CHAPTER V
OPERATING PERFORMANCE OF
SELECTED PHARMACEUTICAL COMPANIES IN INDIA

Introduction

This chapter attempts to evaluate the impact of globalisation on the Indian industries in terms of the operating performance of the selected pharmaceutical companies in India. The operating performance parameters are assuming importance in measuring the growth levels of performance and degree of profitability. Hence an attempt is made in this chapter to analyse the operating results of selected pharmaceutical companies. A comparative picture is also drawn among Indian, foreign and pooled companies by taking pre- and post-globalisation periods in respect of

1. Trends in the value added
2. Measuring the operating leverage
3. Determining production function
4. Operating efficiency- in terms of
   a) Cost responsiveness ratio
   b) Capital output ratio
   c) Capital turnover ratio
   d) Fixed assets turnover ratio
   e) Working capital turnover ratio
   f) Inventory turnover ratio
   g) Debtors turnover ratio and
5. The degree of profitability in terms of
   a) Operating profit ratio and
   b) Net profit ratio.

5.1 Trends in the value added

It is the measure of excess of value of goods and services produced by an industrial unit over the value of total input including hired services from outside sources in the case of manufacturing units. To study this trend i.e., the excess of valued added over the inputs of selected Indian and foreign pharmaceutical companies operating in India before and after the introduction of globalisation, as well as for pooled periods, the Net Values Added (NVA) and Gross Values Added (GVA) have been considered.* The total of Net Value Added in the selected companies have been derived from the following factors:

1) Wages and Salaries
2) Interest paid net of interest received
3) Tax provision
4) Dividend paid net of dividend received
5) Retained earnings (net of non-operating surplus / deficit) and

The total of Gross Value Added is made up of Net Value Added plus provisions for depreciation.

The results pertaining to the rate of growth and homogeneity in NVA and GVA for selected pharmaceutical units for the periods, like (i) pre-globalisation (1986 to 1991) for Indian, foreign and pooled companies, (ii) post-globalisation (1992 to 2003) for the companies, and (iii) over all periods (1986 to 2003) also for the same

* This method has been employed by Divatia V.A and Kripa Shanker, "Value added by non-financial corporate sector, 1970-71 to 1973-74", Reserve Bank Staff Occasional Papers, Vol.2, No.2, Dec.19767

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are presented in Tables V.1, V.2 and V.3. The compound growth rate (CGR) has been used to measure the companies' growth rate and coefficient of variation is considered for measuring the homogeneity in the level of NVA and GVA.

**TABLE V.1**

**NET VALUE ADDED (NVA) OF THE SELECTED INDIAN PHARMACEUTICAL INDUSTRY IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Cipla</td>
<td>14.61 (6.91)</td>
<td>47.27</td>
<td>163.77 (124.23)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>3.71 (3.28)</td>
<td>88.54</td>
<td>174.62 (209.41)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>23.83 (10.67)</td>
<td>44.80</td>
<td>307.69 (199.61)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>6.81 (4.66)</td>
<td>68.43</td>
<td>41.77 (26.46)</td>
</tr>
<tr>
<td>Unichem</td>
<td>10.23 (2.42)</td>
<td>23.68</td>
<td>33.81 (19.57)</td>
</tr>
<tr>
<td>Alembic</td>
<td>16.53 (4.10)</td>
<td>24.79</td>
<td>67.36 (32.74)</td>
</tr>
<tr>
<td>All Indian</td>
<td>12.62 (8.73)</td>
<td>69.17</td>
<td>131.50 (158.42)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD – Standard Deviation;  
CV – Coefficient of Variation;  
CGR – Compound Growth Rate

It is seen from Table V.1, that before globalisation, Dr. Reddy's laboratories has experienced a higher growth rate of 12.57 percent than the others but the coefficient of variation has also been the highest (88.54 percent) indicating the lack of
homogeneity in NVA. Next to Dr.Reddy’s laboratories, Cipla has achieved a growth rate of 5.06 percent (CV = 47.27) followed by Unichem with 3.35 percent (CV = 23.68), J.B.Chemicals with 3.06 percent (CV = 68.43) and Ranbaxy with a growth rate of 2.12 percent (CV = 44.80). There has been a consistent (CV = 24.79) movement in NVA of Alembic but the rate of growth has been very low (1.82 percent). But, after globalisation, the scenario has changed so much that all Indian companies have experienced very low growth rate in NVA ranging from 1.00 percent (Cipla) to 2.81 percent (Dr.Reddy’s). The Ranbaxy has stood next to Dr.Reddy’s having 2.76 percent growth rate. As in the case of pre-globalisation period, in the post-globalisation period also, Dr.Reddy’s Laboratories has shown homogeneity in NVA. During the overall period too, Dr.Reddy’s Laboratories occupied first position in terms of growth rate (47.05 percent) as well as in homogeneity level (CV = 159.59) followed by Cipla with 27.63 percent (CV = 108.22) and Ranbaxy with 27.51 percent growth rate (CV = 99.31) in NVA. The J.B.Chemicals, Alembic and Unichem have shown growth rates of 21.74, 15.43 and 13.46 percent respectively during the pooled period (1984-85 to 2002-03). The CGR which has been used for measuring the trends in the growth of NVA for the Indian pharmaceutical companies have declined in the post Globalisation period, when compared to the pre globalisation period. But however the CGR in the pooled period is higher than the Pre and post Globalisation periods. Leading to the conclusion that the performance of CGR in the whole period is better. However the CV have been showing a fluctuating trend in all the three analysis.
TABLE V.2

NET VALUE ADDED (NVA) OF THE FOREIGN PHARMACEUTICAL INDUSTRY IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th></th>
<th>Post-globalisation</th>
<th></th>
<th>Pooled Period</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>Mean (SD)</td>
<td>CV</td>
<td>Mean (SD)</td>
<td>CV</td>
</tr>
<tr>
<td>Glaxo</td>
<td>49.54 (15.02)</td>
<td>30.33</td>
<td>218.07 (108.98)</td>
<td>49.97</td>
<td>3.04 (118.01)</td>
<td>80.91</td>
</tr>
<tr>
<td>Pfizer</td>
<td>22.43 (6.87)</td>
<td>30.62</td>
<td>85.79 (49.55)</td>
<td>57.75</td>
<td>1.45 (49.00)</td>
<td>83.57</td>
</tr>
<tr>
<td>E-Merck</td>
<td>10.56 (4.21)</td>
<td>39.93</td>
<td>62.96 (28.82)</td>
<td>45.78</td>
<td>1.09 (34.21)</td>
<td>84.46</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>10.22 (9.06)</td>
<td>88.61</td>
<td>59.34 (29.55)</td>
<td>49.80</td>
<td>1.88 (33.67)</td>
<td>87.93</td>
</tr>
<tr>
<td>All Foreign Companies</td>
<td>26.76 (20.21)</td>
<td>75.52</td>
<td>106.54 (89.96)</td>
<td>84.43</td>
<td>2.46 (83.21)</td>
<td>104.1</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD = Standard Deviation;  
CV = Coefficient of Variation;  
CGR = Compound Growth Rate

The observation of the Table V.2 pertaining to the foreign companies functioning in India, indicate that Abbott Ltd. has shown the highest growth rate of 8.43 percent in the pre-globalisation and Glaxo has shown the highest growth rate (3.04 percent) during the post-globalisation period. In the pre-globalisation period, the foreign companies, namely, Pfizer, Glaxo and E-Merck attained the growth rates of 4.38, 2.89 and 1.24 percent respectively. In the years after globalisation, Abbott Ltd., Pfizer and E-Merck have shown the growth rate of 1.88 percent, 1.45 percent and 1.09 percent respectively. In the pooled period, the growth rate has been 19.65 percent in Abbott Ltd., 17.60 percent in E-Merck, 14.09 percent in Pfizer and Glaxo.  

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has ended with a 13.76 percent. The fluctuation in NVA has been almost same for all foreign companies in the pre- and post-globalisation period and also in the pooled period. The growth trends with reference to the foreign pharmaceutical companies also shows that the CGR of the various companies during the Post Globalisation period is lesser than pre period. Here also the CGR’s of whole period have been higher than both the periods.

Next to this, the performance of the pooled (all the selected) pharmaceutical companies is analysed for the purpose of finding out the trends in the growth and the effect of the policy changes on the pharmaceutical industry. The relevant data is presented in the Table V.3.

**TABLE V.3**

**NET VALUE ADDED (NVA) OF THE PHARMACEUTICAL INDUSTRY (POOLED) IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>CGR</td>
</tr>
<tr>
<td>All Companies</td>
<td>18.28 (15.91)</td>
<td>87.08</td>
<td>6.97</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD — Standard Deviation;  
CV — Coefficient of Variation;  
CGR — Compound Growth Rate

While the performance of all the selected pharmaceutical companies was analysed, the growth rate was 6.97 percent in the pre-globalisation period, 1.92 percent in the post-globalisation period and 21.43 percent in the overall period. Finally, it can be summarized that the compound growth rate in NVA of Indian companies has been more than that of foreign companies in both the periods.
The CGR of gross value added of the Indian Pharmaceutical Companies, foreign companies functioning in India, and the pooled companies have been calculated and presented in Tables V.4, V.5 and V 6.

**TABLE V.4**

**GROSS VALUE ADDED (GVA) OF THE INDIAN PHARMACEUTICAL INDUSTRY IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Cipla</td>
<td>17.29 (8.08)</td>
<td>46.74</td>
<td>4.26</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>4.30 (3.70)</td>
<td>86.14</td>
<td>10.65</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>26.66 (12.32)</td>
<td>46.19</td>
<td>2.16</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>7.66 (4.89)</td>
<td>63.86</td>
<td>2.81</td>
</tr>
<tr>
<td>Unichem</td>
<td>10.83 (2.51)</td>
<td>23.18</td>
<td>3.31</td>
</tr>
<tr>
<td>Alembic</td>
<td>18.29 (4.47)</td>
<td>24.42</td>
<td>1.72</td>
</tr>
<tr>
<td>All Indian</td>
<td>14.17 (9.87)</td>
<td>69.62</td>
<td>8.33</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD  =  Standard Deviation;
CV  =  Coefficient of Variation;
CGR =  Compound Growth Rate

From the Table V.4, it is clear that Dr.Reddy's laboratories has shown its lead over the other Indian companies with growth rates of 46.06 percent in the pooled period (CV = 159.44), 10.65 percent in the pre-globalisation period (CV = 86.14) and
of 2.74 percent in the post-globalisation period (CV = 119.92) despite showing a high fluctuation in GVA. Though, Cipla has shown a 4.26 percent growth next only to Dr.Reddy’s in the pre-globalisation period, it has experienced a very low rate of 0.90 percent growth in GVA in the years after the introduction of globalisation, holding the last position and having placed itself in the third position with a 26.53 percent growth in the pooled period. The same declining trend in growth rate can also be seen in the case of J.B.Chemicals, Unichem and Alembic from 2.81 percent to 1.19 percent, 3.31 to 1.08 percent and 1.72 to 1.08 percent respectively from the pre- to post-globalisation period. Their growth rates for the pooled period are 21.15, 13.94 and 15.85 percent respectively. The only company among Indian companies that has attained an increase in growth rate is Ranbaxy. The growth rate of Ranbaxy has shown an increase from 2.16 percent in the pre-globalisation to 2.63 percent in the post-globalisation period and has placed itself in second position with 27.56 percent next to Dr.Reddy’s in the pooled period of study with regard to GVA.

The table pertaining to the trends in the CGR of the GVA of the foreign pharmaceutical companies presented in table V.5.

According to Table V.5, as far as the foreign companies are concerned, the trends in the growth of CGR of GVA are the same as that of NVA. The growth rate of Abbott Ltd. is 19.63 percent for the pooled period and 8.31 percent for the pre-globalisation period, holding the first position in both the periods but with high fluctuation (CV = 89.30 for the pre-globalisation and 87.71 for the whole period). In the years after globalisation, the growth rate of Abbott Ltd. has declined to 1.89 percent next to Glaxo. The later has shown an improvement in its growth in GVA from 2.85 percent to 2.88 percent from pre-globalisation to post-globalisation period.
But its growth rate for the overall period has been at 13.35 percent, which is lower than that of all the other foreign companies.

**TABLE V.5**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>CGR</td>
</tr>
<tr>
<td>Glaxo</td>
<td>55.21 (17.15)</td>
<td>31.06</td>
<td>2.85</td>
</tr>
<tr>
<td>Pfizer</td>
<td>23.72 (7.25)</td>
<td>30.56</td>
<td>4.39</td>
</tr>
<tr>
<td>E-Merck</td>
<td>11.34 (4.53)</td>
<td>39.99</td>
<td>1.21</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>10.79 (9.64)</td>
<td>89.30</td>
<td>8.31</td>
</tr>
<tr>
<td>All Foreign Companies</td>
<td>29.25 (22.81)</td>
<td>77.98</td>
<td>5.48</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD – Standard Deviation;  
CV – Coefficient of Variation;  
CGR – Compound Growth Rate

The remaining two foreign companies namely, Pfizer and E-Merck have experienced a decline in growth of CGR of GVA from 4.39 percent to 1.42 percent and 1.21 to 1.02 percent from pre- to post-globalisation period inspite of the remarkable overall growth rate of 17.71 percent and 14.09 percent respectively.

The analysis of all the selected pharmaceutical companies together as portrayed in Table V.6 has shown a compound growth rate of 6.80 percent in the pre-globalisation period, 1.92 percent during the post-globalisation period and 21.25 percent in the pooled period. It is interesting to note that the compound growth rates
of NVA and GVA remain the same as 1.92 percent for the pooled companies during these periods.

**TABLE V.6**

GROSS VALUE ADDED (GVA) OF THE PHARMACEUTICAL INDUSTRY (POOLED) IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>CV</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>All Companies</td>
<td>20.20 (17.78)</td>
<td>87.99</td>
<td>6.80</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the standard deviation in NVA.

SD — Standard Deviation;  
CV — Coefficient of Variation;  
CGR — Compound Growth Rate

From the foregoing analysis, it can be concluded that Indian companies have shown higher growth rate in both NVA and GVA than the foreign companies in the pre and post-globalisation period as well as in the pooled period.

5.2 Operating Leverage (Operating Risk)

The term leverage may be defined as the employment of an asset or a source of funds for which the firm has to pay a fixed cost or fixed returns. Consequently, the earnings available to shareholders as also the risk are affected. If the earnings are more than the variable costs and fixed costs, or EBIT exceeds the fixed return requirements, the leverage is said to be favorable. When they do not, the result is an unfavorable leverage.\(^1\)

There are two types of leverage – "operating and financial". The leverage associated with investments (asset acquisition) activities is referred to as operating

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leverage, while the leverage associated with financing activities is called 'financial leverage'.

The operating leverage may be defined as the firm's ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and tax. In other words, the operating leverage (OL) is equal to the sales revenue less total variable cost (cost of goods sold) divided by sales revenue less total cost (which is the sum of variable cost and fixed costs). The formula for calculating operating leverage ratio is as follows:

\[
\text{Operating Leverage (OL)} = \frac{\text{Sales - Variable Cost}}{\text{Sales - Total Cost}}
\]

Since operating leverage can be favorable as well as unfavorable, managing the effects of a change in sales, "higher levels of risk are attached to higher degrees of leverage". Since the degree of leverage depends on fixed operating costs, it logically follows that higher he fixed operating costs, the higher the firm's operating leverage and its operating risks. High operating leverage is good when revenues are rising and bad when they are falling. Operating risk is the risk of the firm not being able to cover its fixed operating costs.

The operating leverage which is a measure of business risk is used in this analysis for measuring the operating risk of the pharmaceutical companies in India – both Indian and foreign operating here. The operating leverage of the companies for the pre- and post-globalisation periods are portrayed in Tables V.7 to V.12 and Tables V.14 to V.17. The Table V.13 presents the OL for pooled Indian and the Table V.18

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presents the OL for pooled foreign pharmaceutical companies and Table V.19 portrays the OL for pharmaceutical industry in India.

5.2.1 Operating Leverage of Indian pharmaceutical companies

**TABLE V.7**

**OPERATING LEVERAGE OF CIPLA**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>17.13 (8.84)</td>
<td>32.50</td>
<td>6.26 (3.77)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>214.89 (182.91)</td>
<td>28.04</td>
<td>121.81 (100.91)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>148.97 (175.71)</td>
<td>28.97</td>
<td>83.29 (98.67)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

Table V.7 presents the OL results for CIPLA. It can be seen that the mean value of OL of this pharmaceutical unit after globalisation has been 1.95 whereas in the pre-globalisation period it was 2.92. This implies that the operating risk has reduced after globalisation of the Indian industries.
### TABLE V.8

**OPERATING LEVERAGE OF DR. REDDY'S**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales − VC)</th>
<th>Operating Income (Sales − VC − FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>4.93 (4.17)</td>
<td>91.80</td>
<td>2.63 (2.44)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>257.62 (314.90)</td>
<td>36.13</td>
<td>135.61 (174.30)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>173.39 (281.41)</td>
<td>49.02</td>
<td>91.28 (154.34)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

### TABLE V.9

**OPERATING LEVERAGE OF RANBAXY**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales − VC)</th>
<th>Operating Income (Sales − VC − FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>42.95 (18.66)</td>
<td>27.05</td>
<td>12.63 (6.02)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>473.47 (367.12)</td>
<td>22.04</td>
<td>172.81 (121.43)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>329.96 (361.83)</td>
<td>26.32</td>
<td>119.42 (124.86)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

### TABLE V.10

**OPERATING LEVERAGE OF J.B. CHEMICALS**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales − VC)</th>
<th>Operating Income (Sales − VC − FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>9.05 (6.17)</td>
<td>37.82</td>
<td>4.32 (3.83)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>61.15 (39.96)</td>
<td>19.88</td>
<td>25.75 (18.13)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>43.78 (41.02)</td>
<td>22.70</td>
<td>18.60 (18.03)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

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### TABLE V.11
OPERATING LEVERAGE OF UNICHEM

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>7.84</td>
<td>15.53</td>
<td>2.12</td>
</tr>
<tr>
<td></td>
<td>(2.48)</td>
<td></td>
<td>(0.88)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>50.74</td>
<td>27.07</td>
<td>17.45</td>
</tr>
<tr>
<td></td>
<td>(39.35)</td>
<td></td>
<td>(13.08)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>36.44</td>
<td>21.41</td>
<td>12.34</td>
</tr>
<tr>
<td></td>
<td>(37.90)</td>
<td></td>
<td>(12.89)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

### TABLE V.12
OPERATING LEVERAGE OF ALEMBIC

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>18.65</td>
<td>8.04</td>
<td>5.86</td>
</tr>
<tr>
<td></td>
<td>(4.95)</td>
<td></td>
<td>(1.55)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>91.90</td>
<td>15.88</td>
<td>32.15</td>
</tr>
<tr>
<td></td>
<td>(50.47)</td>
<td></td>
<td>(18.89)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>67.48</td>
<td>16.96</td>
<td>23.39</td>
</tr>
<tr>
<td></td>
<td>(54.01)</td>
<td></td>
<td>(19.86)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

A similar trend is seen in the remaining five Indian pharmaceutical companies namely, Dr.Reddy's (Table V.8), Ranbaxy (Table V.9), J.B.Chemicals (Table V.10), Unichem (Table V.11) and Alembic (Table V.12). The OL have been 1.91, 3.44, 2.41, 3.82 and 3.21 during the pre-globalisation period and 1.88, 2.67, 2.41, 2.94 and 3.08 during post-globalisation period respectively. Among the above five companies, J.B.Chemicals does not show a substantial difference between the mean values of OL levels during before and after globalisation. But, generally, there has been a decline in the OL of Indian pharmaceutical companies in India thus indicating a decrease in
fixed cost which in turn reveals the decrease in the business risk during post-
globalisation period.

**TABLE V.13**

**OPERATING LEVERAGE OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA (POOLED)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>16.76 (15.47)</td>
<td>33.08</td>
<td>5.64 (4.80)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>191.63 (253.92)</td>
<td>24.67</td>
<td>84.26 (111.82)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>133.34 (222.98)</td>
<td>27.17</td>
<td>58.05 (98.44)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The results of OL presented in Table V.13, for the pooled Indian companies, also support the above fact. It also shows a decline in OL to 2.49 in the post-
globalisation period from 2.95 in the pre-globalisation period.

The above decline in the mean value of OL is because of reduction in cost of goods sold in the post-globalisation period, as the material cost is one of the important components of cost structure. Further, the share of material cost as a percentage of sales might have declined marginally because of the fact that all Indian companies have gone for backward integration in the post-globalisation period. Also, the dilution of DPCO in the post-globalisation period has favored the Indian companies leading to an increase in sales, which in turn resulted in an increase in the EBIT (Earning before interest and tax). The above fact can be witnessed by the OPR. Moreover, employee cost and selling expenses of Indian companies are relatively lesser than that of foreign
companies, which has also resulted in low operating leverage values compared to that of foreign companies.

5.2.2 Operating leverage of foreign pharmaceutical companies in India

| TABLE V.14 |
| OPERATING LEVERAGE OF GLAXO |

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>58.21 (24.87)</td>
<td>13.68</td>
<td>14.65 (5.11)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>245.83 (109.06)</td>
<td>11.17</td>
<td>81.47 (53.06)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>165.42 (125.86)</td>
<td>13.92</td>
<td>52.83 (52.03)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

Regarding foreign pharmaceutical companies in India, the OLs have shown better ratio in respect of Glaxo (Table V.14), Pfizer (Table V.15) and E-Merck (Table V.16) Revealing the decrease in business risk of the respective companies whereas it (Business risk) has increased in the case of Abbott Ltd. (Table V.33) in the years after globalisation.

| TABLE V.15 |
| OPERATING LEVERAGE OF PFIZER |

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>14.44 (3.22)</td>
<td>4.52</td>
<td>4.67 (2.44)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>86.05 (68.13)</td>
<td>20.82</td>
<td>31.88 (22.31)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>55.36 (62.25)</td>
<td>15.98</td>
<td>20.22 (21.60)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.
The OL has been 3.97 and 3.34 for Glaxo, 4.21 and 2.95 for Pfizer, 2.70 and 2.13 for E-Merck and 0.50 and 2.79 in case of Abbott Ltd. during the pre- and post-globalisation period. This decline in OL in the post-globalisation period has indicated the decline in fixed costs of the foreign pharmaceutical companies in India thereby signaling the reduction in operating risk.

**TABLE V.16**

**OPERATING LEVERAGE OF E-MERCK**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>9.83</td>
<td>16.42</td>
<td>3.62</td>
</tr>
<tr>
<td></td>
<td>(4.39)</td>
<td></td>
<td>(1.60)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>62.94</td>
<td>16.81</td>
<td>31.22</td>
</tr>
<tr>
<td></td>
<td>(33.26)</td>
<td></td>
<td>(17.11)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>40.18</td>
<td>18.17</td>
<td>19.39</td>
</tr>
<tr>
<td></td>
<td>(36.62)</td>
<td></td>
<td>(18.92)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

**TABLE V.17**

**OPERATING LEVERAGE OF ABBOTT LTD.**

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>10.36</td>
<td>36.09</td>
<td>3.25</td>
</tr>
<tr>
<td></td>
<td>(10.35)</td>
<td></td>
<td>(3.82)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>84.42</td>
<td>12.99</td>
<td>32.30</td>
</tr>
<tr>
<td></td>
<td>(34.46)</td>
<td></td>
<td>(16.72)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>52.68</td>
<td>24.49</td>
<td>19.85</td>
</tr>
<tr>
<td></td>
<td>(45.90)</td>
<td></td>
<td>(19.40)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

In the case of Abbott Ltd., the operating leverage has increased from 0.50 in the pre-globalisation period to 2.79 in the post-globalisation period. The unfavorable trend may be due to unabsorbed expenditure in fixed assets.
### TABLE V.18
OPERATING LEVERAGE OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA (POOLED)

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>23.21</td>
<td>17.14</td>
<td>6.55</td>
</tr>
<tr>
<td></td>
<td>(24.41)</td>
<td>(5.84)</td>
<td>(37.18)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>119.81</td>
<td>15.39</td>
<td>44.21</td>
</tr>
<tr>
<td></td>
<td>(99.49)</td>
<td>(37.18)</td>
<td>(37.18)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>78.41</td>
<td>18.07</td>
<td>28.07</td>
</tr>
<tr>
<td></td>
<td>(90.38)</td>
<td>(33.89)</td>
<td>(33.89)</td>
</tr>
</tbody>
</table>

*Figures in the parentheses indicate standard deviation.*

The results of OL for pooled foreign companies (Table V.18) also clearly indicate the same trend with minimum difference. In the post-globalisation period, the OL has shown a lesser value of 2.80 than the mean value of 2.84 in the pre-globalisation period. Further, the very small difference in OL of pooled foreign companies may be attributed to the high OL level of Abbott Ltd. in the post-globalisation period.

#### 5.2.3 Operating leverage of pooled companies

### TABLE V.19
OPERATING LEVERAGE OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)

<table>
<thead>
<tr>
<th>Period</th>
<th>Contribution (Sales – VC)</th>
<th>Operating Income (Sales – VC – FC)</th>
<th>Operating Leverage (OL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>21.03</td>
<td>24.61</td>
<td>6.33</td>
</tr>
<tr>
<td></td>
<td>(21.54)</td>
<td>(5.52)</td>
<td>(91.62)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>162.90</td>
<td>16.61</td>
<td>68.24</td>
</tr>
<tr>
<td></td>
<td>(208.87)</td>
<td>(91.62)</td>
<td>(91.62)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>115.61</td>
<td>21.97</td>
<td>47.61</td>
</tr>
<tr>
<td></td>
<td>(183.45)</td>
<td>(80.29)</td>
<td>(80.29)</td>
</tr>
</tbody>
</table>

*Figures in the parentheses indicate standard deviation.*

The analysis of Table V.19 pertaining to the comparison of the operating leverages of the pooled pharmaceutical companies in India between the pre- and post-
globalisation periods reveals the same trend as the individual companies have shown, that is, the OL has declined to 2.61 during post-globalisation period from 2.81 leading to the conclusion that the performance of the pharmaceutical units in India as measured by its mean value of the operating leverage ratio for the post-globalisation period has been lesser implying that the risk of business loss of the pharmaceutical companies in India have declined (except in the case of Abbott Ltd.).

5.3 Production function

The goods produced or sale volume of the product is considered as output in any manufacturing organization. The output may depend on the level of application of inputs such as capital, stocks consumed, wages and salaries paid to the employees, total assets of the company, etc. The production function is the strength of relationship between the input variables and the output. For the purpose of evaluating the efficiency of the production of the pharmaceutical industry in India especially the input output relationship the Cobb Douglas function is used here. This model is as follows:

\[ \text{LnSAL} = a + b_1 \text{LnCAP} + b_2 \text{LnSTK} + b_3 \text{LnWAGE} + b_4 \text{LnTA} + e \]

Where, \( \text{LnSAL} \) = Natural log of Sales,
\( \text{LnCAP} \) = Natural log of Capital where capital is the sum of Share Capital, Share holder’s reserve and long term debt
\( \text{LnSTOCK} \) = Natural log of stock
\( \text{LnWAGE} \) = Natural log of Wages and Salaries paid
\( \text{LnTA} \) = Natural log of Total Assets
\( e \) = error

Apart from the above input variables, ‘Time’ is also included as one of the variables because of the time series nature of the data to ascertain the influence of
time on dependent output variable, like ‘sales’. The results of regression equation using above production function model for Indian, foreign and pooled pharmaceutical companies for the pre- and post-globalisation periods as well as for the pooled period with and without dummy variables. In the regression equation 0 for pre-globalisation and 1 for post-globalisation are used. The results are shown in Tables V.36, V.38 and V.40. The results of the chow-test, indicating the effect of globalisation are also presented in Tables V.37, V.39 and V.41.

**5.3.1 Indian Companies**

**H₀:** There is no significant change in the estimated coefficient of determination of output (sales) in the production function regression model for selected Indian pharmaceutical companies due to globalisation.

With a view to testing this hypothesis, the multiple regression equation using various variables and its impact on the output (sales) due to globalisation and without it is calculated and portrayed in Table V.20.

The analysis of Table V.20 portrays the results of production function for the selected Indian pharmaceutical companies. It can be observed that the capital has negative influence over output (sales) during the pooled period from 1986 to 2003 and also during the post-globalisation period and the shift is significant and has positive relationship with output (sales) during the pre-globalisation period. All the other explanatory variables have significant positive influence on sales in both pre- and post-globalisation periods as well as in pooled periods (in the model without dummy). The variable ‘time’ has shown a negative influence on output (sales) during the post-globalisation period and also in the pooled periods and this negative relationship is significant at 5 percent level.
### TABLE V.20

REGRESSION RESULTS OF VARIABLES OF PRODUCTIVITY ON SALES OF SELECTED INDIAN PHARMACEUTICAL COMPANIES FOR PRE- AND POST-GLOBALISATION AND POOLED PERIODS USING COBB-DOUGLAS PRODUCTION FUNCTION

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Dummy</td>
<td>With Dummy</td>
<td></td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>-0.3447**</td>
<td>-0.3332**</td>
<td>-0.1639</td>
</tr>
<tr>
<td></td>
<td>(-4.96)</td>
<td>(-4.80)</td>
<td>(-3.22)</td>
</tr>
<tr>
<td>Log of Capital</td>
<td>-0.0704*</td>
<td>-0.0700*</td>
<td>0.0255</td>
</tr>
<tr>
<td></td>
<td>(-2.25)</td>
<td>(-2.25)</td>
<td>(0.59)</td>
</tr>
<tr>
<td>Log of Stock</td>
<td>0.5294**</td>
<td>0.5260**</td>
<td>0.4406**</td>
</tr>
<tr>
<td></td>
<td>(21.76)</td>
<td>(21.66)</td>
<td>(9.54)</td>
</tr>
<tr>
<td>Log of Wages paid</td>
<td>0.2731**</td>
<td>0.2772**</td>
<td>0.2593**</td>
</tr>
<tr>
<td></td>
<td>(14.27)</td>
<td>(14.42)</td>
<td>(5.34)</td>
</tr>
<tr>
<td>Log of Total Assets</td>
<td>0.3397**</td>
<td>0.3365**</td>
<td>0.2970**</td>
</tr>
<tr>
<td></td>
<td>(5.58)</td>
<td>(5.55)</td>
<td>(3.27)</td>
</tr>
<tr>
<td>Time</td>
<td>-0.0050</td>
<td>-0.0080*</td>
<td>0.0182</td>
</tr>
<tr>
<td></td>
<td>(-1.60)</td>
<td>(-2.17)</td>
<td>(1.90)</td>
</tr>
<tr>
<td>Globalisation Dummy</td>
<td></td>
<td>0.0463</td>
<td>(-2.31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.51)</td>
<td></td>
</tr>
<tr>
<td>R-square</td>
<td>0.9972</td>
<td>0.9972</td>
<td>0.9959</td>
</tr>
<tr>
<td>Adjusted R-square</td>
<td>0.9970</td>
<td>0.9971</td>
<td>0.9952</td>
</tr>
<tr>
<td>F-value</td>
<td>7199.20**</td>
<td>6074.30**</td>
<td>1462.30**</td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>5,102</td>
<td>6,101</td>
<td>5,30</td>
</tr>
<tr>
<td>N</td>
<td>108</td>
<td>108</td>
<td>36</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate 't' values.
*Significant at 5 percent level;
**Significant at 1 percent level.

With respect to the equation with dummy for pooled period, the beta coefficient is 0.0463 for globalisation dummy with 't' value 1.51 being less than the table value of 1.97 at 5% level of significance for 108 degrees of freedom. This shows that the mean output (sales) has been more by 4.63 percent (beta = 0.0463) in the post-globalisation period than in the pre-globalisation period. The adjusted R square shows that all the variables are having more than 99 percent relationship in the equations showing that the regression equation is a good fit and the F-value used for measuring the relationship shows that it is significant at 1 percent level.
The negative behaviour of capital with ‘sales’ may be due to the fact that the Indian companies would have gone for modernisation process by investing more funds in new equipments to compete with the international market or might have increased their investment in Research and Development activities and/or globalisation has necessitated them to switch over from process patent to product patent. As far as the other input variables are concerned, while there is an increase in them there is corresponding increase in the goods produced leading to increase in sales.

Application of Chow test

The impact of globalisation on the Indian industries can be seen through its structural changes and its impact on the pharmaceutical industry in this study. For this purpose, the period of study has been divided into two sub periods like pre-globalisation period from 1980-81 to 1990-91 and post-globalisation period from 1991-92 to 2002-03. For the purpose of analysing the impact of structural changes as part of globalisation of the Indian economy, the most useful tool is the “chow test”.

Procedure for applying chow test

For considering a time series data a regression equation is arrived at using the formula \( y = a + bt \)

Where ‘t’ indicates time

The time interval is divided into two parts as pre- and post-globalisation periods. The numbers of observations in the two sub periods are taken as \( n_1 \) and \( n_2 \), respectively. For the two sub periods three individual regression equations have been fitted as follows.

\[ y_1 = a_1 + b_1t \]
\[ y_2 = a_2 + b_2t \]
\[ y_3 = a_2 + b_2t \]

The following notations are used:

- \( ESS_w \) = Explained sum of square for the whole period
- \( ESS_I \) = Explained sum of square for the first sub period
- \( ESS_{II} \) = Explained sum of square for the second sub period
- \( RSS_I \) = Residual sum of square of error for the first sub period
- \( RSS_{II} \) = Residual sum of square of error for the second sub period
- \( K \) = Number of parameters or explanatory variable to be estimated
- \( n \) = Number of observations

The chow test statistic is provided as follows:

\[
F = \frac{(ESS_w - (ESS_I + ESS_{II})/K)}{((RSS_I + RSS_{II})/(n_I + n_{II} - 2K))}
\]

Using the above said procedure, the results of the calculated equation is presented in Table V.21.

### TABLE V.21

**RESULTS OF CHOW TEST FOR STRUCTURAL SHIFTS BETWEEN PRE- AND POST-GLOBALISATION PERIODS IN THE INDIAN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Sum of Square Residuals</th>
<th>Number of Parameters Estimated</th>
<th>Number of observations</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pooled Period</strong></td>
<td><strong>Pre-globalisation</strong></td>
<td><strong>Post-globalisation</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.1001</td>
<td>0.5746</td>
<td>0.7500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate degrees of freedom.

F-table value for 6,96 degrees of freedom at 5% level is 2.19 and at 1% level is 2.99

The observation of Table V.21 shows that the F-value is not significant. That is, calculated F value being (2.01) is less than the table value of 2.19 for 6,96 degrees of freedom at 5 percent level of significance, the null hypothesis is accepted and it reveals that there is no significant structural shift in output (sales) of selected Indian pharmaceutical companies due to globalisation during the study period from 1986 to 2003.

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5.3.2 Foreign Companies

H₀: There is no significant change in the estimated coefficient of determination of output (sales) using production function regression model for selected foreign pharmaceutical companies in India due to globalisation.

To verify this hypothesis multiple regression is calculated between the probable dependent variables and output (sales) and presented in Table V.22.

<table>
<thead>
<tr>
<th>TABLE V.22</th>
</tr>
</thead>
<tbody>
<tr>
<td>REgression results of variables of productivity on sales of selected foreign pharmaceutical companies for pre- and post-globalisation and pooled periods using Cobb-Douglas production function</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Pooled Period</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Dummy</td>
<td>With Dummy</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0401</td>
<td>0.1227</td>
<td>0.2356</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.67)</td>
<td>(0.81)</td>
</tr>
<tr>
<td>Log of Capital</td>
<td>-0.0201</td>
<td>-0.0131</td>
<td>0.1272</td>
</tr>
<tr>
<td></td>
<td>(-0.45)</td>
<td>(-0.29)</td>
<td>(1.55)</td>
</tr>
<tr>
<td>Log of Stock</td>
<td>0.4718**</td>
<td>0.4423**</td>
<td>0.2166*</td>
</tr>
<tr>
<td></td>
<td>(8.68)</td>
<td>(7.80)</td>
<td>(2.31)</td>
</tr>
<tr>
<td>Log of Wages paid</td>
<td>0.2632**</td>
<td>0.2566**</td>
<td>0.3849**</td>
</tr>
<tr>
<td></td>
<td>(5.13)</td>
<td>(5.04)</td>
<td>(4.20)</td>
</tr>
<tr>
<td>Log of Total Assets</td>
<td>0.2695**</td>
<td>0.2857**</td>
<td>0.2021**</td>
</tr>
<tr>
<td></td>
<td>(5.25)</td>
<td>(5.52)</td>
<td>(3.32)</td>
</tr>
<tr>
<td>Time</td>
<td>0.0132**</td>
<td>0.0084</td>
<td>0.0346**</td>
</tr>
<tr>
<td></td>
<td>(2.57)</td>
<td>(1.43)</td>
<td>(2.78)</td>
</tr>
<tr>
<td>Globalisation Dummy</td>
<td></td>
<td>0.0881</td>
<td>(1.64)</td>
</tr>
<tr>
<td>R-square</td>
<td>0.9863</td>
<td>0.9868</td>
<td>0.9839</td>
</tr>
<tr>
<td>Adjusted R-square</td>
<td>0.9584</td>
<td>0.9857</td>
<td>0.9813</td>
</tr>
<tr>
<td>F-value</td>
<td>1125.90**</td>
<td>959.02**</td>
<td>380.19**</td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>5.78</td>
<td>6.77</td>
<td>5.30</td>
</tr>
<tr>
<td>N</td>
<td>84</td>
<td>84</td>
<td>36</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate 't' values.
*Significant at 5 percent level;
**Significant at 1 percent level.

Analysis of Table V.22 reveals that the relationship between capital and sales has become insignificant in all the sub periods. The strength of relationship between
the stock and sales and total assets and sales have increased and that between the capital and sales has declined during the years from 1992 to 2003 (post-globalisation). But, whatever may be the change in the strength of the relationship, the sign of the beta coefficients of the above input variables, namely, stock, total assets and wages remain positive in the post-globalisation period. The ‘Time’ variable interestingly has shown positive relationship with sales in all the models and also in the models for the period from 1986 to 2003 (pooled period) and from 1986 to 1991 (pre-globalisation), even its beta coefficient is significant at 1 percent level.

The analysis of the table further shows from the coefficient of globalisation dummy (0.0881) that the difference between means sales in the years before and after globalisation is not statistically significant since the t-value (1.64) is less than the table value of 1.97 at 5% level. It can also be seen from the table that all the independent variables together explain the variability in sales to the extent of more than 98 percent ($R^2$ values are around 0.98 for all the models) in the equations.

It is interesting to note that the relationship of capital with sales has got a negative sign. As far as the other input variables are concerned, it has shown that while there is increase in them there is corresponding increase in the goods produced which in turn leads to an increase in output (sales).

To verify these results, the equation for chow test is calculated and portrayed in Table V.23.
TABLE V.23

RESULTS OF CHOW TEST FOR STRUCTURAL SHIFTS BETWEEN PRE- AND POST-GLOBALISATION PERIODS IN FOREIGN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Sum of Square Residuals</th>
<th>Number of Parameters Estimated</th>
<th>Number of observations</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pooled Period</td>
<td>Pre-globalisation</td>
<td>Post-globalisation</td>
<td></td>
</tr>
<tr>
<td>0.1674</td>
<td>0.6819</td>
<td>1.0840</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.8664**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(6,72)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate degrees of freedom.
**Significant at 1 percent level.

F-table value for 6, 72 degrees of freedom at 5% level is 2.23 and at 1% level is 3.06

Analysis of Table V.23 reveals that the calculated F-value of 3.8664 is greater than the table value of 3.06 (at 1 percent level). And hence, it is significant asserting that there is significant change in the output (sales) due to globalisation during the study period from 1986 to 2003. Hence, the null hypothesis is rejected.

After the analysis the operating performance of the pharmaceutical industry with the help of the tools like value added, operating leverage, production function, etc., an attempt is also made to analyse it from the point of view of some of the accounting ratios which are also the measures of the operating performance.

5.3.3 Pooled Companies

For this analysis, a working hypothesis is formulated as follows:

Ho: “There is no significant change in the estimated coefficient of determination of the sales equations of the selected Indian and foreign pharmaceutical companies due to globalisation during the study period”.

For the purpose of testing the hypothesis among the input variable, four input variables, which are likely to influence the changes in the output of the
pharmaceutical industry in India during the pre- and post- globalisation, are worked out and presented in Table V.24.

**TABLE V.24**

REGRESSION RESULTS OF VARIABLES OF PRODUCTIVITY ON SALES OF SELECTED INDIAN AND FOREIGN PHARMACEUTICAL COMPANIES FOR PRE- AND POST-GLOBALISATION AND POOLED PERIODS

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Pooled Period</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Dummy</td>
<td>With Dummy</td>
<td>Pre-</td>
<td>Post</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>globalisation</td>
<td>globalisation</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.2493**</td>
<td>-0.2357**</td>
<td>0.0375</td>
<td>-0.2801**</td>
</tr>
<tr>
<td></td>
<td>(-4.12)</td>
<td>(-3.85)</td>
<td>(0.41)</td>
<td>(-2.92)</td>
</tr>
<tr>
<td>Log of Capital</td>
<td>-0.0577**</td>
<td>-0.0560**</td>
<td>0.0416</td>
<td>-0.0800**</td>
</tr>
<tr>
<td></td>
<td>(-2.55)</td>
<td>(-2.48)</td>
<td>(1.13)</td>
<td>(-2.74)</td>
</tr>
<tr>
<td>Log of Stock</td>
<td>0.5415**</td>
<td>0.5358**</td>
<td>0.3539**</td>
<td>0.5543**</td>
</tr>
<tr>
<td></td>
<td>(22.37)</td>
<td>(21.82)</td>
<td>(7.78)</td>
<td>(18.07)</td>
</tr>
<tr>
<td>Log of Wages paid</td>
<td>0.2984**</td>
<td>0.2993**</td>
<td>0.3611**</td>
<td>0.3008**</td>
</tr>
<tr>
<td></td>
<td>(16.24)</td>
<td>(16.31)</td>
<td>(9.01)</td>
<td>(14.10)</td>
</tr>
<tr>
<td>Log of Total Assets</td>
<td>0.2663**</td>
<td>0.2671**</td>
<td>0.2241**</td>
<td>0.2856**</td>
</tr>
<tr>
<td></td>
<td>(7.61)</td>
<td>(7.65)</td>
<td>(5.01)</td>
<td>(6.33)</td>
</tr>
<tr>
<td>Time</td>
<td>0.0033</td>
<td>0.0007</td>
<td>0.0300**</td>
<td>-0.00004</td>
</tr>
<tr>
<td></td>
<td>(1.43)</td>
<td>(0.22)</td>
<td>(3.71)</td>
<td>(-0.01)</td>
</tr>
<tr>
<td>Globalisation Dummy</td>
<td>0.0384</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-square</td>
<td>0.9938</td>
<td>0.9939</td>
<td>0.9902</td>
<td>0.9915</td>
</tr>
<tr>
<td>Adjusted R-square</td>
<td>0.9936</td>
<td>0.9937</td>
<td>0.9893</td>
<td>0.9911</td>
</tr>
<tr>
<td>F-value</td>
<td>5639.0**</td>
<td>4717.00**</td>
<td>1096.8**</td>
<td>2681.2**</td>
</tr>
<tr>
<td>Degrees of Freedom</td>
<td>5,174</td>
<td>6,173</td>
<td>5,54</td>
<td>5,114</td>
</tr>
<tr>
<td>N</td>
<td>180</td>
<td>180</td>
<td>60</td>
<td>120</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate ‘t’ values.
*Significant at 5 percent level;
**Significant at 1 percent level.

The analysis of Table V.24 shows that all the four input variables are having significant impact on output (sales) during the post-globalisation period from 1992 to 2003 and during the period from 1986 to 2003 (pooled period) with and without globalisation dummy. But the sign of the beta coefficients of the variable ‘capital’ has been negative for the pooled as well as during the post-globalisation period whereas it has been positive in the case of the other input variables. The regression results for the period from 1986 to 1991 (pre-globalisation) show positive sign for ‘capital’ and also the coefficients of all other variables including ‘time’ show
positive significant relationship with sales. The adjusted R-square being 0.9936, 0.9937, 0.9893 and 0.9931 and F-values being significant at 1 percent level reveals that there is good relationship between the input and output variables taken for analysis.

The results of the equation with dummy for globalisation for the pooled period indicate that the mean sales has been more by 0.0384 units in the post-globalisation period than that of pre-globalisation period, but its ‘t’ value 1.28 being less than the table value of 1.97 at 5% level of significance, reveals that the difference in the mean sales due to globalisation has not been statistically significant.

The insignificant impact of capital on output / sales contrary to the expected positive sign, may be attributed either to increase in investment in R&D (Research and Development) equipment as they are pushed to switch over from process patent to product patent in the post-globalisation period or they might have invested in fixed assets in the subsequent years as part of the modernisation process.

The decrease in sales over the period of time after globalisation has also been indicated by the coefficient of ‘Time’ variable. As far as the other input variables are concerned, it is known fact that there is increase in them then there will be corresponding increase in the goods produced i.e., an increase in sales.

It can be seen from Table V.25 that the Chow-test F-value of 2.9127 being greater than the table value (2.91) at 1% significant level reveals that there is significant structural shift in output (sales) of the selected pharmaceutical companies after globalisation. Hence, the null hypothesis is rejected and alternate hypothesis that "there is significant change in the estimated coefficient of determination of output (sales) in production for all selected Indian and foreign companies due to
globalisation is accepted. This further reveals that there is a positive shift in the production function due to globalisation.

### TABLE V.25

**RESULTS OF CHOW TEST FOR STRUCTURAL SHIFTS BETWEEN PRE- AND POST-GLOBALISATION PERIODS IN INDIAN AND FOREIGN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Sum of Square Residuals</th>
<th>Number of Parameters Estimated</th>
<th>Number of observations</th>
<th>F-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pooled Period</strong></td>
<td><strong>Pre-Globalisation</strong></td>
<td><strong>Post-Globalisation</strong></td>
<td></td>
</tr>
<tr>
<td>0.2906</td>
<td>1.5174</td>
<td>1.9836</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figures in the parentheses indicate degrees of freedom.**

**Significant at 1 percent level.**

F-table value for 6,168 degrees of freedom at 5% level is 2.15 and at 1% level is 2.91

#### 5.4 Operating efficiency ratios

The key ratios to be looked at when judging the operations of a company are the operating ratios. Here in this study, various operating ratios such as, cost responsiveness, capital output, capital turnover, fixed assets turnover, working capital turnover, inventory turnover, debtors turnover, operating profit margin, and net profit margin have been considered for evaluating the impact of globalisation on the Indian pharmaceutical industries in India before and after globalisation periods. In order to find out which part of capital is efficiently employed and which part is not, different turnover ratios like fixed assets turnover ratio, working capital turnover ratio are calculated. Similarly, to find out which part of working capital is efficiently employed, inventory turnover ratio and debtors turnover ratio are calculated. The net effect of the above is measured in terms of operating profit ratio and net profit ratio.

#### 5.4.1 Cost responsiveness ratio

The Cost Responsiveness Ratio has been used to measure the operational efficiency of a firm. The Cost Responsiveness Ratio is the rate of change in
operating cost, which is the total of all production expenses (cost of materials consumed, wages and salaries, power and fuel) plus other administrative and selling expenses, divided by the rate of change in value of output, that is, value of goods produced or more precisely ‘rate of change in net sales’. It is found out by adopting the following formula.

\[
\text{Cost Responsiveness Ratio (CRR)} = \frac{\text{Rate of Change in Operating Cost}}{\text{Rate of Change in Output}}
\]

The CRR and operating efficiency are inversely related. That is, the high CRR indicates low operating efficiency and vice versa. That is, if CRR is less than one, it would indicate the relatively less proportionate increase in operating cost compared to the increase in output, which is the most desirable outcome. The calculated values of ‘Cost responsiveness ratios’ for the selected Indian and foreign pharmaceutical companies functioning in India are portrayed in Tables V.26 to V.28. The performance of the pharmaceutical industry is measured in terms of mean values of Cost Responsiveness Ratio during the pre- and post-globalisation periods and also for the whole period.

It is seen from Table V.26 that there are only three Indian pharmaceutical companies, which have shown the Cost Responsiveness Ratio value less than one indicating relatively less proportionate increase in operating cost compared to the increase in output during pre-globalisation period. They are, Cipla with the mean value of the CRR of 0.9650, J.B.Chemicals with 0.8439 and Alembic with CRR of 0.9666. The remaining three companies, namely, Dr.Reddy’s, Ranbaxy and Unichem are having a CRR value of 1.0029, 1.0100 and 1.0356 respectively having an increase in operating cost proportionately more than the increase in output during the pre-globalisation period. After the introduction of globalisation, the CRR of Cipla,
Ranbaxy and Unichem have declined to the levels of 0.9544, 0.9356 and 0.9944 respectively and that Dr.Reddy’s, J.B. Chemicals and Alembic have increased to 3.9435, 1.1300 and 0.9959 respectively.

TABLE V.26
COST RESPONSIVENESS RATIO OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>0.9650 (0.1126)</td>
<td>0.9544 (0.1942)</td>
<td>0.9575 (0.1706)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>1.0029 (0.0457)</td>
<td>3.9435 (10.3431)</td>
<td>3.0786 (8.6865)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>1.0100 (0.0555)</td>
<td>0.9356 (0.2239)</td>
<td>0.9575 (0.1909)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>0.8439 (0.0849)</td>
<td>1.1300 (0.8064)</td>
<td>1.0458 (0.6834)</td>
</tr>
<tr>
<td>Unichem</td>
<td>1.0356 (0.0649)</td>
<td>0.9944 (0.2651)</td>
<td>1.0065 (0.2230)</td>
</tr>
<tr>
<td>Alembic</td>
<td>0.9666 (0.0838)</td>
<td>0.9959 (0.2077)</td>
<td>0.9873 (0.1777)</td>
</tr>
<tr>
<td>All Companies</td>
<td>0.9707 (0.0947)</td>
<td>1.4923 (4.2342)</td>
<td>1.3389 (3.5585)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

Despite showing an increase in CRR after globalisation, Alembic has still maintained its CRR at less than one. Also, the CRR, in the case of pooled Indian companies has increased from 0.9707 in pre-globalisation period to 1.4923 percent in post-globalisation period. In three companies there are positive effects in the post Globalisation period, but in another three companies, there was adverse effect during that period. Hence, from the above results, it can be stated that the CRR level of pharmaceutical companies of Indian origin might have been increased because of (1)
the increased employment of qualified personnel for R&D which might have added
the employee expenses of pharmaceutical companies, and (2) the increased
employment of direct marketing personnel leading to an increase in the employee
cost.

**TABLE V.27**

**COST RESPONSIVENESS RATIO OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>0.8991 (0.3304)</td>
<td>0.8814 (0.7966)</td>
<td>0.8885 (0.6385)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>1.1455 (0.3968)</td>
<td>0.9391 (0.2437)</td>
<td>1.0217 (0.3212)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>1.1015 (0.2161)</td>
<td>1.0878 (0.4377)</td>
<td>1.0933 (0.3580)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>10.6736 (21.2554)</td>
<td>1.0299 (0.2645)</td>
<td>4.8874 (13.7835)</td>
</tr>
<tr>
<td>All Companies of Foreign Origin</td>
<td>3.4549 (10.9557)</td>
<td>0.9845 (0.4797)</td>
<td>1.9727 (6.9799)</td>
</tr>
</tbody>
</table>

**Figures in the parentheses indicate standard deviation.**

The Cost Effectiveness Ratio of foreign pharmaceutical companies in India (Table V.27) has declined in the post-globalisation period from that of pre-
globalisation period. The CRR level has declined from 0.8991 to 0.8814 in Glaxo, 1.1455 to 0.9391 in Pfizer, 1.1015 to 1.0878 in E-Merck and the decline has been from 10.6736 in the pre-period to 1.0299 in the post-period in the case of Abbott Ltd. The CRR value of pooled foreign companies has also declined from 3.4549 in the pre-
globalisation period to less than unit value (0.9845) in the post-globalisation period.

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TABLE V.28

COST RESPONSIVENESS RATIO OF
PHARMACEUTICAL INDUSTRY (POOLED) IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Pooled (Indian &amp; Foreign companies)</td>
<td>1.3213</td>
<td>1.2892</td>
<td>1.2991</td>
</tr>
<tr>
<td></td>
<td>(2.5102)</td>
<td>(3.2940)</td>
<td>(3.0650)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The analysis of the Table V.28 shows that, the CRR for pooled companies in India has declined during the post-globalisation period; it has declined from 1.3213 in the pre-globalisation period to 1.2892 during the post-globalisation period. Also there has been high fluctuation in the CRR during the post-period (SD = 3.2940) compared to the fluctuation in the pre-globalisation period (SD = 2.5102), revealing the dynamic change that is taking place in the industry.

5.4.2 Capital output ratio

The performance of the pharmaceutical industry during the two periods and the whole period has been measured through one of the general performance ratios, which reveals the output per unit of fixed capital, that is, Capital Output Ratio (COR). The COR is the relationship between the stock of capital at a particular period of time with respect to the flow of income in that period.

The COR is calculated by dividing the money value of actual output of a firm in a year with the size of capital employed during that year where the size of capital comprises of the sum of the total long-term funds employed in the business, namely, share capital plus reserves and surplus plus long-term loans minus fictitious assets, and output being the income generated by the firm. The formula for calculating the ratio is:
Capital Output Ratio (COR) = \frac{Net \, Value \, Added \, (NVA)}{Net \, Fixed \, Assets \, (NFA)}

The calculated COR for the pre- and post-globalisation periods as well as for the pooled periods for the selected pharmaceutical companies in India are portrayed in Tables V.29 to V.34, V.36 to V.39. Further, the CORs of the pooled Indian and pooled foreign companies are presented in Tables V.35 and V.40 respectively and Table V.41 portrayed the COR for the pharmaceutical companies of both Indian and foreign (pooled), for the above said period of time.

a) Capital Output Ratio of Indian companies in India

**TABLE V.29**

**CAPITAL OUTPUT RATIO OF CIPLA**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>14.61</td>
<td>28.30</td>
<td>19.55</td>
</tr>
<tr>
<td></td>
<td>(6.91)</td>
<td></td>
<td>(8.43)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>163.77</td>
<td>27.42</td>
<td>147.31</td>
</tr>
<tr>
<td></td>
<td>(124.23)</td>
<td></td>
<td>(106.06)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>114.05</td>
<td>27.06</td>
<td>104.72</td>
</tr>
<tr>
<td></td>
<td>(123.43)</td>
<td></td>
<td>(105.55)</td>
</tr>
</tbody>
</table>

*Figures in the parentheses indicate standard deviation.*

From the Table V.29 it is seen that the COR of CIPLA has been better and stood at 1.0386 in the post-globalisation period showing an increase from 0.7598 in the pre-globalisation period. The COR for the entire period (1986 to 2003) has been 0.9456, showing that for every unit of capital employed there has been 0.95 unit of output in CIPLA during the periods from 1985 to 2003. Thus there seem to be some
effect of globalisation on the COR as it is better in the post than in the pre-
globalisation period.

The COR of Dr. Reddy's laboratories (Table V.30) has shows a better value of 1.0290
during post-globalisation period than the pre-globalisation period (0.6284). Further, it
can be seen from the Table that COR has been fluctuating more in the post-
globalisation period (SD = 0.3415) than in the pre-globalisation period (SD = 0.2597).

TABLE V.30
CAPITAL OUTPUT RATIO OF DR. REDDY'S

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR (Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>3.71 (3.28)</td>
<td>87.93</td>
<td>5.41 (4.11)</td>
</tr>
<tr>
<td>(1986 – 1991)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>174.62 (209.41)</td>
<td>32.33</td>
<td>162.17 (146.28)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>117.65 (187.76)</td>
<td>47.05</td>
<td>109.92 (140.12)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The CORs of the Indian pharmaceutical companies - Ranbaxy (Table V.31),
Unichem (Table V.33) and Alembic (Table V.34) during the post-globalisation period
(0.7190, 0.8474 and 0.6455 respectively) have been lower than that of the pre-
globalisation period (0.7471, 0.9620 and 0.7616 respectively). Further the CORs have
also been more volatile in the post-globalisation period (standard deviations for
Ranbaxy, Unichem and Alembic being 0.2210 0.3875 and 0.1861 respectively) than
in the pre-globalisation period (SDs being 0.2104, 0.1369 and 0.0760 for Ranbaxy,
Unichem and Alembic respectively). Therefore from the above results, it is evident
that the CORs for Cipla, Dr. Reddy's laboratories, J.B.Chemicals have increased in the
post-globalisation period indicating an increase in the output of the products while there is no such increase in the other companies like Unichem and Alembic.

**TABLE V.31**
**CAPITAL OUTPUT RATIO OF RANBAXY**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>23.83</td>
<td>26.23</td>
<td>33.09</td>
</tr>
<tr>
<td></td>
<td>(10.67)</td>
<td></td>
<td>(13.46)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>307.69</td>
<td>20.11</td>
<td>428.64</td>
</tr>
<tr>
<td></td>
<td>(199.61)</td>
<td></td>
<td>(214.25)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>213.07</td>
<td>27.51</td>
<td>296.79</td>
</tr>
<tr>
<td></td>
<td>(211.60)</td>
<td></td>
<td>(258.01)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

For, J.B.Chemicals (Table V.31), the COR in the post-globalisation period has been more than that in the pre-globalisation period. It has been 0.9229 with less fluctuation as against 0.7814 during the pre-globalisation period with high fluctuation.

**TABLE V.32**
**CAPITAL OUTPUT RATIO OF J.B.CHEMICALS**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>6.81</td>
<td>39.20</td>
<td>8.26</td>
</tr>
<tr>
<td></td>
<td>(4.66)</td>
<td></td>
<td>(1.48)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>41.77</td>
<td>18.76</td>
<td>46.53</td>
</tr>
<tr>
<td></td>
<td>(26.46)</td>
<td></td>
<td>(26.33)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>30.12</td>
<td>21.74</td>
<td>33.77</td>
</tr>
<tr>
<td></td>
<td>(27.33)</td>
<td></td>
<td>(28.18)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.
### Table V.33: Capital Output Ratio of Unicem

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>10.23 (2.42)</td>
<td>11.29</td>
<td>10.55 (1.38)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>33.81 (19.57)</td>
<td>15.31</td>
<td>51.95 (37.21)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>25.95 (19.50)</td>
<td>13.46</td>
<td>38.15 (36.05)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

### Table V.34: Capital Output Ratio of Alembic

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>16.53 (4.10)</td>
<td>13.37</td>
<td>21.48 (3.48)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>67.36 (32.74)</td>
<td>15.09</td>
<td>115.03 (63.07)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>50.41 (36.14)</td>
<td>15.43</td>
<td>83.85 (68.09)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The analysis of the table V.35 pertaining to, the pooled Indian pharmaceutical companies, the capital output ratio (Table V.35) in the post-globalisation period (0.8671) has improved from its pre-globalisation period level (0.7734) but with high fluctuations compared to that in the pre-globalisation period. This higher fluctuation

173
in COR in the post-globalisation period may be attributed to the more crisscross trend in the Net value added (NVA) than in Net fixed assets (NFA).

**TABLE V.35**

**CAPITAL OUTPUT RATIO OF INDIAN PHARMACEUTICAL COMPANIES (POOLED)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>12.62 (8.73)</td>
<td>32.23</td>
<td>16.39 (11.52)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>131.50 (158.42)</td>
<td>21.34</td>
<td>158.61 (172.69)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>91.88 (140.89)</td>
<td>25.00</td>
<td>111.20 (156.10)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The capital output ratios of pooled Indian companies have increased as in the cost effectiveness ratio of pooled Indian companies because of the increase in operating cost.

b) Capital Output Ratio of foreign companies in India

With regard to foreign pharmaceutical companies in India, the analysis of the Tables V.36 to V.39 reveals that Glaxo, Pfizer, E-Merck and Abbott Ltd. have shown better capital output ratios during the post-globalisation period than the pre-globalisation period.
### TABLE V.36
CAPITAL OUTPUT RATIO OF GLAXO

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>49.54</td>
<td>10.91</td>
<td>54.33</td>
</tr>
<tr>
<td></td>
<td>(15.02)</td>
<td></td>
<td>(15.36)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>218.07</td>
<td>11.18</td>
<td>95.55</td>
</tr>
<tr>
<td></td>
<td>(108.98)</td>
<td></td>
<td>(10.97)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>145.84</td>
<td>13.47</td>
<td>77.88</td>
</tr>
<tr>
<td></td>
<td>(118.01)</td>
<td></td>
<td>(24.44)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

### TABLE V.37
CAPITAL OUTPUT RATIO OF PFIZER

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>22.43</td>
<td>8.06</td>
<td>11.99</td>
</tr>
<tr>
<td></td>
<td>(6.87)</td>
<td></td>
<td>(2.06)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>85.79</td>
<td>14.85</td>
<td>34.53</td>
</tr>
<tr>
<td></td>
<td>(49.55)</td>
<td></td>
<td>(10.11)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>58.64</td>
<td>12.64</td>
<td>24.87</td>
</tr>
<tr>
<td></td>
<td>(49.00)</td>
<td></td>
<td>(13.73)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.
TABLE V.38
CAPITAL OUTPUT RATIO OF E-MERCK

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>10.56 (4.21)</td>
<td>15.18</td>
<td>11.91 (8.18)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>62.96 (28.82)</td>
<td>15.62</td>
<td>53.91 (13.04)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>40.50 (34.21)</td>
<td>17.32</td>
<td>35.91 (23.96)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

TABLE V.39
CAPITAL OUTPUT RATIO OF ABBOTT LTD.

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>10.22 (9.06)</td>
<td>32.15</td>
<td>5.85 (3.70)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>59.34 (29.55)</td>
<td>13.93</td>
<td>35.25 (16.04)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>38.29 (33.67)</td>
<td>20.35</td>
<td>22.65 (19.21)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The COR for Glaxo has stood at 2.3093 during post-globalisation period against 0.9158 during pre-globalisation period but the fluctuation in COR in the post-globalisation period (SD = 1.2178) has been higher than in the pre-globalisation period (SD = 0.1626). The COR for the other three foreign companies, namely, Pfizer, E-Merck and Abbott Ltd. are 2.3787, 1.1214, 1.8645 during the post-
globalisation period and, 1.9213, 0.9945 and 1.5965 during the pre-globalisation period respectively. At the same time, in all the cases the CORs have revealed higher fluctuations in the post-globalisation period than in the pre-globalisation period as the values of standard deviation of COR’s in the post-globalisation period are higher than that in the pre-globalisation period for the three companies.

**TABLE V.40**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>23.19 (18.66)</td>
<td>16.22</td>
<td>21.02 (21.45)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>106.54 (89.96)</td>
<td>13.88</td>
<td>54.81 (27.91)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>70.82 (80.32)</td>
<td>15.90</td>
<td>40.33 (30.30)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The COR for the pooled foreign pharmaceutical companies in India (as in the Table V.40) has risen to 1.9185 during the post-globalisation period. But, as has been in the case of individual foreign companies, there has been high fluctuation in the COR during post-period (SD = 0.9356) compared to the pre-period (SD = 0.6330). The above trend in the foreign companies can be attributed either to selling of their companies to the Indian counterparts due to the unfavorable conditions prevailing in the years after globalisation or to the diversification of their business to other areas and reducing their investments in the pharmaceutical industry in India as the increase
in COR clearly indicates a decrease in fixed assets (investments in fixed assets is less).

c) Capital Output Ratio of Pharmaceutical Industry in India (Pooled)

**TABLE V.41**

**CAPITAL OUTPUT RATIO OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Net Value Added (NVA)</th>
<th>Net Fixed Assets (NFA)</th>
<th>Capital Output Ratio (COR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>CGR</td>
<td>Mean</td>
</tr>
<tr>
<td>Pre-globalisation</td>
<td>18.28 (15.91)</td>
<td>29.03</td>
<td>19.18 (17.27)</td>
</tr>
<tr>
<td>Post-globalisation</td>
<td>121.52 (135.36)</td>
<td>15.72</td>
<td>117.09 (143.90)</td>
</tr>
<tr>
<td>Pooled Period</td>
<td>87.10 (121.02)</td>
<td>20.59</td>
<td>84.45 (126.52)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The analysis of Table V.41, in which the results of calculated COR for pooled pharmaceutical companies (both Indian and foreign companies in India) is reveal a of better utilization of capital resources in the post-globalisation period than in the pre-globalisation period despite higher variation (SD = 0.8189). Regarding the entire period, the COR has been at a higher level with a value of above one (1.2001).

Further observation of Table V.41 reveals that the COR of all the pharmaceutical companies (pooled) in India is also measured in the same lines. The COR of the pharmaceutical units in India after globalisation as measured through its mean value was 1.2876 higher than that before globalisation 1.0250. The above results indicate an improvement in the COR of pharmaceutical industry in India in the post globalisation period.
To conclude, from the foregoing analysis, there has been an improvement in capital output ratio (COR) during the post-globalisation period. That is, the pharmaceutical industry, in general, has utilized the capital resources in a better way in the post-globalisation era than in the pre-globalisation period, which in turn, reveals the influence of globalisation on the utilization of capital resources of pharmaceutical industry in India.

5.4.3 Capital Turnover Ratio

The Capital Turnover Ratio (CTR) measures the relationship between sales and total capital employed. That is, how far the total long-term funds have been used in generating the sales. Higher the ratio, higher is the operating efficiency of the company. It is calculated by dividing Net Sales by Total Capital where the total capital is the sum of paid-up capital and shareholders reserves and surplus, and long-term borrowings. The formula for calculating Capital turnover ratio is as follows:

\[
\text{Capital Turnover Ratio (CTR):} \quad \frac{\text{Net Sales}}{\text{Share Capital} + \text{Shareholders' Reserves} + \text{Longterm Debt}}
\]

The capital turnover ratio (CTR) for the Indian, foreign companies as well as for all the companies together for the pre- and post-globalisation periods have been calculated and the results are portrayed in Tables V.42 to V.44.
<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Cipla</td>
<td>3.3676 (0.91)</td>
<td>2.1265 (0.71)</td>
<td>2.5402 (0.96)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>3.7289 (1.37)</td>
<td>2.0545 (1.73)</td>
<td>2.6126 (1.77)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>4.8302 (1.07)</td>
<td>2.2992 (2.00)</td>
<td>3.1429 (2.11)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>3.5851 (0.73)</td>
<td>1.9951 (0.57)</td>
<td>2.5251 (0.98)</td>
</tr>
<tr>
<td>Unichem</td>
<td>4.5094 (1.16)</td>
<td>3.5696 (1.77)</td>
<td>3.8829 (1.62)</td>
</tr>
<tr>
<td>Alembic</td>
<td>3.9123 (0.97)</td>
<td>4.4214 (2.35)</td>
<td>4.2517 (1.98)</td>
</tr>
<tr>
<td>All Companies</td>
<td>3.9889 (1.11)</td>
<td>2.7444 (1.85)</td>
<td>3.1592 (1.74)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate degrees of freedom.

The analysis of Table V.42 indicates a lower CTR during the post-globalisation period than in the pre-globalisation period for the Indian pharmaceutical companies except Alembic, which has shown a higher CTR of 4.42 in the above period, an increase from 3.91. For all the Indian companies together, the decline in CTR has been from 3.98 in the pre-globalisation period to 2.74 in the post-globalisation period reveals that Re.1 employed as capital has generated Rs.3.99 of sales in the pre-globalisation period whereas the same one rupee has generated only Rs.2.74 of sales in the post-globalisation period i.e., an ineffective use of capital.
<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>3.6761 (0.97)</td>
<td>3.5470 (1.64)</td>
<td>3.6024 (1.36)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>2.7861 (0.87)</td>
<td>3.7016 (0.91)</td>
<td>3.3092 (0.99)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>3.7800 (0.41)</td>
<td>3.5888 (1.20)</td>
<td>3.6707 (0.93)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>4.4395 (1.50)</td>
<td>3.9807 (1.17)</td>
<td>4.1773 (1.31)</td>
</tr>
<tr>
<td>All Companies</td>
<td>3.6704 (1.14)</td>
<td>3.7045 (1.23)</td>
<td>3.6899 (1.18)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The Capital Turnover Ratios of the foreign companies is also on par with the Indian companies. The Table V.43 indicates that, in the post-globalisation period, only Pfizer has shown an improvement to 3.7016 from 2.7861 in the pre-globalisation period. That is, the other three foreign companies, namely, Glaxo, E-Merck and Abbott Ltd. have generated less sales in the post-globalisation period than they had generated in the pre-globalisation period with one rupee of total fund employed. For all the foreign companies together, the Capital Turnover Ratios have shown a slight improvement in the ratio from 3.6704 to 3.7045.
### TABLE V.44

**CAPITAL TURNOVER RATIOS OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (Standard Deviation)</td>
<td>Mean (Standard Deviation)</td>
<td>Mean (Standard Deviation)</td>
</tr>
<tr>
<td>All Companies in India</td>
<td>4.0330 (1.10)</td>
<td>3.1284 (1.69)</td>
<td>3.4300 (1.57)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

Analysis of Table V.44 pertaining to Capital Turnover Ratios of the pharmaceutical industry in India reveals that one rupee of investors’ fund has generated only Rs.3.13 of sales in the post-globalisation period as against Rs.4.03 in the pre-globalisation period. To sum up, the overall results indicate that the effect of globalisation on CTR is such that each rupee of investors’ fund has generated less sales in the post-globalisation period when compared to the pre-globalisation period.

#### 5.4.4 Fixed assets turnover ratio

The fixed assets turnover ratio attempts to measure the efficiency of the capital by indicating the proportion of fixed assets used to generate output. The smaller the amount of assets the firm needs to generate a given level of output, the better is the Total Assets Turnover Ratio. Lower the ratio, poorer is the performance. Higher the ratio better is the performance. Therefore, if the ratio increases, it is a symptom of better use of the assets. The formula for calculating this ratio is:

\[
\text{Fixed Assets Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Total Assets}}
\]

The calculated Fixed Assets Turnover Ratios for the Indian, foreign and all companies together are depicted in Tables V.45 to V.47.
Observation of Table V.45 shows that the fixed assets turnover ratio in Cipla has increased marginally from 2.83 during the pre-globalisation period to 2.87 during the post-globalisation period. That is, Cipla generated 2.83 rupees worth of output in the pre-globalisation period and 2.87 rupee worth of output in the post-globalisation period for every rupee of assets invested. Except Cipla all other companies like Dr. Reddy's, Ranbaxy, J.B. Chemicals, Unichem and Alembic this ratio showed downward trend from pre-globalisation to post-globalisation period.

**TABLE V.45**

FIXED ASSETS TURNOVER RATIO OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>2.8288 (1.06)</td>
<td>2.8655 (0.38)</td>
<td>2.8532 (0.65)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>2.3734 (0.86)</td>
<td>2.3174 (1.09)</td>
<td>2.3361 (0.99)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>3.7397 (1.11)</td>
<td>2.3465 (0.71)</td>
<td>2.8109 (1.07)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>3.3475 (0.49)</td>
<td>2.5833 (0.82)</td>
<td>2.8380 (0.80)</td>
</tr>
<tr>
<td>Unichem</td>
<td>3.8295 (0.89)</td>
<td>3.6320 (2.16)</td>
<td>3.6978 (1.81)</td>
</tr>
<tr>
<td>Alembic</td>
<td>3.5740 (0.64)</td>
<td>2.7169 (1.41)</td>
<td>3.0026 (1.26)</td>
</tr>
<tr>
<td>All Companies</td>
<td>3.2821 (0.96)</td>
<td>2.7436 (1.27)</td>
<td>2.9231 (1.20)</td>
</tr>
</tbody>
</table>

The figures in brackets indicate standard deviation.
In the companies like Dr. Reddy's, Ranbaxy, J.B.Chemicals and Alembic, the fixed assets ratio has fallen when compared to the pre-globalisation revealing a fall in the operating performance and hence the profit generating capacity has reduced.

**TABLE V.46**

**FIXED ASSETS TURNOVER RATIO OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glaxo</td>
<td>3.0184</td>
<td>6.6139</td>
<td>5.0730</td>
</tr>
<tr>
<td></td>
<td>(0.71)</td>
<td>(1.42)</td>
<td>(2.15)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>5.3535</td>
<td>6.1228</td>
<td>5.7931</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(1.45)</td>
<td>(1.73)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>2.9357</td>
<td>2.8532</td>
<td>2.8886</td>
</tr>
<tr>
<td></td>
<td>(0.46)</td>
<td>(0.51)</td>
<td>(0.48)</td>
</tr>
<tr>
<td>Abbott</td>
<td>5.2345</td>
<td>5.9865</td>
<td>5.6642</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(2.12)</td>
<td>(1.88)</td>
</tr>
<tr>
<td>All Companies</td>
<td>4.1355</td>
<td>5.3941</td>
<td>4.8547</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(2.08)</td>
<td>(2.03)</td>
</tr>
</tbody>
</table>

The figures in brackets indicate standard deviation.

With respect to the fixed assets turnover ratio of the selected foreign pharmaceutical companies in India, the observation of Table V.46 shows an increase in the same after globalisation. In the post-globalisation period, the fixed assets turnover ratio for Glaxo, Pfizer, and Abbott has increased to 6.61, 6.12, 5.98 respectively in the post-globalisation period from 3.02, 5.35 and 5.99 respectively in the pre-globalisation period. Among the foreign companies E-Merck fixed assets turnover ratio has decreased in the same period. The above trend can be attributed to the fact that the fixed capital intensity is lower for the foreign companies compared to
that of the Indian companies because they primarily concentrate on formulation. Accordingly, the fixed assets turnover ratio for the foreign companies is higher.

In the case of the fixed assets turnover ratio of the foreign companies together, the ratio has increased from 4.14 to 5.40 in the pre- to post-globalisation period revealing that the operating performance of the foreign companies is better after the introduction of the change.

The operating performance of the Indian pharmaceutical industry as measured through the assets turnover ratio, of all the sample companies is prepared and shown in the table V.47.

**TABLE V.47**

**FIXED ASSETS TURNOVER RATIO OF PHARMACEUTICAL INDUSTRY (POOLED) IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>All Companies</td>
<td>3.7088 (1.46)</td>
<td>3.8038 (2.09)</td>
<td>3.7682 (1.88)</td>
</tr>
</tbody>
</table>

The figures in brackets indicate standard deviation

Table V.47 depicts the fixed assets turnover ratio of all the selected pharmaceutical companies in India (pooled). Analysis of the table clearly indicates the marginal increase in fixed asset turnover ratio after globalisation. The fixed assets turnover ratio of the pharmaceutical industry of Indian origin has decreased from 3.28 in the pre-globalisation period to 2.74 in the post-globalisation period whereas the fixed assets turnover ratio of the foreign companies has increased from 4.14 to 5.39 in the same period. The above results further indicate that the pharmaceutical companies in India, generally, have used more assets in the post-globalisation period than in the
pre-globalisation period to generate a given level of output, which may be due to increase in the investments. The increase in investments may further be attributed to the expansion and modernisation of their manufacturing activities after globalisation to compete with the international market.

5.4.5 Working Capital Turnover Ratio

The Working Capital Turnover Ratio (WCTR) studies the velocity or utilization of the Working Capital (WC) of the firm during a year. The higher the WCT ratio, the lower is the investment in the WC and higher would be the profitability. A high WCT ratio reflects a better utilization of the WC of the firm.

It is calculated dividing cost of goods sold by the average gross working capital, where the average gross working capital is the average of opening and closing balance of the given period. The formula is given below:

\[
\text{Working Capital Turnover Ratio (WCTR)} = \frac{\text{Cost of Goods Sold}}{\text{Average Gross Working Capital}}
\]

The working capital turnover ratio (WCTR) for the selected pharmaceutical companies individually as well as for pooled (pooled Indian, foreign and overall) has been calculated and the results are portrayed in Tables V.48 to V.50.
### TABLE V.48

**WORKING CAPITAL TURNOVER RATIOS OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>1.9079 (0.40)</td>
<td>1.2381 (0.24)</td>
<td>1.4613 (0.44)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>1.8331 (0.23)</td>
<td>1.2363 (0.64)</td>
<td>1.4352 (0.60)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>1.4078 (0.30)</td>
<td>1.1752 (0.46)</td>
<td>1.2528 (0.42)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>2.2997 (0.27)</td>
<td>1.3824 (0.42)</td>
<td>1.6882 (0.58)</td>
</tr>
<tr>
<td>Unichem</td>
<td>2.8968 (0.53)</td>
<td>2.2259 (0.31)</td>
<td>2.4495 (0.50)</td>
</tr>
<tr>
<td>Alembic</td>
<td>1.8494 (0.27)</td>
<td>2.0811 (0.47)</td>
<td>2.0039 (0.42)</td>
</tr>
<tr>
<td>All Companies</td>
<td>2.0324 (0.57)</td>
<td>1.5565 (0.61)</td>
<td>1.7152 (0.63)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

Observation of Table V.48 shows that the WCTR has declined to 1.2381 from 1.9079 in Cipla, to 1.2363 from 1.8331 in Dr. Reddy's, to 1.1752 from 1.4078 in Ranbaxy, to 1.3824 from 2.2997 in J.B. Chemicals, to 2.2259 from 2.8968 in Unichem respectively during the post-globalisation period from the pre-globalisation period whereas the WCTR of Alembic has increased from 1.8494 in the pre-globalisation period to 2.0811 in the post-globalisation period. The decrease in WCTR in the post-globalisation period for Cipla, Dr. Reddy's, Ranbaxy, J.B. Chemicals and Unichem may be due to busy business as a result of globalisation i.e., a positive impact. The Alembic might not have made use of this situation. Anyhow, the WCTR for the
pooled Indian pharmaceutical companies has declined to 1.5565 period from 2.0324 in the pre-globalisation period.

**TABLE V.49**

**WORKING CAPITAL TURNOVER RATIOS OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>2.3835 (0.44)</td>
<td>2.2509 (0.91)</td>
<td>2.3077 (0.73)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>1.8393 (0.52)</td>
<td>1.8631 (0.45)</td>
<td>1.8529 (0.47)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>1.6333 (0.11)</td>
<td>1.8289 (0.25)</td>
<td>1.7451 (0.22)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>2.1856 (0.35)</td>
<td>2.3804 (0.42)</td>
<td>2.2969 (0.40)</td>
</tr>
<tr>
<td>All Companies</td>
<td>2.0104 (0.47)</td>
<td>2.0808 (0.60)</td>
<td>2.0506 (0.54)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

With regard to the foreign pharmaceutical companies in India, the analysis of Table V.49 shows that the WCTR of all the foreign companies, except Glaxo, have shown upward movement in the post-globalisation period compared to that of the pre-globalisation period. In Glaxo, the WCTR has declined to 2.2509 in the post-globalisation period from 2.3835 in the pre-globalisation period as in the Indian companies. The increase in WCTR in the case of all other foreign companies, namely, Pfizer, E-Merck and Abbott Ltd. in the post-globalisation period might be due to increase in the cost of goods sold or reduction in the level of business. The pooled foreign companies also have shown an increase in the average WCTR and higher (standard deviation) in the post-globalisation period. The average WCTR has
increased from 2.0104 with standard deviation of 0.47 in the pre-globalisation period to 2.0808 with standard deviation of 0.60 in the post-globalisation period. This is because all foreign companies except Glaxo have reduced their operation in view of heavy competition with Indian companies.

**TABLE V.50**

**WORKING CAPITAL TURNOVER RATIOS OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation Mean</th>
<th>Post-globalisation Mean</th>
<th>Pooled Period Mean</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Companies in India</td>
<td>2.0848 (0.53)</td>
<td>1.7662 (0.65)</td>
<td>1.8724 (0.63)</td>
<td></td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

From Table V.50, which gives the WCTR of the overall pharmaceutical industry, it is seen that the ratio has decreased from 2.0848 to 1.7662. The volatility in WCTR is less (SD = 0.53) in the pre-globalisation period compared to that in the post-globalisation period (SD = 0.65). This may be because, after globalisation, the pharmaceutical companies in India have increased their product portfolios, exports, and credit terms in view of the competition resulting in an increase in the Current Assets. This is particularly true for Cipla, Dr.Reddy’s, Ranbaxy, J.B.Chemicals, Unichem and Glaxo.

**5.4.6 Inventory Turnover Ratio**

The Inventory Turnover Ratio (ITR) indicates the rate at which a company is turning its inventory into cash. One needs to compare this number for pre-globalisation with that of the post-globalisation to get a good feel of how efficiently the current assets are managed in each of the pharmaceutical companies (Indian and foreign). The formula for calculating the inventory turnover ratio is as follows:
Inventory Turnover Ratio = Cost of Goods Sold
Average Annual Inventory

Where, Average annual inventory = (opening balance of inventory + closing balance of inventory)/2.

The 'Inventory Turnover Ratios' for the selected Indian and foreign pharmaceutical companies as well as for the pooled companies are calculated and presented in Tables V.51 to V.53.

TABLE V.51

INVENTORY TURNOVER RATIOS OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>3.8869 (1.18)</td>
<td>2.6954 (0.29)</td>
<td>3.0926 (0.89)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>3.6486 (0.49)</td>
<td>3.7144 (0.92)</td>
<td>3.6925 (0.79)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>3.1194 (0.59)</td>
<td>3.7227 (0.72)</td>
<td>3.5216 (0.72)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>8.0081 (1.37)</td>
<td>6.3146 (0.50)</td>
<td>6.8791 (1.18)</td>
</tr>
<tr>
<td>Unichem</td>
<td>6.8981 (1.29)</td>
<td>6.4911 (0.97)</td>
<td>6.6268 (1.07)</td>
</tr>
<tr>
<td>Alembic</td>
<td>3.7511 (0.54)</td>
<td>4.9635 (0.94)</td>
<td>4.5594 (1.00)</td>
</tr>
<tr>
<td>All Companies</td>
<td>4.8854 (2.09)</td>
<td>4.6503 (1.59)</td>
<td>4.7286 (1.77)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

It can be seen from Table V.51 that the ITRs of Cipla, J.B.Chemicals and Unichem have become lesser in the post globalisation period than the pre-
globalisation period indicating an increase in the inventory holding days and a decline in selling of the inventories. The ITR of Cipla 2.6954 shows that the inventories are held for 135 days (365/2.6954) during the post-period as against 94 days (365/3.8869) during the pre-period and also the 118 days (365/3.0926) during the overall period. Similarly, the inventory holding days for J.B. Chemicals has been 58 in the post globalisation-period as against 46 days in the pre-period, and for Unichem it has been 56 days in the post-period as against 53 days in the pre-period. At the same time, it seems that there has not been much difference in days of inventory held during pre- and post-globalisation periods, in the case of Unichem.

The other three Indian pharmaceutical companies namely Dr. Reddy’s, Ranbaxy, and Alembic have performed well in selling their inventories after globalisation, which in turn have led to decrease in the inventory-holding period. Before and after the globalisation period, the inventory has been held for and 98 days in Dr. Reddy’s, and 98 days in Ranbaxy, and 97 and 74 days in the case of Alembic. In case of the overall Indian pharmaceutical companies, inventory holding has been more after globalisation (78 days) than before globalisation (75 days) and also the pooled period figure of 77 days. The above scenario may be due to the fact that the average inventory levels are quite high in the pharmaceutical industry because of extensive marketing and distribution network and presence of a large number of brand formulations. The high inventory holding period is also a result of high raw material inventory. The Indian companies’ inventory turnover ratio has increased from the pre- to post-globalisation period may be because of increased sales in the export market and increased credit term that can be witnessed in the debtors turnover ratio.

Regarding the foreign pharmaceutical companies in India, the Table V.53 shows clear indication of good performance by them after globalisation.
<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>3.8435 (0.70)</td>
<td>4.7978 (0.95)</td>
<td>4.3888 (0.96)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>3.5425 (0.74)</td>
<td>4.6730 (0.76)</td>
<td>4.1885 (0.93)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>3.0156 (0.48)</td>
<td>3.5987 (0.48)</td>
<td>3.3488 (0.55)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>3.9502 (0.50)</td>
<td>4.7454 (0.55)</td>
<td>4.4046 (0.66)</td>
</tr>
<tr>
<td>All Companies</td>
<td>3.5880 (0.70)</td>
<td>4.4537 (0.85)</td>
<td>4.0827 (0.89)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The ITRs of all the selected foreign companies have been more than that of pre-globalisation level. That is, during the pre- and the post-globalisation period, the ITRs have been 3.8435 and 4.7978 for Glaxo, 3.5425 and 4.6730 for Pfizer, 3.0156 and 3.5987 for E-Merck, and 3.9502 and 4.7454 for Abbott Ltd. respectively. In terms of inventory holding days, it has been 95 and 76 days for Glaxo, 103 and 78 days for Pfizer, 121 and 101 days for E-Merck, and 92 days and 77 days for Abbott Ltd. respectively during the pre- and post-globalisation periods. For the pooled foreign companies the ratios are on par with the individual companies. For the pooled companies the ITRs have been 3.5880 and 4.4537 during the pre and post globalisation periods having a inventory holding period of 102 days and 82 days for the same period i.e. increase in the ratio and decrease in the inventory holding periods. This may be because the foreign companies might have reduced their
operations in India after the introduction of globalisation. More over the foreign companies might have followed more of cash sales policy and less of credit sales. It decreases in the inventory holding period.

**TABLE V.53**

INVENTORY TURNOVER RATIO OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>All Companies</td>
<td>4.4569 (1.75)</td>
<td>4.5717 (1.35)</td>
<td>4.5334 (1.49)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

As a whole the analysis of the inventory turn over ratio of selected Indian and foreign pharmaceutical companies operating in India have revealed that the globalisation has created an impact on managing and selling of the inventory only in the foreign companies and it has not created that impact on the Indian companies.

5.4.7 Debtors turnover ratio (Accounts receivable turnover ratio)

The Debtor Turnover Ratio (DTR), also called accounts receivable turnover ratio indicates how quickly a firm collects its debts. This ratio can also be expressed as Days Account Receivable Outstanding. That is, the number of days that elapse between the time of sales and the time of its collection. To compute this ratio for selected pharmaceutical companies, the following formula has been used.

\[
\text{Debtors Turnover Ratio} = \frac{\text{Net Credit Sales}}{\text{Average Accounts Receivable}}
\]
The debtor's turnover ratio for the individual pharmaceutical companies and pooled companies of all origin have been calculated and presented in Tables V.54 to V.56.

**TABLE V.54**

DEBTORS TURNOVER RATIOS OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>11.7262 (2.49)</td>
<td>8.1060 (2.34)</td>
<td>9.3128 (2.91)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>8.8055 (3.80)</td>
<td>4.5774 (3.13)</td>
<td>5.9867 (3.85)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>5.3454 (0.95)</td>
<td>3.3556 (1.66)</td>
<td>4.0189 (1.73)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>4.7137 (0.76)</td>
<td>2.9818 (0.91)</td>
<td>3.5591 (1.19)</td>
</tr>
<tr>
<td>Unichem</td>
<td>7.0709 (1.16)</td>
<td>5.0843 (1.05)</td>
<td>5.7465 (1.43)</td>
</tr>
<tr>
<td>Alembic</td>
<td>5.0769 (0.59)</td>
<td>6.0975 (1.48)</td>
<td>5.7573 (1.33)</td>
</tr>
<tr>
<td>All Companies</td>
<td>7.1231 (3.13)</td>
<td>5.0338 (2.54)</td>
<td>5.7302 (2.91)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The results presented in Table V.42 clearly reveal that the mean value of the DTR of all the Indian companies have come down in the post-globalisation period from 7.12 to 5.03 and the ratio for the pooled period is 5.73. Among the Indian pharmaceutical companies, only Alembic has shown an increase in the DTR during post-globalisation period. That is, the average number of days needed for Alembic to collect the cash has decreased from 72 days (365 / 5.08) in the pre-globalisation
period to 60 days (365 / 6.10) in the post-globalisation period. Though, the average collection period has been more during the years after globalisation for the remaining Indian companies, the collection period of 45 days (365 / 8.11) for Cipla is quicker than the pooled Indian companies’ average of 73 days (365 / 5.03) and pooled companies’ average of 59 days. The remaining four Indian companies, namely, Dr.Reddy’s, Ranbaxy, J.B.Chemicals and Unichem have kept their average collection periods at 80, 109, 122 and 72 days respectively during the post-globalisation period which is more than that of the pre-globalisation period. But anyhow, either increase or decrease in average collection period of accounts receivable or sales on credit may be because of the intensive competition in pharmaceutical industry due to the impact of globalisation.

**TABLE V.55**

DEBTORS TURNOVER RATIOS OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>20.2153 (11.78)</td>
<td>9.6037 (3.61)</td>
<td>14.1515 (9.57)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>8.2124 (1.41)</td>
<td>6.5012 (1.26)</td>
<td>7.2346 (1.56)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>5.4902 (0.72)</td>
<td>6.0055 (1.20)</td>
<td>5.7847 (1.03)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>7.3944 (2.46)</td>
<td>9.7195 (2.11)</td>
<td>8.7230 (2.50)</td>
</tr>
<tr>
<td>All Companies</td>
<td>10.3281 (8.26)</td>
<td>7.9575 (2.79)</td>
<td>8.9734 (5.88)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.
Regarding the analysis of the DTR of foreign pharmaceutical companies, Table V.51, it reveals that the average collection periods for Glaxo, Pfizer, E-Merck and Abbott Ltd. are 38 days (365/9.6037), 56 days (365/6.5012), 61 days (365/6.0055) and 38 days (365/9.7175) respectively during the post-globalisation period compared to 18 days, 44 days, 66 days and 49 days in the pre-globalisation period. The average collection period for the pooled foreign companies is 46 days for the post-globalisation period as against 35 days in the pre-globalisation period. From the above results, it is clear that the credit sales has been more in the case of Glaxo and Pfizer while the scenario has been reverse in E-Merck and Abbott Ltd. Anyhow, the impact of globalisation is visible in respect of foreign companies too. The foreign companies have very low number of day’s outstanding credit, which is the result of their strong brand equity. Further, they have reduced their operations in India because of the enactment of the IPA in 1970. This has resulted in reduction in the credit sales.

The analysis of Table V.44 shows an increase in average collected period of 59 days (365/6.2033) during the post-globalisation period from the average level of 43 days (365 / 8.4967) during the pre-globalisation period thus revealing an increase in the credit collection period after the introduction of globalisation. This further reveals that globalisation has created a competitive environment in the pharmaceutical industry, which resulted in a decrease in the DTR and an increase in the Debt Collection Period.
TABLE V.56

DEBTORS TURNOVER RATIOS OF
PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>All Companies</td>
<td>8.4967 (6.38)</td>
<td>6.2033 (3.00)</td>
<td>6.9677 (4.54)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

5.5 Profitability ratios

5.5.1 Operating Profit Ratio

The operating profit ratio will pinpoint the proportion of operating profits to total sales revenue and also indicate the profitability rate achieved by the company’s business. The higher the value, the better is the Operating Profit Margin. Here, the operating profit ratios for the periods before and after globalisation as well as with the whole period (1985-2003) have been compared. The formula for calculating the above ratio is as follows:

\[
\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}}
\]

The calculated ‘Operating Profit Ratio’ for the selected individual Indian and pooled Indian companies and for the individual foreign and pooled foreign companies and for the whole sample Indian and foreign companies are depicted in Tables V.57 to V.59.
<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Cipla</td>
<td>0.1203 (0.01)</td>
<td>0.1892 (0.05)</td>
<td>0.1662 (0.05)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>0.1688 (0.01)</td>
<td>0.2321 (0.05)</td>
<td>0.2110 (0.05)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>0.0935 (0.01)</td>
<td>0.1423 (0.02)</td>
<td>0.1261 (0.03)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>0.1246 (0.05)</td>
<td>0.1681 (0.03)</td>
<td>0.1536 (0.04)</td>
</tr>
<tr>
<td>Unichem</td>
<td>0.0574 (0.01)</td>
<td>0.1055 (0.04)</td>
<td>0.0895 (0.04)</td>
</tr>
<tr>
<td>Alembic</td>
<td>0.0798 (0.005)</td>
<td>0.1113 (0.03)</td>
<td>0.1008 (0.03)</td>
</tr>
<tr>
<td>All Companies</td>
<td>0.1074 (0.04)</td>
<td>0.1581 (0.06)</td>
<td>0.1412 (0.06)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The observation of the Table V.57 indicates that the operating profit ratios of Indian companies have increased during the post-globalisation period. The operating profit ratios have increased from 0.12 to 0.19 in Cipla, from 0.17 to 0.23 in Dr.Reddy's, from 0.09 to 0.14 in Ranbaxy, from 0.12 to 0.17 in J.B.Chemicals, from 0.06 to 0.11 in Unichem, and from 0.08 to 0.11 in case of Alembic. The operating profit margin for the pooled Indian companies has also increased from 10.7 percent (0.11) in the pre-globalisation period to 15.8 percent (0.16) in the post-globalisation period.
For all the Indian companies, the operating profit ratio has increased from pre- to post-globalisation period ranging from 50 percent to 75 percent. This is due to the efficient reduction in material cost. The reason for this decline is the backward integration into raw material production. A part of the reduction in material cost can be attributed to the decline in bulk drug production. Further, the dilution of DPCO from 70 percent to 30 percent market share of drugs and an increase in exports has boosted the operating profit ratio. This will have same implications on fixing the selling price at a higher level.

**TABLE V.58**

<table>
<thead>
<tr>
<th>OPERATING PROFIT RATIOS OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Companies</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Glaxo</td>
</tr>
<tr>
<td>Pfizer</td>
</tr>
<tr>
<td>E-Merck</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
</tr>
<tr>
<td>All Companies</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The operating profit ratios for the foreign pharmaceutical companies in India have also shown an improvement as has been seen in the Indian companies. From Table V.58, it can be observed that the operating profit ratio for Glaxo has increased to some extent from 0.09 in the pre-globalisation period to 0.11 in the post-globalisation period. But,
there has been considerable increase in the operating profit margin of the other three companies, namely Pfizer, E-Merck and Abbott Ltd. From the pre-globalisation period to the post-globalisation period, the operating profit ratios have increased from 0.08 to 0.12 in Pfizer, from 0.11 to 0.16 in E-Merck, and from 0.07 to 0.13 in Abbott Ltd. In respect of the pooled foreign companies, the operating profit margin has increased from 0.09 in the pre-globalisation period to 0.13 in the post-globalisation period. The operating profit margin of MNCs has increased only from about 8.7 percent to 12.7 percent because of the dilution of DPCO after globalisation. The above increase in operating profit ratio can also be attributed to the decrease in import tariff as MNCs are used to import the brands affiliated to the parent company as well as to abolition of quantitative restriction.

**TABLE V.59**

**OPERATING PROFIT RATIOS OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)**

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>All Companies</td>
<td>0.0969(0.04)</td>
<td>0.1457(0.05)</td>
<td>0.1294(0.05)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

For all the companies pooled together, the operating profit ratio has increased to 0.15 during the years after globalisation from 0.10 during the years before globalisation (Table V.59).

The operating profit ratio of the pharmaceutical industry in the post-globalisation period (0.15) has been more than in the pre-globalisation period (0.10). When comparing the industrial average ratio of 9.7 percent for the pre- and 14.6 percent for the post-globalisation period, the Indian companies are at a higher level both in the pre- and
14.6 percent for the post-globalisation period, the Indian companies are at a higher level both in the pre-and post-globalisation periods when compared to the foreign companies. This would have further boosted Indian companies to invest more in their company.

From the foregoing analysis of the operating profit margin ratios of the selected Indian and foreign pharmaceutical companies in India, it can be concluded that the operating expenses have declined during the years after globalisation (1992-2003) when compared to that of the pre-globalisation period (1985-1991) leading to increase in earnings before interest and taxes due to globalisation.

5.5.2 Net Profit Ratio

The net profit ratio (NPR) fine-tunes the operating profit margin. In the case of net profit ratio also, the higher the ratio, the better is the profitability of the company in turn indicating the level of operating performance of the company in a given period. The formula for calculating net profit ratio is as follows:

\[
\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}}
\]

The calculated 'Net Profit Ratio' for the individual Indian and foreign pharmaceutical companies, the pooled Indian and the pooled foreign companies, and also for the pharmaceutical industry are presented in Tables V.60 to V.62.
TABLE V.60

NET PROFIT RATIOS OF INDIAN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation Mean</th>
<th>Post-globalisation Mean</th>
<th>Pooled Period Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cipla</td>
<td>0.0521</td>
<td>0.1315</td>
<td>0.1050</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Dr Reddy</td>
<td>0.0500</td>
<td>0.1805</td>
<td>0.1370</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.06)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Ranbaxy</td>
<td>0.0338</td>
<td>0.1126</td>
<td>0.0863</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.03)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>J.B. Chemical</td>
<td>0.0600</td>
<td>0.1235</td>
<td>0.1024</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Unichem</td>
<td>0.0179</td>
<td>0.0659</td>
<td>0.0499</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Alembic</td>
<td>0.0175</td>
<td>0.0363</td>
<td>0.0300</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>All Companies</td>
<td>0.0385</td>
<td>0.1084</td>
<td>0.0851</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

The analysis of the net profit margin ratios reveals that the profit margin ratios after adjusting for interest and tax payments, for selected Indian pharmaceutical companies, have shown improvement during the years after globalisation compared to that during the years before globalisation. The calculated net profit ratios for the pre- and post-globalisation periods are 0.05 and 0.13 for Cipla, 0.05 and 0.18 for Dr.Reddy’s, 0.03 and 0.11 for Ranbaxy, 0.06 and 0.12 for J.B.Chemicals, 0.02 and 0.07 for Unichem and 0.02 and 0.04 for Alembic respectively. The pooled data of Indian companies shows that the net profit ratio has increased.
from 3.9 percent (0.0385) during the years before globalisation to 10.8 percent (0.1084) during the years after globalisation.

The net profit margins for the Indian pharmaceutical companies have increased by 3 to 6 times. This may be because of three reasons: (1) After globalisation, the RBI has reduced the interest rates on par with the global market in order to help Indian companies to compete in the international market. This is helpful to reduce the input cost for Indian pharmaceutical industry. Invariably, all the Indian companies have increased net profit ratio and operating profit ratio; (2) the growth phase of Indian companies and capacity expansion; and (3) increased export sales out of the total sales in respect of the individual Indian companies (30 percent to 50 percent of the total sales are made through exports).

TABLE V.61

NET PROFIT RATIOS OF FOREIGN PHARMACEUTICAL COMPANIES IN INDIA

<table>
<thead>
<tr>
<th>Companies</th>
<th>Pre-globalisation</th>
<th>Post-globalisation</th>
<th>Pooled Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Glaxo</td>
<td>0.0415 (0.01)</td>
<td>0.0869 (0.06)</td>
<td>0.0674 (0.05)</td>
</tr>
<tr>
<td>Pfizer</td>
<td>0.0312 (0.02)</td>
<td>0.0685 (0.04)</td>
<td>0.0525 (0.04)</td>
</tr>
<tr>
<td>E-Merck</td>
<td>0.0398 (0.01)</td>
<td>0.0772 (0.04)</td>
<td>0.0612 (0.04)</td>
</tr>
<tr>
<td>Abbott Ltd.</td>
<td>0.0261 (0.03)</td>
<td>0.1294 (0.06)</td>
<td>0.0851 (0.07)</td>
</tr>
<tr>
<td>All Companies</td>
<td>0.0346 (0.02)</td>
<td>0.0905 (0.05)</td>
<td>0.0606 (0.05)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.
The analysis of the net profit margin ratios of the foreign pharmaceutical companies in India (Table V.61) in the post-globalisation period show more than two-fold increase from its level in the pre-globalisation period with the increase being more than six-fold in the case of Abbott Ltd. During the periods before and after globalisation, the net profit ratios have been 0.0415 and 0.0869 in the case of Glaxo, 0.0312 and 0.0685 in the case of Pfizer, 0.0398 and 0.0772 in the case of E-Merck, and 0.0261 and 0.1294 in the case of Abbott Ltd. respectively. With respect to the pooled foreign companies, during the post-globalisation period, the net profit margin has been at 9 percent (0.0905), approximately a three-fold increase from the pre-globalisation period level of 3.5 percent (0.0346).

The NPR of the foreign companies have increased. But the increase in NPR of the foreign companies is not on par with the Indian companies. This increase has been the result of the rise in prices of brand-based products and dilution of DPCO after globalisation.

**TABLE V.62**

<table>
<thead>
<tr>
<th>NET PROFIT RATIOS OF PHARMACEUTICAL INDUSTRY IN INDIA (POOLED)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Companies</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All Companies</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate standard deviation.

With regard to the pharmaceutical industry in India (pooled analysis) (Table V.62), it shows a considerable improvement in the net profit ratio for the period after globalisation compared to the period before globalisation. It has increased from the
pre-period level of 3.6 percent (0.0359) to 10.12 percent (0.1012), level after
globalisation.

The NPR of the Indian companies are higher and that of foreign companies are
lower when compared to the NPR of the pooled companies in both the periods. After
globalisation, the NPR of Unichem and Alembic have jumped to about three times.
This shows good sign for development in the functioning of Indian companies.

The above scenario has exposed that the pharmaceutical companies in India
have managed to improve their profit during the period after globalisation by reducing
their operating expenses (might be due to automation of production process) as well
as their cost to a certain extent facilitated by the government policies such as
reduction in interest rate and revision of corporate taxes compared to the situation
before globalisation.