CHAPTER – 4
FDI AND PERFORMANCE OF INDIAN ECONOMY
4. INTRODUCTION

India’s increasing openness to FDI, especially after the New Industrial Policy (NIP) announced in 1991, has contributed significantly to its growth performance. The Indian government’s attitude towards foreign investment has been changing in the post-liberalisation period. In the 1990s, the policy was liberalized further and made more open and transparent. Beginning July 1991, The Indian government introduced a number of changes in regulatory policies under the general acceptance of the policy package known widely as the structural adjustment program (SAP). In the recent period, a number of measures have been taken to further promote FDI. These include raising the foreign ownership to 100 percent in most of the sector, ending state monopoly in insurance and telecommunications, opening up of banking and manufacturing to competition and disinvestment of state ownership in public sector undertakings (PSUs). Though the foreign companies investing in India have performed better than the domestic companies, FDI to India has been attracted mainly by the lure of the large market. In mid-January 2004, the Central Government reviewed FDI limits in several sectors, including banking, petroleum and natural gas to create an enabling environment for FDI inflows. In case of private sector banks, for example, the FDI limit has been hiked to 74 percent. Concurrently, overseas investments in joint ventures (JVs) and Wholly Owned Subsidiaries (WOSs) have been recognized as important avenues for promoting global business by Indian entrepreneurs.

Attracting FDI has become an integral part of the economic development strategies for India. FDI ensure huge amount of domestic capital, production level, and employment opportunities in the developing countries, which is a major step towards the economic growth of the country. FDI has been a booming factor that has bolstered the economic life of India. The effects of FDI are by and large transformative. The incorporation of a range of well-composed and relevant policies will boost up the profit ratio from FDI (Annual Report of DIPP, 2006-07).

Here, we have tried to evaluate the impact of FDI inflows on different sectors of Indian economy during the era of globalization. The main objective of this study is to measure the impact of FDI inflows on economic growth of India.
4.1 IMPACT OF FDI ON ECONOMIC GROWTH

To measure the impact of FDI inflows on economic growth of India, we have used the variables such as: Gross Domestic Product (GDP), Foreign Exchange Reserves (FER), Exports, Imports and Balance of Trade (BOT).

4.1.1 FDI AND GROSS DOMESTIC PRODUCT (GDP)

<table>
<thead>
<tr>
<th>Year</th>
<th>FDI Inflow</th>
<th>Rs. Crore</th>
<th>% Change</th>
<th>GDP</th>
<th>Rs. Crore</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>409</td>
<td></td>
<td>-</td>
<td>1099072</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>1992-93</td>
<td>1094</td>
<td></td>
<td>167.48</td>
<td>1158025</td>
<td></td>
<td>5.3639</td>
</tr>
<tr>
<td>1993-94</td>
<td>2018</td>
<td></td>
<td>84.4606</td>
<td>1223816</td>
<td></td>
<td>5.6813</td>
</tr>
<tr>
<td>1994-95</td>
<td>4312</td>
<td></td>
<td>113.6769</td>
<td>1302076</td>
<td></td>
<td>6.3948</td>
</tr>
<tr>
<td>1995-96</td>
<td>6916</td>
<td></td>
<td>60.389</td>
<td>1396974</td>
<td></td>
<td>7.2882</td>
</tr>
<tr>
<td>1996-97</td>
<td>9654</td>
<td></td>
<td>39.589</td>
<td>1508378</td>
<td></td>
<td>7.9747</td>
</tr>
<tr>
<td>1997-98</td>
<td>1354</td>
<td></td>
<td>-85.974</td>
<td>1573263</td>
<td></td>
<td>4.3016</td>
</tr>
<tr>
<td>1998-99</td>
<td>12343</td>
<td></td>
<td>811.595</td>
<td>1678410</td>
<td></td>
<td>6.6834</td>
</tr>
<tr>
<td>1999-00</td>
<td>10311</td>
<td></td>
<td>-16.4627</td>
<td>1786526</td>
<td></td>
<td>6.4416</td>
</tr>
<tr>
<td>2000-01</td>
<td>12645</td>
<td></td>
<td>22.6360</td>
<td>1864301</td>
<td></td>
<td>4.3534</td>
</tr>
<tr>
<td>2001-02</td>
<td>19361</td>
<td></td>
<td>53.1119</td>
<td>1972606</td>
<td></td>
<td>5.8094</td>
</tr>
<tr>
<td>2002-03</td>
<td>14932</td>
<td></td>
<td>-22.875</td>
<td>2048286</td>
<td></td>
<td>3.8365</td>
</tr>
<tr>
<td>2003-04</td>
<td>12117</td>
<td></td>
<td>-18.8521</td>
<td>2222758</td>
<td></td>
<td>8.5180</td>
</tr>
<tr>
<td>2004-05</td>
<td>17138</td>
<td></td>
<td>41.4376</td>
<td>2388768</td>
<td></td>
<td>7.4686</td>
</tr>
<tr>
<td>2005-06</td>
<td>24613</td>
<td></td>
<td>43.62</td>
<td>2616101</td>
<td></td>
<td>9.5167</td>
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<tr>
<td>2006-07</td>
<td>70630</td>
<td></td>
<td>186.96</td>
<td>2871118</td>
<td></td>
<td>9.7480</td>
</tr>
<tr>
<td>2007-08</td>
<td>98664</td>
<td></td>
<td>39.69</td>
<td>3129717</td>
<td></td>
<td>9.0069</td>
</tr>
</tbody>
</table>

Source : (i) RBI, (ii) SIA, Newsletter

In general terms, FDI inflow has a positive impact on the growth of GDP in India.

Data presented in Table 4.1 reveals that FDI inflow increased by more than 240 times during 1991 – 92 to 2007 – 08 despite some fluctuations in 1997 – 98, 2002 – 03, 2003 – 04, GDP has increased by about three times during the same period.

\[ \log GDP = \log \beta_1 + \log \beta_2 \text{ FDI Inflow} \]
log GDP = 12.5825 + 0.200422 FDI Inflow

SE = (0.225623) (0.0246591)

t = (55.768) (8.128)

R = 0.9027 R^2 = 0.8149 R^2 = 0.8026 df = 15

A log linear (Ordinary Least Square) OLS model shows that GDP will certainly grow with the growth in FDI Inflow. The above results confirm theoretical expectations. Regression of GDP on FDI inflow shows that R^2 = 0.8149 ad R^2 = 0.8026. These values show that the model has high explanatory power. It explains that over 80 percent of the variation in GDP is a result of inflow of FDI. Here high correlation between GDP and FDI inflow R = 0.9027 also validate our hypothesis that higher the FDI, higher will be the GDP. Since the value of R^2 and R^2 are almost the same, the model is fitted.

4.1.2 FDI AND FOREIGN EXCHANGE RESERVES (FER)

FDI inflows are being increasingly seen as a means of supplementing foreign aid flows and borrowing for bridging the balance of payments gap. During 2003-04, India experienced an all-time high reserve accumulation of US $ 36.9 billion (including valuation changes, gold, SDR and the reserve position at the IMF).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total FDI Inflows</th>
<th>Foreign Exchange Reserves (US $ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>133</td>
<td>9220</td>
</tr>
<tr>
<td>1992-93</td>
<td>559</td>
<td>9832</td>
</tr>
<tr>
<td>1993-94</td>
<td>4153</td>
<td>19254</td>
</tr>
<tr>
<td>1994-95</td>
<td>5138</td>
<td>25186</td>
</tr>
<tr>
<td>1995-96</td>
<td>4892</td>
<td>21687</td>
</tr>
<tr>
<td>1996-97</td>
<td>6133</td>
<td>26423</td>
</tr>
<tr>
<td>1997-98</td>
<td>5385</td>
<td>29367</td>
</tr>
<tr>
<td>1998-99</td>
<td>2401</td>
<td>32490</td>
</tr>
<tr>
<td>1999-00</td>
<td>5181</td>
<td>38036</td>
</tr>
<tr>
<td>2000-01</td>
<td>6789</td>
<td>42281</td>
</tr>
<tr>
<td>2001-02</td>
<td>8151</td>
<td>54106</td>
</tr>
<tr>
<td>Year</td>
<td>FDI Inflow</td>
<td>FER</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>2002-03</td>
<td>6014</td>
<td>75428</td>
</tr>
<tr>
<td>2003-04</td>
<td>15699</td>
<td>112959</td>
</tr>
<tr>
<td>2004-05</td>
<td>15366</td>
<td>141514</td>
</tr>
<tr>
<td>2005-06</td>
<td>21453</td>
<td>151622</td>
</tr>
<tr>
<td>2006-07</td>
<td>29829</td>
<td>199179</td>
</tr>
<tr>
<td>2007-08</td>
<td>63757</td>
<td>309723</td>
</tr>
<tr>
<td>2008-09</td>
<td>19758</td>
<td>251985</td>
</tr>
</tbody>
</table>

Cumulatively foreign exchange reserves rose to all time high at US $ 314.61 billion in May 2008-09. A comparative analysis vis-à-vis FDI inflow and foreign exchange reserves shows that large accentuation of foreign exchange reserves is a direct result of FDI inflow in India during 1991-2008. Table 4.2 gives the data of foreign exchange reserve and FDI inflow from 1991-92 to 2008-09. As per data from the Table 4.2, a OLS model is presented as under

\[
\log \text{FER} = \log \beta_1 + \log \beta_2 \text{ FDI Inflow}
\]

\[
\log \text{FER} = 4.97994 + 0.671077 \text{ FDI Inflow}
\]

SE = (0.225623) (0.0246591)

\( t = (55.768) \quad (8.128) \)

\( R = 0.88 \quad R^2 = 0.790 \quad R^2 = 0.777 \quad df = 16 \)

In general terms, FDI inflow has a positive impact on the growth of foreign exchange reserves. The log linear model shows that Foreign Exchange Reserves will certainly grow with the growth in FDI Inflow. The above results confirm the theoretical expectations. Regression of FER on FDI Inflow shows that \( R^2 = 0.790 \) and \( R^2 = 0.777 \). This shows that model has high explanatory power. It explains over 75 percent of the variation. Its high correlation between FER and FDI Inflow \( R = 0.88 \) also validate our hypothesis that higher the FDI, higher will be the FER. Since the values of \( R^2 \) and are almost the same, the model is fitted.
### Table 4.3

<table>
<thead>
<tr>
<th>Year</th>
<th>FDI Inflows (US$ millions)</th>
<th>Exports (including re-exports) (US$ millions)</th>
<th>Imports (US$ millions)</th>
<th>BOT (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>129</td>
<td>17865</td>
<td>19411</td>
<td>-1546</td>
</tr>
<tr>
<td>1992-93</td>
<td>315</td>
<td>18537</td>
<td>21882</td>
<td>-3345</td>
</tr>
<tr>
<td>1993-94</td>
<td>586</td>
<td>22238</td>
<td>23306</td>
<td>-1068</td>
</tr>
<tr>
<td>1994-95</td>
<td>1314</td>
<td>26330</td>
<td>28654</td>
<td>-2324</td>
</tr>
<tr>
<td>1995-96</td>
<td>2144</td>
<td>31797</td>
<td>36678</td>
<td>-4881</td>
</tr>
<tr>
<td>1996-97</td>
<td>2821</td>
<td>33470</td>
<td>39133</td>
<td>-5663</td>
</tr>
<tr>
<td>1997-98</td>
<td>3557</td>
<td>35006</td>
<td>41484</td>
<td>-6478</td>
</tr>
<tr>
<td>1998-99</td>
<td>2462</td>
<td>33218</td>
<td>42389</td>
<td>-9171</td>
</tr>
<tr>
<td>1999-00</td>
<td>2155</td>
<td>36822</td>
<td>49671</td>
<td>-12849</td>
</tr>
<tr>
<td>2000-01</td>
<td>4029</td>
<td>44560</td>
<td>50536</td>
<td>-5976</td>
</tr>
<tr>
<td>2001-02</td>
<td>6130</td>
<td>43827</td>
<td>51413</td>
<td>-7586</td>
</tr>
<tr>
<td>2002-03</td>
<td>5035</td>
<td>52719</td>
<td>61412</td>
<td>-8693</td>
</tr>
<tr>
<td>2003-04</td>
<td>4322</td>
<td>63843</td>
<td>78149</td>
<td>-14306</td>
</tr>
<tr>
<td>2004-05</td>
<td>6051</td>
<td>83536</td>
<td>111517</td>
<td>-27981</td>
</tr>
<tr>
<td>2005-06</td>
<td>8961</td>
<td>103091</td>
<td>149166</td>
<td>-46075</td>
</tr>
<tr>
<td>2006-07</td>
<td>22826</td>
<td>126414</td>
<td>185735</td>
<td>-59321</td>
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<tr>
<td>2007-08</td>
<td>34835</td>
<td>163132</td>
<td>251654</td>
<td>-88522</td>
</tr>
<tr>
<td>2008-09</td>
<td>35180</td>
<td>185295</td>
<td>303696</td>
<td>-118401</td>
</tr>
</tbody>
</table>

Source: (i) RBI's Bulletin (FDI inflows)
(ii) Economic survey of Government of India, 2009-10 (Export & Import)
Table 4.4
Results for the correlation co-efficient and regression equations of Export and FDI, and Import and FDI

<table>
<thead>
<tr>
<th></th>
<th>X-Y₂</th>
<th>X-Y₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Correlation Co-efficient</td>
<td>0.96</td>
<td>0.97</td>
</tr>
<tr>
<td>Regression Line a</td>
<td>27755.72</td>
<td>28174.789</td>
</tr>
<tr>
<td>Regression b</td>
<td>4.3550</td>
<td>7.2717</td>
</tr>
<tr>
<td>t-statistic</td>
<td>13.7142</td>
<td>15.9605</td>
</tr>
</tbody>
</table>

Correlation is significant at the 0.01 level (t₀.₀₁ = 2.921)

4.1.3.1 Impact of FDI inflows on Exports

There is a positive impact of FDI inflows on exports of India. This has been tested through the following hypothesis:

H₀ = FDI inflows does not have any impact on the exports of India.

H₁ = FDI inflows does have impact on the exports of India.

The correlation between FDI inflows and exports of India is significant as it is clear from the table 4.4 where the value of r is 0.96 which is very close to 1. Hence the null hypothesis is rejected. That is also seen in table 4.3 which shows a positive and strong relationship between the level of exports and the scale of FDI inflows. The coefficient of exports is positive and statistically significant at one per cent level, indicating clearly a positive relationship between exports and FDI inflows.

The regression line is

Y₂ = a + bX

Y₂ = 27755.72 + 4.3550 X

The regression coefficient of Y₂ on X is 4.3550. This indicates that a dollar increases in FDI inflows results into increase in the exports by 4.3550 dollar. From the above regression analysis, it can also be inferred that FDI has had stronger positive relation with the exports volume in India. This is quite in tune with common knowledge that FDI has led to the growth of the IT industry and also as a low cost manufacturing hub. The exports have followed the
FDI over many years and gradually have scored higher than FDI in India. The net inference is that FDI in India has fuelled more exports in India first and then indirectly impacted the GDP of India.

### 4.1.3.2 Impact of FDI inflows on Imports

There is a positive impact of FDI inflows on imports of India. This has been tested through the following hypothesis:

- $H_0$: FDI inflows does not have any impact on the imports of India.
- $H_1$: FDI inflows does have impact on the imports of India.

The correlation between FDI inflows and imports of India is significant as it is clear from the table 4.4 where the value of $r$ is 0.97 which very close to one. Hence, the null hypothesis is rejected. That is also seen in table 4.3 which shows a positive and strong relationship between the level of imports and the scale of FDI inflows. The coefficient of imports is positive and statistically significant at one per cent level, indicating clearly a positive relationship between imports and FDI inflows.

The regression line is

$$ Y_3 = a + bX $$

$$ Y_3 = 28174.789 + 7.2717 X $$

The regression coefficient of $Y_3$ on $X$ is 7.2717. This indicates that a dollar increases in FDI inflows results into increase in the imports by 7.2717 dollar. From the above regression analysis, it can also be inferred that FDI has had stronger positive relations with the import volume in India.

Thus, it signifies that FDI inflows enhance the imports to the country. As it is evident that FDI may contribute to India's economic growth by augmenting the countries capital stock, introducing complementary inputs, inducing technology transfer and skill acquisition and increasing competition in the local industries. Of course, FDI may also inhibit competition and thus hamper growth, especially if the host country government affords extra protection to foreign investors in the process of attracting their capital.

To analyse further the joint impact of FDI on Import and Export, we have taken BOT (Balance of Trade) instead of Import and Export. We have used Granger Causality test (Table 4.5) to find the empirical relationship and also used graphical representation (Chart 4.1) for clear understanding the true relationship.
In order to empirically test the relationship between FDI and BOT we applied the Granger-Causality test which shows that FDI has a significant influence on BOT of India and the graphical representation also shows that FDI and BOT are inversely related.

4.2 IMPACT OF FDI ON DIFFERENT SECTORS

Foreign Direct Investment in India has a positive impact on the economy as a whole. But, its impact on various individual sectors varies in nature and content. An attempt has been made to assess the impact of FDI on certain key industries of the economy. The analysis is
based upon simple Karl Pearson’s correlation index. Since the data of different sector are heterogeneous and with different units of measurement, so the only comparable indicator is correlation index (Table 4.6).

### 4.2.1 SERVICE SECTOR

Service sector is a rapidly growing sector of Indian economy. It comprises of trade and commerce, banking and insurance, hotels and restaurants, real estate and business services, etc., it is also the sector which has attracted the highest amount of FDI inflow since 1991. Collectively, telecommunication sector is also a part of service sector, but for the purpose of analyzing the impact of FDI on various sectors, telecommunication sector has been studied separately.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Different Sectors</th>
<th>Correlation</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FDI inflow into service sector and growth rate of service sector</td>
<td>0.72447508</td>
<td>2.57448</td>
</tr>
<tr>
<td>2.</td>
<td>FDI inflow in Telecommunication Sector and teledensity</td>
<td>0.59051333</td>
<td>1.79233</td>
</tr>
<tr>
<td>3.</td>
<td>FDI inflow in Drugs &amp; Pharmaceutical sector and Export of drugs and pharmaceuticals</td>
<td>0.61005061</td>
<td>1.8859</td>
</tr>
<tr>
<td>4.</td>
<td>FDI inflow into Transport Equipment Sector and Index of Industrial Production of Transport Equipment Sector</td>
<td>0.52242484</td>
<td>1.50076</td>
</tr>
<tr>
<td>5.</td>
<td>FDI into Metallurgical Sector and Index of Industrial Production of Basic Metals and Allow Industries</td>
<td>0.94725988</td>
<td>7.24039</td>
</tr>
</tbody>
</table>

India service sector registered an average growth rate of 7.73 percent during 1999-2007, as compared to 6.8 percent growth registered by manufacturing, construction, electricity, gas and water supply sector. Share of services sector in the GDP of the country increased to more than 55 percent. During the last decade service sector attracted huge amount of FDI during 1999-2007 period. Total FDI inflow into service sector increased to an in record level of Rs. 178584.7 million in 2005-06 from a meager amount of Rs 1861.5 million. It slightly decreased in the subsequent year Rs. 143776.22 million; thus, FDI inflow
into service sector grew by about 96 times. Policy changes regarding the cap on FDI in various segments of service sector encouraged foreign investors to invest heavily in India. Many green field projects came up under FDI.

<table>
<thead>
<tr>
<th>TABLE 4.7</th>
<th>Growth of Service Sector of Indian Economy and FDI Inflow into Service Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Service Sector</td>
</tr>
<tr>
<td>1990-00</td>
<td>5.20</td>
</tr>
<tr>
<td>2000-01</td>
<td>6.51</td>
</tr>
<tr>
<td>2001-02</td>
<td>6.64</td>
</tr>
<tr>
<td>2002-03</td>
<td>7.13</td>
</tr>
<tr>
<td>2003-04</td>
<td>8.59</td>
</tr>
<tr>
<td>2004-05</td>
<td>9.93</td>
</tr>
<tr>
<td>2005-06</td>
<td>10.02</td>
</tr>
<tr>
<td>2006-07</td>
<td>9.95</td>
</tr>
</tbody>
</table>


As a result of this large inflow the service sector registered higher growth rates. Karl Pearson’s coefficient of correlation between growth rate of service sector and FDI inflow into this sector shows that growth rate and FDI inflow are positively correlated very effectively (0.724). Entry of foreign players in aviation sector created world class services at New Delhi, Mumbai and Hyderabad airports. Likewise foreign insurance companies expanded the insurance sector and broke the huge monopoly of public sector giant LIC. FDI has a positive impact on the growth of service sector of Indian economy not only in terms of growth rates but also in the form of generation of high quality services.

4.2.2 TELECOMMUNICATION SECTOR

Telecommunication sector is one of the fastest growing sectors of the Indian economy. Government of India liberalized the rules and regulations that allowed private investors to invest in this sector. FDI cap increased to 74 percent in telecom sector through FIPB route created suitable condition for FDI inflow International giant such as Vodafone and Aircel, etc. have entered into the arena.
### TABLE 4.8
Growth of Telecommunication Sector in India and FDI Inflow into Telecom Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>Wire Line (phone in Lakhs)</th>
<th>Wire Less (phone in Lakhs)</th>
<th>Total (phone in Lakhs)</th>
<th>Tele Density</th>
<th>FDI Inflow into Telecom, (in Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 Mar. 2000</td>
<td>265.10</td>
<td>18.80</td>
<td>283.9</td>
<td>2.79</td>
<td>6855.41</td>
</tr>
<tr>
<td>31 Mar. 2001</td>
<td>324.40</td>
<td>35.80</td>
<td>360.20</td>
<td>3.48</td>
<td>42671.49.</td>
</tr>
<tr>
<td>31 Mar. 2002</td>
<td>379.80</td>
<td>64.30</td>
<td>444.10</td>
<td>4.22</td>
<td>9090.70</td>
</tr>
<tr>
<td>31 Mar. 2003</td>
<td>406.20</td>
<td>126.90</td>
<td>533.10</td>
<td>4.99</td>
<td>7272.59</td>
</tr>
<tr>
<td>31 Mar. 2004</td>
<td>425.80</td>
<td>336.00</td>
<td>761.80</td>
<td>7.01</td>
<td>6787.84</td>
</tr>
<tr>
<td>31 Mar. 2005</td>
<td>459.10</td>
<td>522.10</td>
<td>981.20</td>
<td>8.82</td>
<td>9639.13</td>
</tr>
<tr>
<td>31 Mar. 2006</td>
<td>728.94</td>
<td>691.98</td>
<td>1420.92</td>
<td>12.74</td>
<td>43541.09</td>
</tr>
<tr>
<td>31 Mar. 2007</td>
<td>407.74</td>
<td>1660.54</td>
<td>2068.28</td>
<td>18.31</td>
<td>43541.50</td>
</tr>
</tbody>
</table>

The total number of telephone connections increased from 283.9 lakhs on 31st March 2000 to 2068.8 lakhs as on 31st March 2007. Teledensity increased from 2.79 to 18.31 during the same period. Quantum of FDI into telecom sector jumped from Rs. 6855.41 million in 1999-2000 to Rs. 43541.5 million in 2006-07.

Coefficient of correlation between FDI inflow into telecom sector and teledensity (An effective parameter of growth of telecom sector) is 0.5905 which shows positive impact of FDI inflow on the growth of telecom sector.
4.2.3 DRUGS AND PHARMACEUTICAL SECTOR

Drugs and pharmaceuticals sector is another sector of Indian economy with high potentials for growth. Data regarding production on a combined basis is not available; however, export data about this sector are available. For the purpose of analysis export figures have been used for this sector.

Coefficient of correlation between FDI inflow into Drugs and Pharmaceuticals sector and export from this sector is 0.61 which establishes that FDI inflow has a positive impact on the performance of this sector.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export (in US $ million)</th>
<th>FDI Inflow into drugs and Pharmaceutical (in Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-00</td>
<td>1343.4</td>
<td>2079.88</td>
</tr>
<tr>
<td>2000-01</td>
<td>1614.0</td>
<td>4081.79</td>
</tr>
<tr>
<td>2001-02</td>
<td>1733.3</td>
<td>2510.52</td>
</tr>
<tr>
<td>2002-03</td>
<td>2226.3</td>
<td>2793.28</td>
</tr>
<tr>
<td>2003-04</td>
<td>2324.8</td>
<td>15711.08</td>
</tr>
<tr>
<td>2004-05</td>
<td>2767.5</td>
<td>5107.25</td>
</tr>
<tr>
<td>2005-06</td>
<td>3250.8</td>
<td>9757.29</td>
</tr>
<tr>
<td>2006-07</td>
<td>4076.3</td>
<td>11405.68</td>
</tr>
</tbody>
</table>

Source: India Trades, CMIE Report.
However, the findings are a little misleading as a large chunk of FDI inflow into this sector was through acquisitions, rather than in green field projects.

### 4.2.4 TRANSPORTATION SECTOR

Transportation industry comprises of manufacturing of two wheelers, three-wheelers, four wheelers and means of mass transport system. Transportation industry received Rs. 51520.62 million FDI during Aug. 1991 to Dec. 1999 which was 12.37 percent of total FDI inflow into India. FDI into this sector increased to Rs. 21242.48 million in 2002 and declined in subsequent years reaching at the lowest level of Rs. 8063.68 million in 2004.

FDI inflows in transportation industry have shown a rising trend therefore and reached record level in 2007 of Rs. 33486.9 million. Thus, cumulatively total FDI inflow into transportation industry during Aug. 1991 to Dec. 2007 was Rs. 183411.52 million which is 7.54 percent of total FDI inflow.

FDI inflow into transportation industry has a positive impact on the growth of transportation equipment sector.

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of Industrial Production (base 1993-94= 100)</th>
<th>FDI Inflow in Transportation Industry (in Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-00</td>
<td>194.1</td>
<td>12180.28</td>
</tr>
<tr>
<td>2000-01</td>
<td>190.3</td>
<td>13820.05</td>
</tr>
<tr>
<td>2001-02</td>
<td>203.3</td>
<td>21242.48</td>
</tr>
<tr>
<td>2002-03</td>
<td>232.9</td>
<td>15133.84</td>
</tr>
<tr>
<td>2003-04</td>
<td>272.6</td>
<td>8063.68</td>
</tr>
<tr>
<td>2004-05</td>
<td>283.7</td>
<td>9659.22</td>
</tr>
<tr>
<td>2005-06</td>
<td>319.7</td>
<td>18304.40</td>
</tr>
<tr>
<td>2006-07</td>
<td>367.7</td>
<td>33486.90</td>
</tr>
</tbody>
</table>


Index of Industrial Production (IIP) for transport equipment sector has increased from 194.1 (base 1993-94 = 100) in 1999-2000 to 367.7 in 2006-07, representing growth of 173.6
percentage point. Coefficient of correlation between IIP in transportation equipment sector and FDI inflow into transportation sector is 0.522 which shows a positive impact of FDI inflow on the growth of the sector.

4.2.5 METALLURGICAL SECTOR

FDI inflow into Metallurgical industry in India has increased many folds during Aug. 1991 to Dec. 2007. It stood at Rs. 6333.34 million for the entire period of Aug. 1991 to Dec. 1999 and was only 1.52 percent of total FDI inflow into India in a few region / sectors / states.

However, it jumped to Rs. 8553.79 million in 2004 (5.81 percent of total FDI) and further to Rs. 20298.6 million in 2007 (3.10 percent of total FDI). Cumulatively total FDI inflow into Metallurgical industry was Rs. 58242.35 million for the period Aug. 1991 to Dec. 2007 which is 2.4 percent of total FDI inflow into India during the same period.

<table>
<thead>
<tr>
<th>Year</th>
<th>Index of Industrial production Basic metals and alloy Industries (base 1993-94 =100)</th>
<th>FDI Inflow into Metallurgical Industry (in Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-00</td>
<td>146.9</td>
<td>655.95</td>
</tr>
<tr>
<td>2000-01</td>
<td>149.6</td>
<td>1505.8</td>
</tr>
<tr>
<td>2001-02</td>
<td>156.0</td>
<td>2095.59</td>
</tr>
<tr>
<td>2002-03</td>
<td>170.4</td>
<td>1454.52</td>
</tr>
<tr>
<td>2003-04</td>
<td>186.0</td>
<td>8583.79</td>
</tr>
<tr>
<td>2004-05</td>
<td>196.1</td>
<td>9321.99</td>
</tr>
<tr>
<td>2005-06</td>
<td>227.0</td>
<td>7992.77</td>
</tr>
<tr>
<td>2006-07</td>
<td>278.9</td>
<td>20298.6</td>
</tr>
</tbody>
</table>


FDI inflow into Metallurgical industry gave boost to the industry. It is reflected in the growth of index of industrial Production of this sector. The IIP for Metallurgical industry was
146.9 (base 1993-94 = 100) in 1999-2000 which increased to 278.9 in 2006-07 registering a growth of 132 percentage points. The coefficient of correlation between IIP metallurgical industry and FDI inflow into this sector shows that FDI inflow has a positive impact on the growth of the industry.

4.3 EXAMINING THE RELATIONSHIP BETWEEN NSDP AND FDI BY APPLYING PANEL DATA REGRESSION ANALYSIS

We have used panel data regression model to highlight the relation between Net State Domestic Product and FDI. This model is used to highlight two different types of effects such as fixed and random effects. We have used the fixed cross sectional and time period effect as well as the random cross sectional effect. The results of fixed and random effects have been compared with the statistical tests such as Hausman Test. Hausman Test can be performed to examine whether the two equations of fixed and random effects are statistically different.

We have used the general form of Panel Regression using the following equation:

$$y_{it} = \beta_1 + \beta_2 x_{it} + u_{it}$$

Here, $y$ = Dependent Variable (i.e., Net State Domestic Product)

$x$ = Independent Variable (i.e., FDI)

$i$ = $i$ th cross-sectional unit (i.e., states 1, 2, 3….12)

$t$ = $t$ th time period (i.e., 2008, 2009 …2013)

The Eviews output is appended in the following tables which summarize the output for fixed and random effects respectively. The interpretation of the output has been mentioned in each of the output table. Other information such as period, number of cross sectional units and the number of independent variables along with the total number of observations are also available in the tables.

The value of $R^2$ cross-section fixed effect is 0.959002 which suggests that the relationship between the two variables is strong i.e., the variable FDI of the whole explains 95% of the variations in Net State Domestic Product. However, the sign of the co-efficient of the independent variable is negative indicating the negative relationship between the two variables. Therefore, we may say that FDI has produced negative impact on cross-state and cross-time Net State Domestic product. The possible explanation may be that with the more inflow of FDI in Indian economy Domestic Investment has been reduced. Thus the common trend is that Domestic Investment is being replaced by FDI.

We have applied Hausman Test which indicates the significant chi-square of 15.772143 with probability 0.0001 suggesting that the Fixed Effect Equation and Random Effect Equation are different. When there is a difference between the two, Fixed Effect Model (FEM) is usually selected as it is more appropriate than Random Effect Model (REM). Hence we have taken the result of FEM in interpreting the tables for decision making.
### Table 4.12 Cross-section random effects test equation

Dependent Variable: SDP  
Method: Panel Least Squares  
Date: 09/20/15   Time: 20:29  
Sample: 2008 2013  
Periods included: 6  
Cross-sections included: 12  
Total panel (balanced) observations: 72

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>2281.182</td>
<td>69.40438</td>
<td>32.86798</td>
<td>0.0000</td>
</tr>
<tr>
<td>FDI</td>
<td>-0.015726</td>
<td>0.007547</td>
<td>-2.083643</td>
<td>0.0415</td>
</tr>
</tbody>
</table>

### Table 4.13 Effects Specification

Cross-section fixed (dummy variables)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.959002</td>
<td>Mean dependent var</td>
<td>2166.824</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.950664</td>
<td>S.D. dependent var</td>
<td>1622.907</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>360.4753</td>
<td>Akaike info criterion</td>
<td>14.77471</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>7666606.</td>
<td>Schwarz criterion</td>
<td>15.18577</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-518.8894</td>
<td>Hannan-Quinn criter.</td>
<td>14.93835</td>
</tr>
<tr>
<td>F-statistic</td>
<td>115.0093</td>
<td>Durbin-Watson stat</td>
<td>0.567636</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.14 Cross-section random effects test equation

Dependent Variable: SDP
Method: Panel EGLS (Cross-section random effects)
Date: 09/20/15  Time: 20:32
Sample: 2008 2013
Periods included: 6
Cross-sections included: 12
Total panel (balanced) observations: 72
Swamy and Arora estimator of component variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>2223.542</td>
<td>335.8104</td>
<td>6.621421</td>
<td>0.0000</td>
</tr>
<tr>
<td>FDI</td>
<td>-0.007800</td>
<td>0.007279</td>
<td>-1.071573</td>
<td>0.2876</td>
</tr>
</tbody>
</table>

Table 4.15

<table>
<thead>
<tr>
<th>Effects Specification</th>
<th>S.D.</th>
<th>Rho</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>1139.275</td>
<td>0.9090</td>
</tr>
<tr>
<td>Idiosyncratic random</td>
<td>360.4753</td>
<td>0.0910</td>
</tr>
</tbody>
</table>

Weighted Statistics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.013364</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>-0.000730</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>396.6917</td>
</tr>
<tr>
<td>F-statistic</td>
<td>0.948175</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.333537</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean dependent var</th>
<th>277.5886</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.D. dependent var</td>
<td>396.5469</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>11015502</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>0.301714</td>
<td></td>
</tr>
</tbody>
</table>

Unweighted Statistics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>-0.086254</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>2.03E+08</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean dependent var</th>
<th>2166.824</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.D. dependent var</td>
<td>396.6997</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>2.03E+08</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>0.016361</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.16
Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>15.772143</td>
<td>1</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Cross-section random effects test comparisons:

<table>
<thead>
<tr>
<th>Cross Variable</th>
<th>Fixed</th>
<th>Random</th>
<th>Var(Diff.)</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI</td>
<td>-0.015726</td>
<td>-0.007800</td>
<td>0.000004</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

4.4 CONCLUSION

In this chapter we have attempted to measure the impact of FDI inflows on economic growth of India using variables like GDP, FER, Exports and Imports. It can be observed from the above analysis that FDI has helped to raise the GDP, FER, Export and Import of India.

The following explanation emerges from the above analysis that the foreign investor provides international marketing support which creates demand. Further the technical support from the foreign investors helps to increase per capita income which in turns increases the demand. Thus, to cater the demand, the productive activities also increase using new techniques of productions. The foreign investor also provides marketing support by marketing the production internationally which leads to increase the exports. FDI inflows enhance the imports to the country by augmenting the countries capital stock, introducing complementary inputs and inputs and inducing technology transfer. Thus, it signifies that FDI enhances the productivity of the country which leads to economic growth.

We have also attempted to examine the relationship between NSDP and FDI by applying Panel Data Regression Analysis. We surprisingly found that NSDP and FDI are negatively related. The possible explanation may be that with the increase in FDI inflows in Indian economy Domestic Investments deteriorated which indicates the Domestic Investment is being replaced by FDI.

Thus it can be said that the analysis of the data of FDI inflow and growth of the Indian economy in general and important industries in particular shows that FDI has a positive impact on the economy. However, this positive effect could be all the more widespread if the FDI is evenly distributed throughout the country and leads to inclusive growth rather than being concentrated.