDI inflows in India. The country-wise annual growth rate of the FDI inflows shows that Mauritius, which was not in the picture till 1992, has the highest growth rate. A lion's share of such investment is represented by the holding companies of Mauritius set up by the US firms. It means that the investment flowing from the tax havens is mainly the investment of the multinational corporations headquartered in other countries. Now an important question arises as to why the US companies have routed their investment through

Mauritius. It is because, firstly, the US companies have positioned their funds in Mauritius, which they like to invest elsewhere. Secondly, because the tax treaty between Mauritius and India stipulates a dividend tax of five per cent, while the treaty between Indian and the US stipulated a dividend tax of 15 per cent (World Bank, 1999). On the other hand, the shares of the total FDI inflows of these top 10 countries have been fluctuating since recent years (Table 2).

The analysis of sector-wise FDI inflows shows that electrical equipments, transportation, telecommunication, power and fuels, service, chemicals, food processing, drugs and pharmaceuticals, metallurgical, textile and industrial machinery sectors attracted more FDI, which together accounted for more than 73 per cent of total FDI inflows during 1991-1999 (Table 3). Among these core sectors, transportation industry accounted for 12.45 per cent followed by electrical equipments including IT and electronics with 9.76 per cent, and service and telecommunication sector with 9.77 per cent and 9.76 per cent respectively of the total investment. It is important to note that though food-processing sector attracted less FDI inflows, it recorded a significant share (5.72 per cent) in attracting total FDI inflows in India. The share of the FDI inflows to the top sectors is not very encouraging baring electrical equipments, telecommunications and power and fuels sectors in recent years (Table 3).

3. FDI and the Host Economy: A brief Review of the Literature

This section reviews the empirical studies on the relation between FDI and economic activities in the host economy, which could facilitate in identifying the issues relating to the impact of FDI at the sectoral level. In the earlier stage, few studies had shown that FDI has a negative impact on the growth of the developing countries (Singer, 1950; Griffin, 1970; Weisskof, 1972). The main argument of these studies was that FDI flows to Less Developing Countries (LDCs) were mainly directed towards the primary sector, which basically promoted the less market value of this sector. Since these primary products are exported to the developed countries and are processed for import, it receives a lower price for its primary product. This could create a base for the negative impact of FDI flows in the economy. On the other hand, Rodan (1961), Chenery and Strout (1966) in the early 1960s argued that foreign capital inflows have

a favorable effect on the economic efficiency and growth towards the developing countries. It has been explained that FDI could have a favorable short-term effect on growth as it expands the economic activity. However, in the long run it reduces the growth rate due to dependency, particularly due to "decapitalization" (Bornschier, 1980). This is due to the reason that the foreign investors repatriate their investment by contracting the economic activities in the long run. The studies that used the endogenous growth theory challenged this view in explaining the long run growth rate of the economy by using endogenous variables like technology and human capital (Barro and Martin, 1999; Helpman and Grossman, 1991). FDI is an important vehicle for the transfer of technology and knowledge and it demonstrates that it can have a long run effect on growth by generating increasing return in production via positive externalities and productive spillovers. Thus, FDI can lead to a higher growth by incorporating new inputs and techniques (Feenstra and Markusen, 1994).

A recent study by Kasibhatla and Sawhney (1996) in the U.S. supports a unidirectional causality from GDP to FDI and not the reverse causation. This may be due to the fact that for a developed country, FDI follows GDP, as GDP is an indicator for market size. Aitken, et al. (1997) showed the external effect of FDI on export with example of Bangladesh, where the entry of a single Korean Multinational in garment exports led to the establishment of a number of domestic export firms, creating the country's largest export industry. The recent study by Chen, Chang and Zhang (1995), using time series data for the period of 1979-93, estimated the regression between GNP, domestic saving in one period lag, and FDI in one period lag (all in logarithmic value). The results of the study show that there is a positive relationship between FDI and GNP and it is significant at 5 per cent level for the Chinese economy. It also supported by other study by Sahoo et al (2002). Hu and Khan (1997) attribute the spectacular growth rate of Chinese economy during 1952 to 1994 to the productivity gains largely due to market oriented reforms, especially the expansion of the non-state sector, as well as China's "open-door" policy, which brought about a dramatic expansion in foreign trade and FDI. Further, Bashir (1999) examined the relationship between FDI and growth empirically in some MENA countries, using panel data. The study found that FDI leads to economic growth; the effect however varies across regions and over time. Xu (2000), by using panel data has investigated the U.S. MNEs as a channel of international technology diffusion in

40 countries from 1966 to1994. This study found a strong evidence of technology diffusion from U.S. MNEs affiliated in developed countries (DCs) but weak evidence of such diffusion in the less developed countries (LDCs). The result for the DCs indicates that US MNEs are almost as important as international trade for technology spillover. Nearly 40 per cent of the total factor productivity (TFP) of DCs is attributable to the technology transfer of US affiliates. Further, the study also found that the level of human capital is crucial for a country to benefit from technology spillovers of MNEs. A country needs to achieve a human capital threshold of about 1.9 years (in terms of male secondary school attainment) to benefit from the technology transfer by the MNEs. The results are consistent with the findings of single country study that the technology spillover effects of MNEs are positive in advanced countries but are insignificant in less developed countries.

The results by Borensztein, De Gregorio and Lee (1998) and Carkovic and Levine (2002) found a little support for FDI having an exogenous positive effect on economic growth. These results are robust to the inclusion of other growth determinants such as human capital measures, domestic financial development, and institutional quality along with the use of lagged values of FDI.

The studies on FDI and economic growth in India are very limited. A recent study by Banga (2005) demonstrates that FDI, trade and technological progress have differential impact on wages and employment. While higher extent of FDI in an industry leads to higher wage rate in the industry, it has no impact on its employment. On the other hand, higher export intensity of an industry increases employment in the industry but has no effect on its wage rate. Technological progress is found to be labor saving but does not influence the wage rate. Further, the results show that domestic innovation in terms of research and development intensity has been labor utilizing in nature but import of technology has unfavorably affected employment in India.

The study by Dua and Rashid (1998) for the Indian economy does not support the unidirectional causality from FDI to Index of Industrial Production (IIP), where IIP is taken as the proxy for GDP. In fact, this study used the monthly data for IIP and GDP, which may include seasonal component in its variation and hence it is required to de-seasonalise the data. Alam (2000) in his comparative study of FDI and economic growth for Indian and Bangladesh economy stressed that though the impact of FDI on growth is more in case of Indian economy yet it is not satisfactory. Sharma

(2000) used a multiple regression technique to evaluate the role of FDI on the export performance in the Indian economy. The study concluded that FDI does not have a statistically significant role in the export promotion in Indian Economy. This result is also confirmed by the study of Pailwar (2001) and the study also argues that the foreign firms are more interested in the large Indian market rather than aiming for the global market. By using a vector error correction model (VECM), Chakraborty and Basu (2002) tried to find the short run dynamics of FDI and growth. The study reveals that GDP in India is not Granger caused by FDI; the causality runs more from GDP to FDI and the trade liberalization policy of the Indian government had some positive short run impact on the FDI flow. The study by Sahoo and Mathiyazhagan (2003) also support the view that FDI in India is not able to enhance the growth of the economy. Though there is a common consensus among all the studies in the Indian context that FDI is not growth stimulant rather it is growth resultant, none of the studies have tried to examine the role of FDI at the sectoral level in the Indian economy. The present study is an endeavor in this regard.

It is also imperative to note that there is rarely any study that analyses the impact of FDI at the sectoral level. Since FDI is the major factor in liberalization and globalization policy of all the transitional economies including India, the present study is an endeavor since it examines the impact of FDI at the sectoral level, by using the precise new technique called Panel Co-integration (PCONT) in order to validate the results of the analysis.

4. Analytical Framework

In order to analyze the impact of FDI at the sectoral level on the Indian economy, this paper uses the basic theoretical framework as presented by Sahoo, Mathiyazhagan and Parida (2002) and Sahoo and Mathiyazhagan (2003). The relation between FDI and the host country economy activities could be expressed as:

$$\gamma = (1/\theta)\{(H/\varphi)A^{1/(1-\alpha)}(1-\alpha)/\alpha\,\alpha^{2/(1-\alpha)} - \rho\} \quad \text{.....[1]}$$

Where, γ is the growth rate of the host economy,

H is the stock of human capital in the economy,

A is a fixed technology parameter,

r is the steady state rate of return of capital

ρ is the subjective rate of time preference,

θ is the inverse of the inter-temporal elasticity of substitution.

The expression in (1) is valid only if the parameters are such that $\gamma \geq 0$. The expression shows that rate of growth of the economy is an increasing function of A, H and a decreasing function of ρ, θ and φ (thus an increasing function of the number of MNEs).

As is evidenced from the literature, FDI is assumed to transfer technology, promote learning by doing, train the labour, and in general result in the spillovers of human skills and technology. It also promotes the growth of output of the sectors, raises their labour productivity and export performances. On this line, it is very important to examine the impact of FDI inflows on the sector specific variables like labour productivity, output and export. The main sectors included for this measurement are power and fuels (PF), Electrical Equipments (EL), Transport (TR), Chemicals (CH), Food Processing (FP), Metallurgical (ME), Drugs and Pharmaceuticals (DP), Textiles (TE), and Industrial Machinery (IN). The study uses the Panel co-integration (PCONT)[3] technique in order to examine the impact of FDI inflows at the sectoral level. A PCONT model is best suited because of the following reasons:

- The pooling of the data for nine sectors over ten years will increase the degrees of freedom and also it will enable to explore the co-movement of the variables.
- It will also enable to allow the short-run dynamics to be potentially heterogeneous.

There is a considerable amount of ambiguity in the quantitative data on FDI in India (Srivastava 2003; Nagaraj 2003; Sahoo and Mathiyazhagan 2003). It is mainly because of the discrepancy in defining the FDI data by different agencies. *The Economic Survey (ES)* includes *American Depositary Receipts (ADRs)* and the *Global*

[3] For a detailed discussion, see Pedroni, 2001.

Depositary Receipts (GDRs) in the FDI inflows whereas the RBI considers ADR and GDR as portfolio investments. Thus, the figures on FDI as given by the Economic Survey overstate the FDI inflows. The FDI data at the sectoral level have been collected from various issues of Secretariat for Industrial Assistance (SIA) newsletter. The other variables of the sectors have been collected from the Annual Survey of Industry (ASI) CD-Rom, which is published by the Central Statistical Organization, Government of India and Prowess, Centre for Monitoring Indian Economy Pvt. Ltd (CMIE). The choice of the period of study is due to the structural adjustment program and macroeconomic stabilization policy launched in 1991 and as a consequence India became the lucrative place for most of the international investors. In order to net out the effect of price change in the economy, all the variables used in the study except LPR, are deflated by using the GDP deflator. In order to estimate the PCONT relationship among the sector specific variables, the PCONT model is described as follows:

$FDII_{it} = \alpha_i + \beta_i X_{it} + V_{it}$ ……. (2)

Where,

$FDII_{it}$ = Foreign Direct Investment inflows to sector 'i' at time period t.

X_{it} = vector of right-hand side variables at time "t" for cross-section units "i" = 1 to 9;

B_t = coefficient vector, and

V_{it} = error vector over N.

In the above equation, FDII and X are co-integrated with slopes β, which may or may not be homogeneous across 'i'. In this case, in order to have the cointegrating relationship among the variables, we require under the null hypothesis that $H_o : \beta_I = 1$ for all *i*. Let,

$\xi_{it} = (\hat{u}_{it}, \Delta\hat{p}_{it})'$

be a stationary vector consisting of the estimated residual form the cointegrating regression and the differences in the X values, and let,

$$\Omega_i \equiv \lim_{T\to\infty} E[T^{-1}(\sum_{t=1}^{T}\xi_{it})(\sum_{t=1}^{T}\xi_{it}^{'}]$$

be the long-run covariance for this vector process. It can be decomposed as:

$$\Omega_i = \Omega_i^o + \Gamma_i + \Gamma_i^{'},$$

where Ω_i^o is the contemporaneous covariance and Γ_i is a weighted sum of autocovariances. Using this notation, the expression for the between-dimension, group-mean model panel FMOLS estimator is given as:

$$\hat{\beta}_{GFM} = N^{-1}\sum_{i=1}^{N}[\sum_{t=1}^{T}(p_{it} - \ddot{p}_i)^2]^{-1} \times [\sum_{t=1}^{T}(p_{it} - \ddot{p}_i)s_{it}^{*} - T\hat{\gamma}_i]..... (3)$$

where

$$s_{it}^{*} = (s_{it} - \ddot{s}_i) - (\hat{\Omega}_{21i}/\hat{\Omega}_{22i})\Delta p_{it},$$

and

$$\hat{\gamma}_i \equiv \hat{\Gamma}_{21i} + \hat{\Omega}_{21i}^{0} - (\hat{\Omega}_{21i}/\hat{\Omega}_{22i})(\hat{\Gamma}_{22i} + \hat{\Omega}_{22i}^{0})$$

In the similar spirit, a between-dimension, group-mean panel DOLS estimator can be constructed as follows. The DOLS regression is:

$$s_{it} = \alpha_i + \beta_i p_{it} + \sum_{k=-k_i}^{K_i}\gamma_{ik}\Delta p_{it-k} + u_{it}..... (4)$$

From the equation 3, the group-mean panel DOLS estimator can be constructed as:

$$\hat{\beta}_{GD} = [N^{-1}\sum_{i=1}^{N}(\sum_{t=1}^{T} z_{it}z_{it}^{'})^{-1}(\sum_{t=1}^{T} z_{it}\hat{s}_{it})]_1..... (5)$$

where

z_{it} is the 2(K+1)×1 vector of regressors and the subscript outside the brackets indicates that we are taking only the first element of the vector to obtain the pooled slope coefficient.

The vector X has three sector specific variables namely; gross output (GO), labour productivity (LPR) and exports (EX). Since the number of observations in the current study is limited to 117 only, the study has the following combinations of the variables to test the co-integrating relations among the variables. The combination of the variables is as follows:

PCONT : ($FDII_{it}$, GO_{it}, EX_{it}, LPR_{it})

There is a need for the verification of the stationary properties of the variables in the analysis of a PCONT model and for the present study it has been carried out for all the pooled variables by the unit root tests as prescribed by Pedrini (1999)[4]. However, all the variables are used in their logarithmic values to make them unit free. The usual tests for the unit root for a panel set of data are Levin-Lin Augmented Dickey-Fuller (ADF) test. The test covers the most general specification for all the pooled variables, which include a constant, a trend and lags. It is also necessary to determine the lag length of the variables in the PCONT model. The Akaike Information Criterion (AIC) and Schwarz Criterion (SC) are the common test-criterion to fix the lag length in any model. However, in the current PCONT model, the lag length cannot exceed one, since the time period is small (i.e. 10 years) and the explanatory variables vector consists of three variables i.e. GO, EX and LPR. Moreover, it is also appropriate to have a one lag because the analysis is done for the yearly data.

5. Results and Discussion

The estimation of the PCONT model first needs to examine the unit-root properties of times series variables in the system. It is imperative to mention here that the analysis of the variables is carried out at their logarithmic value. The result of unit root tests for all the variables used in the PCONT is given in the Table 4. It shows that all the four variables namely FDI, EX, W and IR are non-stationary at their log level. These variables are stationary at their first difference and are integrated of order one i.e. I (1). Thus, in order to carry out the analysis, all the variables are made stationary by differentiating once. The lag lengths of the variables, as mentioned earlier, are decided by taking into the statistical logic of the model. Given that the number of variables included in the PCONT and the time dimension of the time series, the system cannot be tested for a lag length more than one[5]. Confirming the variables are stationary at their first difference, the PCONT model is estimated with the first difference of all variables. The analysis included computation of individual sector-

[4] For details, see Pedroni 1999.

[5] If lag length is *k,* each of the *n* equation in the system will contain *nk+1* coefficients. In the present case, with 13 data points, the maximum lag-length can be one, in which case PCONT will have to estimate 6 coefficients.

wise Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS), Panel Group FMOLS and Panel Co-integration.

The results of the individual FMOLS are presented in Table 5. The results show that FDI has a co-integrating relation with GO in five sectors such as PF, EL, FP, TE and IN. It shows that there is a negative relation between these two variables in sectors like PF and TR. This implies that the FDI inflows into these two sectors have a deterrent effect on the gross output of these sectors. However, the results show a positive co-integrating relation between FDI and GO in the sectors like FP, TE and IN. This may be due to the advent of better technology through FDI, in these sectors, which has helped them to grow at a faster rate. On the contrary, FDI has a negative relationship with EX in three sectors namely, TR, CH and FP. However, there is no positive relation between EX and FDI in any other sectors. This may be due to the export requirement policy of the government. Thus, if the government is persisting with its policy of export compulsion at least in these sectors, the goal cannot be achieved, as FDI does not promote EX in these sectors. As far as the co-integrating relation between FDI and LPR is concerned, the result shows that two sectors, *i.e.*, TR and ME have a positive co-integrating relationship whereas two sectors i.e. FP and IN have a negative co-integrating relationship. The positive relationship implies that FDI has helped to raise the LPR in the two sectors and thus it will be appropriate to encourage FDI in these two sectors. But the negative relationship of FDI and LPR in the two sectors calls for a judicious wage rate in the sectors, since FDI is supposed to raise the LPR.

The result of the individual sector-wise DOLS has been presented in Table 6. The result shows that FDI has a positive co-integrating relationship with the other variables like GO, EX and LPR in two sectors namely, TR and ME, whereas it has a negative co-integrating relationship in two other sectors i.e. FP and IN. This implies that FDI has a positive contribution in transport and metallurgical sectors, but it has affected the food-processing sector and the industrial machinery sector adversely. There is the absence of any co-integrating relation in other sectors. The result of the Panel FMOLS also suggests that the flow of FDI has not helped to raise the GO and LPR, rather it has an adverse impact on the export of all the sectors (Table 7). The panel co-integration result also reveals that there is no significant co-integrating relationship among the variables like FDI, GO, EX and LPR in all the nine sectors

(Table 8). This implies that when there is an increase in the output, export or labour productivity of the sectors it is not due to the advent of FDI. Thus, it could be concluded that the advent of FDI has not helped to wield a positive impact on the Indian economy at the sectoral level. In the overall analysis, it can be observed that the flow of FDI into the sectors has helped to raise the output, labour productivity and export in some sectors but a better role of FDI at the sectoral level is still expected. It also shows from the result of the PCONT that a very minimal relation in these variables (output, labour productivity and export) is established by the FDI inflows into the sectors.

6. Conclusion

It can be observed from the above analysis that at the sectoral level of the Indian economy, FDI has helped to raise the output, productivity and export in some sectors. However, it can be observed from the result of the PCONT that a very minimal relation in these variables (output, labour productivity and export) is established by the FDI inflows into the sectors. This may be due to the low flow of FDI into India both at the macro level as well as at the sectoral level. It implies that the spirit in which the economy has been liberalized and exposed to the world economy at the late eighties and early nineties has not been achieved after so many years. This calls for a judicious policy decision towards FDI at the sectoral level. Therefore, in the eve of India's plan for further opening up of the economy, it is advisable to open up the export oriented sectors and a higher growth of the economy could be achieved through the growth of these sectors.

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Table 1: Foreign Direct Investment and its share to GDP in India from 1991-2003

Years	**FDI Inflows**	**Annual Growth Rate[@]**	**FDI as % of GDP[@]**
1991	3,514.30		0.62
1992	6,751.80	0.92	1.03
1993	17,877.10	1.65	2.39
1994	32,892.80	0.84	3.83
1995	68,200.30	1.07	6.75
1996	103,892.00	0.52	8.79
1997	164,253.30	0.58	12.00
1998	133,398.40	-0.19	8.76
1999	168,677.90	0.26	9.69
2000	193,417.40	0.15	9.99
2001	192,651.00	0.00	9.16
2002	212,859.70	0.10	9.27
2003	143,009.40	-0.33	6.36

Notes: @ author's computations. FDI figures are cumulative total for the period
Source: Reserve Bank of India, (ECD) Central Office, Mumbai, India

Table 2: Share of top investing countries in FDI inflows

(Rupees in crore/ US $ in million)

Country	1991-1999*	% to the Total FDI	2000	% to the Total FDI	2001	% to the Total FDI	2002	% to the Total FDI	2003	% to the Total FDI
Mauritius	124,659.00	30.12	35,686.50	35.36	75,036.10	47.37	72,844.60	45.18	25,859.30	26.95
USA	83,542.30	20.19	17,993.10	17.83	16,541.30	10.44	13,572.00	8.42	19,040.00	19.84
Japan	29,693.70	7.18	9,856.90	9.77	9,965.40	6.29	19,804.60	12.28	4,343.90	4.53
UK	22,279.00	5.38	2,814.80	2.79	12,840.20	8.11	16,988.10	10.54	8,629.00	8.99
Netherlands	21,743.30	5.25	5,468.00	5.42	10,315.50	6.51	7,475.60	4.64	11,618.80	12.11
Germany	23,510.80	5.68	3,714.70	3.68	5,981.30	3.78	6,629.30	4.11	3,625.00	3.78
Korea (South)	20,920.90	5.06	761.70	0.75	203.00	0.13	1,814.40	1.13	1,128.60	1.18
Singapore	12,393.20	2.99	5,015.20	4.97	1,606.60	1.01	2,262.30	1.40	1,680.50	1.75
France	9,638.10	2.33	3,415.80	3.38	5,951.30	3.76	5,301.50	3.29	1,624.50	1.69
Switzerland	7,951.20	1.92	1,872.20	1.86	1,780.20	1.12	2,516.90	1.56	4,289.60	4.47
Total of all countries (in Indian Rupees)	413,806.40	-	100,923.80	-	158,418.00	-	161,233.60	-	95,960.40	-
Total of all countries (in US$)	11,489.70		2,347.00		3,520.40		3,359.00		2,079.10	

Notes: Figures are from August 1991 to December 1999 and January to December for the rest of the years.
Total amount includes FDI inflows received through Foreign Investment Promotion Board (FIPB), Secretariat of Industrial Assistance (SIA) and

Table 3: Top Sectors attracting highest FDI inflows in India

(Rupees in crore/ US $ in million)

Sector	FDI stock (1991-1999)	% of FDI stock (1991-1999)	2000 -2003	% of FDI stock (2000-2003)	FDI stock (1991-2003)	% of FDI stock (1991-2003)
Electrical Equipments (including IT and Electronics)	46,424.75	11.22	78,033.98	15.12	124,469.95	13.38
Transportation Industry	51,520.67	12.45	62,376.65	12.08	113,897.32	12.25
Telecommunications	40,376.82	9.76	65,890.19	12.76	106,267.01	11.43
Power and Fuels	36,433.77	8.80	60,747.11	11.77	97,180.88	10.45
Service Sector (financial and non-financial)	40,443.49	9.77	39,398.72	7.63	79,842.21	8.58
Chemicals (other than fertilizers)	39,861.28	9.63	16,981.39	3.29	56,842.67	6.11
Food processing industries	23,676.92	5.72	17,627.75	3.41	41,304.67	4.44
Drugs & Pharmaceuticals	8,221.75	1.99	11,465.47	2.22	19,687.22	2.12
Metallurgical industries	6,333.34	1.53	5,711.86	1.11	12,045.20	1.30
Textiles	8,293.49	2.00	3,323.44	0.64	11,616.93	1.25
Industrial machinery	3,627.90	0.88	2,719.95	0.53	6,347.85	0.68
Total FDI inflows (in Indian Rupees)	413,806.40	73.76	516,215.80	70.57	930,022.20	71.99
Total FDI inflows (in US $)	11,489.70	-		-	22,795.20	-

Table 4: Unit-root Test Results for Variables for PCONT

Variables	ADF	
	Level	First Difference
LFDI	-4.21	-7.91
LGO	-2.72	-5.92
LEX	-0.65	-3.24
LLPR	-1.33	-3.36

Note: The unit root test regressions include the intercept and trend.
The critical values for ADF test at 1%, 5% and 10% are –4.06, -3.46, and –3.15 respectively.

Table 5: Individual Sector-wise FMOLS

Sectors	Coefficient of GO	Coefficient of EX	Coefficient of LPR
PF	-4.92 (-2.62)	1.02 (0.05)	3.16 (1.22)
EL	-4.33 (-1.09)	6.93 (1.00)	-0.08 (-0.33)
TR	-1.04 (-2.06)	-1.50 (-2.80)	3.29 (2.30)
CH	-2.88 (-1.52)	-1.74 (-4.71)	3.35 (0.69)
FP	4.59 (2.64)	-1.77 (-4.00)	-3.62 (-2.46)
ME	-0.38 (-1.05)	-0.26 (-0.79)	4.58 (2.39)
DP	2.13 (0.83)	3.22 (1.79)	0.63 (-0.23)
TE	7.33 (2.36)	1.44 (0.67)	1.92 (0.33)
IN	5.46 (2.66)	0.74 (-0.13)	-5.96 (-3.63)

Note: Figures in parenthesis are t-statistics

Table 6: Individual Sector-wise DOLS

Sectors	DOLS
PF	3.16 (1.22)
EL	-0.08 (-033)
TR	3.29 (2.03)
CH	3.35 (0.69)
FP	-3.62 (-2.46)
ME	4.58 (2.39)
DP	0.63 (-0.23)
TE	1.92 (0.33)
IN	-5.96 (-3.63)

Note: Figures in parenthesis are t-statistics

Table 7: Panel Group FMOLS Result

Coefficient of GO	Coefficient of EX	Coefficient of LPR
0.66 (0.04)	0.90 (-3.05)	0.81 (0.00)

Note: Figures in the parenthesis are the t-statistics

Table 8: Panel Co-integration Result

Panel rho-stat	0.30
Panel PP-stat	-7.12
Panel ADF-stat	-5.58

Note: The critical values for Panel rho-stat, PP-stat and ADF-stat are 1.36, -10.03 and -7.58 respectively.