CHAPTER VII
FINDINGS, SUGGESTIONS AND CONCLUSION

The study in general aimed at making profitability and productivity performance of Indian oil refineries after liberalization. The study specifically aimed at assessing the trends in the profits, analyzing profitability position from the viewpoint of financial management, shareholders and utilization of assets, the relationship of profitability with size, growth, liquidity and working capital and determinants of profitability of Indian oil refineries. Further, an attempt has also been made to assess the financial health of selected oil refineries using Altman Z-Score Model and Malmquist Productivity Index has also been used to assess the source of productivity growth in selected oil refineries in India.

This chapter being the concluding part of the study is an endeavour to present a summarized version of the findings of the present study. The summary of the major findings is given below.

Profitability analysis

The profitability performance of Indian oil refineries under review has been studied by computing various ratios relating to profitability. The profitability ratios have been determined on the basis of sales and investment. The profitability analysis has been made from the point of view of financial management, shareholders and utilization of assets.

Profitability analysis from the point of view of Financial Management

The profitability measured through operating profit margin ratio is satisfactory in all the selected oil companies and found adequate to cover the fixed charges and dividend reserve during the study period. The company-wise analysis reveals that Reliance Industries Ltd, Mangalore Refinery and Petrochemicals Ltd and Essar Oil Ltd showed better performance regarding operating profit margin. The operating profit margin was insignificant between the companies and years. The overall fluctuating trend of this ratio in all the companies can be attributed to the factors like variation in operating expenses,
market condition and government policy. Thus, the overall analysis of profitability measured through operating profit margin ratio was satisfactory during the study period.

The overall analysis of gross profit margin ratio shows the ability of the selected companies to withstand competition and adverse conditions during the study period. The average gross profit margin ratio was higher than the whole industry average in Reliance Industries Ltd and Essar Oil Ltd. The overall gross profit margin ratio was 6.51 per cent for the whole industry during the study period. The analysis of variance reveals that there is a significant difference in the gross profit margin ratio between the companies but this is insignificant between the years.

The overall analysis of return on capital employed ratio showed that this ratio has improved significantly during the study period which was on account of considerable increase in profit margin as well as assets turnover. Finally, it can be inferred that the operating efficiency of selected oil refineries in India was satisfactory and the management generally succeeded in investing capital funds. The analysis of return on capital employed also reveals that this ratio varied significantly between the companies due to wide fluctuation in the growth rate of earnings before interest and tax and capital employed in the selected oil refineries during the study period.

It is concluded from the analysis of interest coverage ratio of the selected companies measured through the interest coverage ratio is satisfactory subject to the variation in the coverage. The earnings before interest and tax of all the sample companies is adequate to cover the financial charges of debt and credit facilities. Company-wise analysis of interest coverage ratio showed that Hindustan Petroleum Corporation Ltd, Bharat Petroleum Corporation Ltd, Reliance Industries Ltd and Indian Oil Corporation Ltd are not taking the advantages of ‘trading on equity’ and are very conservative in using debt and credit facilities as their interest coverage ratios were too high. It is also noticed that Essar Oil Ltd signifies a danger signal as the firm was highly dependent on borrowed funds since the average interest coverage ratio was very low. It is concluded that the overall interest coverage ratio of the selected companies
measured through the interest coverage ratio is satisfactory in spite of variation in the coverage. The EBIT of all the sample companies is adequate to cover the financial charges of debt and credit facilities.

Hence, the overall analysis of profitability of selected oil refineries during the period under review highlighted better performance and prospects from the point of view of financial management.

**Profitability analysis from the point of view of shareholders**

The analysis of net profit margin ratio reveals that selected oil refineries had an average of 3.13 per cent during the period of study. The average net profit margin ratio varied from company to company, the highest average was 15.10 per cent in Chennai Petroleum Corporation Ltd. The performance of Reliance Industries Ltd and Chennai Petroleum Corporation Ltd was good because their average net profit margin ratios were better than the industry average. Mangalore Refinery Petrochemicals Ltd and Essar Oil Ltd have not performed well during the period of study, as their average net profit margin ratios were negative and lower than the industry average due to rising cost of production, price control by the government, inventory losses and FOREX loss. In these circumstances, these companies failed to achieve satisfactory return on share holders’ funds.

The analysis of return on total assets ratio depicts that operating assets were effectively utilized in a profitable manner by the selected companies during the study period. The overall fluctuating trend of return on total assets ratio could be attributed to the differences in the growth rates of profit after tax and total assets because of the excess investment in assets and under utilization of assets. The industry has registered 5.99 per cent average rate of return on total assets during the period of study. The efficiency in generating profits on its assets was far better than the industry average in all the selected companies except Mangalore Refinery and Petrochemicals Ltd, Essar Oil Ltd and Chennai Petroleum Corporation Ltd. The asset utilization efficiency of Essar Oil Ltd was the worst among the selected oil refineries in India because its average ratio was the least among the companies and below the industry average. This poor performance could be attributed to the under-utilization of assets and over stocking.
The analysis of return on shareholders fund also reveals that owners funds was utilized profitably by all the selected oil refineries in India except Mangalore Refinery and Petrochemicals Ltd and Essar Oil Ltd. Except these two companies all the selected oil refineries have performed well in generating adequate return for the capital invested by the owners and used the resources of owners well. The CV value of this ratio shows very high fluctuations during the study period. The fluctuations in this ratio could be attributed to the differences in growth rates of profit after tax and shareholders fund. The analysis of variance reveals that there is a significant difference in the return on shareholders fund between the companies. However, this was not significant between the years.

It is significant to note that the position regarding earnings per share and dividend pay out ratio in all the selected oil refineries during the period under review shows better performance and prospects from the point of view of shareholders. However, the fluctuating trend of the ratio can be attributed to the factors like profitability position, fluctuation in the market price and dividend policy.

To sum up, the analysis of profitability of the selected oil refineries reveals that majority of the companies under review highlighted better performance and prospects from the point of view of owners.

Analysis of profitability from the point of view utilization of assets

Turnover ratio reflects how efficiently the companies manage their resources. Turnover ratios affect the overall profitability of a company to a larger extent. A study of turnover of various assets reveals the following observations. The total assets turnover ratio of the whole industry and all the selected oil refineries in India have registered a fluctuating trend during the study period. Such a fluctuating trend could be characterized by the increase in sales and is not in tune with that of total assets, due to market conditions and revaluation of assets. The total assets turnover ratio of all the selected oil refineries was higher than the industry average except Essar Oil Ltd and Reliance Industries Ltd. The overall ratio of the oil refineries in India was 1.90 times during the study period. The assets turnover of Hindustan Petroleum Corporation Ltd, Bharat Petroleum
Corporation Ltd and Chennai Petroleum Corporation Ltd was satisfactory. The asset utilization efficiency of Essar Oil Ltd was the worst among the selected oil refineries in India during the study period for the reason that its average ratio was the least among the companies and below the industry average. The analysis of variance reveals that there is significant differences in the mean percentage of asset turnover ratio between the years and companies.

The analysis of fixed assets turnover ratio and current assets turnover ratio indicated a fluctuating trend in almost all the selected companies under study during the period under review. The analysis of the turnover ratios suggest that all the selected companies were able to utilize the fixed assets and current assets properly in generating sales. The average ratio is more than one throughout the study period. Thus, the addition to investment in fixed assets and current assets could result in proportionate increase in sales.

The inventory turnover ratio represents a low fluctuating trend during the study period. The oil industry in India had the overall average inventory turnover of 10.25 times. All the selected oil refineries in India have performed well regarding inventory turnover ratio because their average ratios were higher than the whole industry average. The average inventory turnover ratio varied from company to company and the highest average was 13.96 times in Bharat Petroleum Corporation Ltd. Such fluctuations could be attributed to the differences in the growth rates of inventory and sales because of the factors such as market conditions, rise in raw material price and upward revision of selling price. The analysis of variance depicts that differences in inventory turnover ratios which were significant between the companies, however they were not significant between the years.

The overall analysis of asset turnover reveals that different assets were utilized effectively by the selected oil refineries during the study period.

**Profitability trend**

The linear model of time trend of profitability has proved to be a “good fit” in the case five out of seven companies examined. The results showed that Hindustan Petroleum Corporation Ltd, Bharat Petroleum Corporation Ltd,
Mangalore Refinery and Petrochemicals, Essar Oil Ltd and Reliance Industries Ltd experienced a strong tendency in profitability to decline over the study period. The falling tendency of profit rate of these companies is the proof of adverse effect of various controls on process, output, expansion, investment and distribution imposed by government on these companies over time. Only in the case of Mangalore Refinery and Petrochemicals Ltd, Chennai Petroleum Corporation Ltd and Reliance Industries Ltd, the time trend co-efficient is positive implying the tendency of profit rate to rise over time. Further, variation in value of $R^2$ implies profitability variations of different companies in different degrees over time. The company-wise dispersion in rates of selected oil refineries in India over the study period showed that Bharat Petroleum Corporation Ltd experienced the highest rate of profit over the study period. The relative dispersion in the series of profit rate is captured by the value of co-efficient of variation. It is observed that two out of seven companies experienced erratic fluctuation in profit rate over the study period. These companies are Mangalore Refinery and Petrochemicals Ltd and Chennai Petroleum Corporation Ltd. Five out of seven companies experienced moderate fluctuations in profit rate during the study period. These companies are Hindustan Petroleum Corporation Ltd, Bharat Petroleum Corporation Ltd, Indian Oil Corporation Ltd, Essar Oil Ltd and Reliance Industries Ltd.

**Size and profitability**

The pooled regression results of the model regressing profit margin (PM) with size measured by sales and total assets showed that degrees of explanation of profitability by size is 84 per cent and 76 per cent respectively. The results also showed the negative relationship between the size and profitability which support the findings of Whittington (1980), Vishnukanda Prohit (1998) and Desai (1997) who advocate negative relationship between size and profitability. It is also evident from the results that positive relationship between size and profitability reported in Indian Oil Corporation Ltd and Chennai Petroleum Corporation Ltd support the findings that Vijayakumar (1998) and Kesha Parmar (2011) who advocate positive relationship between size and profitability. The co-efficient of size is statistically significant and goodness of fit of the model is
also satisfactory. The pooled results of the model regressing profit rates (PR) with size measured by sales and total assets showed that degrees of explanation of profitability by size is 60 per cent and 53 per cent respectively. These results show more or less similar findings to the results of regressing profit margin (PM) with sales and total assets. The co-efficient is statistically significant and goodness of fit of the model is also satisfactory. It can be concluded from the analysis that size and profit have negative relationship in majority of the selected companies and the whole industry.

**Growth and profitability**

The relationship between profit and growth has been explored by means of regression analysis. The pooled regression results of the model regressing profit rate with growth measured by growth rate of gross block shows that degree of explanation of profitability by growth is 20 per cent in the whole industry. The results also showed the negative significant relationship between growth rate of gross block and profitability in majority of the selected oil refineries and the whole industry. The pooled regression results of the model regressing profit margin with growth measured by fixed assets and rate of sales shows more or less similar findings to the results of regressing profit margin with growth rate of gross block. However, the explanatory capacity of growth rate of fixed assets and growth rate of net sales on profit rate has improved in this model. It can be concluded from the analysis that growth and profit have negative relationship in majority of the selected companies and the whole industry.

**Liquidity and Profitability**

The relationship between liquidity and profitability has been examined through correlation and regression analysis. It is evident from the results that there is negative correlation between profitability and liquidity in all the selected oil refineries except Bharat Petroleum Corporation Ltd during the study period. The correlation co-efficient was found to be statistically significant in all the selected companies except Chennai Petroleum Corporation Ltd. The regression equation of selected oil refineries in India as a whole indicates that an increase of one per cent in liquidity ratio will cause a decrease of 6.75 per cent in return on total assets.
Determinants of profitability

Determinants of profitability are analyzed using the techniques of ordinary least squares. In Indian oil refineries, the model explains 92 per cent of variation in profitability of the firms included in the industry. The analysis reveals that inventory turnover ratio is the strongest determinant of profitability followed by growth rate of assets, age, vertical integration, operating expenses to sales ratio, size, leverage and current ratio. In Indian Oil Corporation Ltd and Hindustan Petroleum Corporation Ltd the model explains 98 per cent of variation in profitability and vertical integration is the strongest determinant of profitability in both the companies. The analysis shows that all the selected independent variables except age and vertical integration are found to be statistically significant in Indian Oil Corporation Ltd and except current ratio all the selected independent variables are found to be statistically significant in explaining profitability of Hindustan Petroleum Corporation Ltd during the study period. The regression model shows 98 per cent of variation in profitability of Bharat Petroleum Corporation Ltd and Mangalore Refineries and Petrochemicals Ltd. The analysis shows that all the selected independent variables are found to be statistically significant except size and inventory turnover ratio in explaining profitability of Bharat Petroleum Corporation Ltd. In Mangalore Refineries and Petrochemicals Ltd except vertical integration all the selected variables have shown significant relationship during the study period. Chennai Petroleum Corporation Ltd had 92 per cent of variation in profitability. It is evident from the results all the selected variables have shown significant relationship except growth rate of assets and inventory turnover ratio. The estimated co-efficient of multiple determination ($R^2$) exhibits 98 per cent of variation in profitability of Essar Oil Ltd and Reliance Industries Ltd. The analysis shows that all the selected independent variables except growth rate of assets and vertical integration are found to be statistically significant in explaining profitability of Essar Oil Ltd and age is the strongest determinant of profitability. The analysis shows that all the selected independent variables are found to be statistically significant in explaining profitability of Reliance Industries Ltd during the study period.
Impact of working capital on profitability

The study of the impact of working capital ratios on profitability of the whole industry showed both negative and positive impact. Two out of six working capital ratios viz., liquidity ratio and cash turnover ratio have shown negative association and remaining ratios have shown positive association with profitability. The pooled regression results of the model showing the impact of working capital ratios on profitability for Indian oil refineries as a whole are encouraging. The selected independent variables contribute 80 per cent of the variation in the profitability of the whole industry. The selected variables also contribute more than 80 per cent variation in profitability of all the selected companies.

Assessment of financial health

The assessment of financial health of Indian oil refineries has been made by using Altman’s Z score. The analysis shows that the financial health of oil refineries in India during the study period was lying in too healthy zone. It may be attributed to the positive changes in the net operating profit from the increased sales volume and market capitalization of the equity, maintaining sufficient working capital and effective utilization of capacity.

Sources of productivity growth in oil refinery industry

The analysis reveals that all the companies recorded productivity improvement and a similar trend has followed in the technical change also. In efficiency change there are four companies that reported negative efficiency change in the study period. On the whole the impact of economic reforms on the Total Factor Productivity at the aggregate level was impressive as the TFP change was estimated at 8.6 per cent for all the companies. The highest annual productivity growth has been recorded by Essar Oil Ltd 24.1 per cent followed by Mangalore Refinery and Petrochemicals Ltd (15.5 per cent) and Chennai Petroleum Corporation Ltd (12.1 per cent). It is evident from the results that the free economic environment has benefited only in technology and not in efficiency of Indian manufacturing sector. There was higher inflow of capital and greater
improvements in the technological changes as a consequence of economic reforms in the country. But these advancements must be fully utilized by the work force to convert the innovations into productivity gains. The study suggests that while formulating policy for an industry, this heterogeneity at the company level must be considered for the effective use of factor inputs.

**Suggestions**

Keeping in view the observations relating to the study the following measures are suggested which would go a long way to improve the performance of oil refineries in India.

1. It is suggested that the standards for each component of cost of production should be fixed by the companies. It should make inter-firm comparison study and each unit should try to stick to the standards. An analysis of deviation, if any, should be made periodically. Materials management plays an effective role in controlling the cost of production and its reduction. A special emphasis and attention, therefore, should be given to sound and efficient materials management.

2. The profitability trend of the selected oil refineries experienced a strong tendency in profitability to decline over the study period. Therefore, it is suggested that all the selected companies should undertake cost control measures further so that profit margin of the companies may enhance the earning power ratios.

3. A systematic, prompt and regular flow of information and its analysis is important for improving productivity, efficiency and profitability. A suitable management information system needs to be evolved which will take care of the data requirement of administrative offices as well as other units like factory etc., for internal management and control. Appropriate organizational management should be made for the successful implementation of management information system in oil refineries in India.

4. At present, in India, the financial statements are presented on historical cost basis. As such these statements do not exhibit the correct realizable value of
the assets on the date of the financial statements. Thus, the true profitability cannot be ascertained on the basis of figures given in the financial statements on historical cost basis. It is, therefore, suggested that a supplementary statement should be included in the annual reports showing the figures of incomes, expenses, assets and liabilities on the basis of current values.

5. It is also suggested that EVA be used as a performance evaluation tool of the companies. The cost drivers of EVA like sales growth, operating profit margin and cost of capital should be measured based on the improvement made in this value drivers. It appears to be useful in spotting changes in companies’ ongoing performance that are hidden in EPS.

6. The unfavourable impact of leverage on profitability in certain companies can be avoided by reducing the dependability on debt capital, particularly when the business does not produce a rate of return at least equivalent to the rate of interest to be paid on borrowed capital.

7. Due to change in fuel specification norms of Euro IV grade MS and diesel, there is a higher demand of these products in domestic as well as in international markets. To grab this opportunity, oil refineries have to start their production of Euro IV grade MS and diesel.

8. The main problems with the oil refinery industry in India are related to infrastructural developments. It has been suggested that government should take measures for providing infrastructural facilities to the companies, which in turn will increase the production performance of the companies and thereby improve their profitability.

9. The lack of proper storage facilities, enhancements in refining capacities and fluctuating import prices play an important role in the development of the sector. The target of improvement for the growth of the economy for India should be in the area of the petrochemical sector. The need for intermediary products for the manufacturing of the end use products is an important sector to tap. With the per capita consumption for the petrochemical products in India being low and the production of these products being high, India may become one of the leading exporters of such intermediary products.
10. Lack of a comprehensive energy policy is a barrier to foreign investment in long-term energy projects in India. India should revise foreign ownership regulations for refinery operations to allow 100 per cent foreign ownership.

11. India suffers from low drilling recovery rates. Recovery rates in Indian fields average only about 30 per cent, well below the world average. The government hopes one of the benefits to opening up the energy industry to foreign companies will be access to better technology which will help improve recovery rates.

12. Efficient and reliable energy supplies are a precondition for accelerating the growth of the Indian economy. While the energy needs of the country are going to increase at a rapid rate in the coming decades, the energy resources that are indigenously available are limited and may not be sufficient in the long run to sustain the process of economic development. The Ministry of Petroleum and Natural Gas is mandated to take measures for exploration and exploitation of petroleum resources including natural gas and coal bed methane, apart from distribution, marketing and pricing of petroleum products.

13. The government should eliminate rate dispersion by bringing down the duties on petro-products. When the customs duty on crude oil and petroleum products is equal, then this anomalous profitability of Indian refineries will be removed.

14. The long-term energy strategies of India have to emphasize the methods of using energy effectively and efficiently, and to enhance energy self-sufficiency. To lift the Indian economy to enhanced economic standards, innovation, diplomacy, creativity, and vision are the need of the hour.

15. Today, India imports more than 70 per cent of its oil requirements from the Middle East. Dependency on oil supplies from the Middle East should be avoided.
Practical utility of the study

The present study is mostly an analytical research on trend, pattern of profitability and productivity performance of selected oil refineries in India during 1994-95 to 2008-09. The study has also given an overall idea of profitability and sources of productivity growth of Indian oil refineries in the post liberalization era. The study also tests some hypothesis concerning the profitability and productivity of selected oil refineries with the help of theoretical model. It is hoped that the study will be useful to the corporate sector in India in general, and entrepreneurs, financial managers, financial institutions, investors, policy makers and researchers in particular, for evaluating the profitability of any company. The sick unit in the corporate sector can use these findings for improving the financial as well as operational efficiency in future. The government can also use the findings of the study while formulating the industrial and investment policies for better industrial climate in selected oil refineries in India in particular and for the country in general. Finally, selected oil refineries can make the best use of the findings of the study for better financial management.

Finally, in the light of above mentioned implications, two precautionary points must be stated precisely. First the findings of the study cannot be taken as conclusive because profitability performance is a complex phenomenon and is influenced by a number of factors. Here, only some of these have been taken into consideration in this thesis. Second, the estimation results might be sensitive to data sample. It has been witnessed that when results were taken with the data sample, changes occurred with regard to the intensity of co-efficient and explanatory power of the model. This suggests that underlying data might be the root of disagreement in empirical results taken by different researchers by using very similar model specifications.

Scope for further research

Any research study can explore only a limited field of knowledge. There are many aspects that need to be researched further. In the present case also there is a considerable scope for further research. In spite of every attempt to make this
study more comprehensive, there are quite many fields that remained unexplored owing to constraints of time and resources. Financial study, specially, has numerous dimensions. Each component of the financial statement has got scope for an extensive study. An analysis of the social profitability of the oil refineries in India with the help of value added and other techniques can provide an ample scope for further research. A considerable scope for further research also exists in the area of diversification, mergers and takeover. Another interesting theme would be to identify sick and healthy units separately in oil refinery industry and find out discriminating characteristics of each group with respect to performance. A study can also be undertaken in the area of performance appraisal comparing private sector and public sector oil refineries operating in India.

The findings of the study may not have universal applicability since the study is confined to a definite period and to a definite scheme of corporate sector in India. Hence, to arrive at any general conclusion, the hypothesis needs further testing by way of additional research in the same field in different periods and even in different fields in the same period. A study can also be undertaken to compare the performance of oil refinery industry in the pre-liberalization and the post-liberalization period. Therefore, research work in the above mentioned areas would be of great practical significance and would throw more light on the operations of oil refinery industry in India.

Conclusion

India ranks fourth in oil consumption, the 22\textsuperscript{nd} largest producer in the world and fifth largest petroleum refining country with a share of 3 per cent of global capacity. The oil refinery industry has contributed heavily to the manufacturing industry in the country through foreign trade in petroleum products. Rapid globalization, fast-changing technology, and the changing methods in the way business is conducted have brought significant changes and enormous opportunities for oil refineries in India to flourish and expand their operation to global markets. The adoption of liberalization and privatization in July 1991 changed the situation again. The government also eased the stringent regulation process on the petroleum sector. This gave a tremendous boost to this
industry. The industry began to grow at a tremendous pace. The production of petroleum and petroleum products also showed a significant rise. The profitability of oil refineries in India has proved to be volatile with regular boom and bust cycles. Due to change in fuel specification norms to Euro IV grade MS and diesel, there is a higher demand of these products in domestic as well as in international markets. To grab this opportunity all the refineries have to start producing Euro IV grade MS and diesel. The Indian government has been very supportive of the refining industry, which has not only been able to meet domestic demand but has also become an important export hub with an excellent safety record. A seven year tax-holiday, which has been extended to 2012, and freedom to sell products to domestic marketing companies at international prices, have helped to shore up their profitability. The fast economic growth of India and the various developmental activities taking place presents India with opportunities to be a dominant player globally in the export of petroleum products in the future. The oil refinery industry has the most significant role to play in changing the Indian economy from an agrarian economy to an industrial economy.