DETERMINANTS OF PROFITABILITY- AN EMPIRICAL INVESTIGATION USING INDIAN CEMENT INDUSTRY

P.Vaijayanthimala*

Dr.A.Vijayakumar**

ABSTRACT

Actually, profitability is a highly sensitive economic variable which is affected by a host of factors operating through a variety of ways. Some of them affect product prices and quantities; some affect cost of production while others make changes in capital stock, size, market share and growth of the firm. Further, corporate policy relating to various functions will affect profitability. Some of them are relevant in the short-run while others have impact in the long-run. It is difficult to build a theory of profitability, which accounts for all such factors. Because of these difficulties, it is quite natural to analyze the variation in profitability by taking the partial approach i.e., to find the effect of certain major variables, ignoring the implications of other left out independent variables at a time. The present study is a step towards this direction. The determinants of profitability in Indian cement industry during the study period are analyzed using the technique of ordinary least square. The analysis reveals that current ratio is the strongest determinant of profitability of Indian cement industry. The overall analysis of determinants of profitability reveals that current assets turnover ratio, size, inventory turnover ratio, leverage, past profitability, operating expenses to sales, growth rate of assets and vertical integration significantly explain the profitability of Indian cement industry during the study period.

Keywords: Profitability, Size, Past Profitability, Vertical Integration, Determinants of Profitability and Liquidity

* Ph.D Scholar, Part-Time, Department of Commerce, Erode Arts and Science College, Erode.

** Associate Professor of Commerce, Erode Arts and Science College, Erode, Tamilnadu.

Introduction

The business firms are generally established with a view to earning profit from their business operations. But under different situations the object of the business firms may be changed to survival, growth and stability etc. Business firms are to survive in a dynamic and expanding environment. It has to go on expanding the scale of its operation on a regular and continuing basis by generating sufficient profit. Profits are the soul of the business without which it is lifeless. In fact, profits are useful intermediate beacons towards which a firm's capital should be directed. It is difficult for a business to breathe well without profit. It may be regarded as a mirror of the operating performance of the business activities. But in the real business environment of today, profit is thus, not the sole objective but one among the most important objectives, which normally guide and direct business operations. The importance of profit in judging and directing business affairs has been recognized both by economic thinkers and accounting practitioners. According to economic thinkers, profits are the report card of the past, the incentive gold star for the future and also the stake for the new venture. Accountants ascertain profits, because profit index as they perceive, is a reliable measure of efficient performance in using productive resources. The ultimate test of any business enterprise is profit. Perhaps the most important reason for keeping accounts is that the information contained in them provides the means of measuring the progress of the business or "Testing its pulse", and of indicating when and where remedial action, if necessary shall be taken.

These days' managements are giving top priority to increase the profits and maximize their shareholders' wealth. The efficiency of a management is measured in terms of profit generated by the business. It is sometimes said that higher profitability implies greater efficiency. Apart from the owners, the management of the company, and the creditors, both long-term and short-term, would be interested in the financial soundness of the firm. The management of a firm is generally eager to measure the operating efficiency of a firm and its ability to ensure adequate return to its shareholders depends ultimately on the profits earned. Moreover, profits provide money for repaying the debt used to finance the project and the resources for expansion.

Statement of the problem

The efficiency of the business is measured by the amount of profit earned. The greater the profit, the more efficient is the business considered to be. The profit of a business may be measured by studying the profitability of investment in it. Profitability may be defined as the ability of a given investment to earn a return from its use. This ability is referred to as lending power or operating performance of the investment concerned. Profitability is a relative term and its relation with the other factors affects the profit. It is the test of efficiency, powerful motivational factor and the measure of control in any business. Actually, profitability is a highly sensitive economic variable which is affected by a host of factors operating through a variety of ways. Some of them affect product prices and quantities; some affect cost of production while others make changes in capital stock, size, market share and growth of the firm. Further, corporate policy relating to various functions will affect profitability. Some of them are relevant in the short-run while others have impact in the long-run. It is difficult to build a theory of profitability, which accounts for all such factors. Because of these difficulties, it is quite natural to analyze the variation in profitability by taking the partial approach i.e., to find the effect of certain major variables, ignoring the implications of other left out independent variables at a time. The present study is a step towards this direction.

Objectives of the study

The specific objective of the study is to study about the determinants of profitability of the Indian cement industry.

Hypotheses

The following are the important hypothesis framed and tested for the study.

i) There is positive relationship between size and growth rate of assets.

ii) Profitability is negatively correlated with leverage and current ratio.

iii) There is a positive relationship between inventory turnover ratio and profitability.

iv) Fixed assets turnover ratio, vertical integration and past profitability are positively correlated with profitability.

v) Profitability is negatively correlated with operating expenses to sales ratio.

vi) There is no significant correlation between liquidity and profitability.

vii) There is a negative association between risk and profitability.

Selection of Cement Industry

Indian Cement Industry is one of the major and oldest established manufacturing industries in the modern sector of the Indian economy. It is one of the key capital intensive industries in India. It is basic and consumer industry also. Indian cement industry is not only one of the basic infrastructure industries for development but also it is the 2nd largest in the world. It constitutes an important segment of the modern industrial economy of India. No other industry of equal standing plays such an important and vital role in the economic life of an economy. Cement is a commodity that enters into various construction, investment and welfare activities in almost every segment of an economy. It is a product required by firms, factories, households, for construction of air ports, highways, bridges, dams, hospitals, schools, colleges, universities, institutions etc. It contributes to the development of modern civilization. It is a vital industry, which assumes a crucial part in the economic growth and the development of a country. The capacity of the Indian cement industry today is about 144.98 million tonnes. The industry is vibrant with 126 major plants owned by 39 groups and 53 companies. Mini-cement plants produce about 6 million tonnes with a capacity of 300 tonnes per day or less. They constitute 59 per cent of the share among the major players. In a developing economy like India with a low per capita consumption, the potential for cement industry is excellent. The Indian economy is at the threshold of take off in to the circle of developed economies and for this fast pace of development heavy investments will be required to create the basic infrastructure. In fact, to reach the world average of 265 kgs per capita, the installed capacity in India must increase 1.5 times to a staggering 250 million tonnes per annum. Therefore, cement industry has been selected for this study in order to determine its financial efficiency during the study period.

Selection of sample

Keeping in view the scope of the study, it is decided to include all the companies under cement industry working before or from the year 1995-96 to 2009-10. But, owing to several constraints such as non-availability of financial statements or non-working of a company in a particular year, merged companies, it was compelled to restrict the number of sample companies to eight. The Capitaline and CMIE database publish key financial data of Indian corporate sector systematically. Hence, Capitaline and CMIE databases proved to be complimentary to finalize the sample for the study. The exhaustive list of cement industry in India from Capitaline was cross checked with CMIE database to sort out companies to fit in as the sample for the study. The comprehensive list of companies prepared from the

database was modified by sorting out the firms using the following criteria; Which were not in operation for a year during the period of study; Which were in operation but non-availability of data for the whole study period; Which were merged with another company during the period of study; Which were not listed in Bombay Stock Exchange; and which had above 20,00,000 MT installed capacity. There were 42 large cement companies and 94 mini cement companies operated in India. The list of large cement companies selected included in the present study along with year of incorporation and their market share is presented in Table 1. It is evident from Table 1 that sample companies represent 39.13 percentage of market share in the Indian cement industry.

Selection of variables

In this study at hand, a number of key financial variables have been identified for the purpose of analysis. The computation of these variables has been made for a period of 15 years. An epigrammatic explanation of the selected variable is outlined below:

Profitability

Return on assets and return on sales are widely used measures of profitability. It is assumed that management may be concerned with effective utilization of all resources and these two measures could be proper in this line of arguments. The review includes the study of Deepak Chawala (1986), Amit Mallick and Vijayakumar (2002) which provide direct evidence of using return on assets and return on sales as a measure of profitability. The profit rates measured by sales will give a short-term perspective of profitability because sales are annual flows. On the other hand, the return on assets will give us long-term perspective of profitability. In this study, ratio of profit margin on sales is used as dependent variable.

Size

One of the very important structural characteristics of the industry which is commonly used to explain profitability in applied research is the size of the firm. Many researchers have employed firm size as a variable in their study of determinants of profitability. The big firms have been considered to be endowed with certain advantages such as lower costs and higher returns on account of access to capital market and economies of scale (Sidhu and Bhatia, 1993). Hence, generally a positive hypothesis is set for size-profitability relationship. The size – profitability relationship is more likely to be curvi-linear and after reaching a certain stage, the advantage of scale economies may cease and beyond that the

relationship may even reverse due to the problems of large scale. Due to the expected curvi-linear size performance relationship, size variable is generally employed in the long term. Though the positive relationship between size and profitability has been found to be significant, after a point of time, profitability increases at a rate with proportional increase in size. This could arise when (i) other firms in the market follow similar strategies (ii) diseconomies and inefficiency due to unmanageable size, and (iii) increased possibility of public criticism of excessive profits as firm becomes larger. Therefore, impact of firm size on profitability cannot be determined apriori. Generally, two sizes measures are employed, they are assets and sales turnover. Assets express amount of resources utilized for producing output whereas sales is an output variable. Sales are an annual flow depending upon output produced and sold in the market. Further sales needs to be adjusted for excise payment to more meaningful comparison. Therefore, in this study the log of total assets as the measure of size has been employed.

Leverage

A firm with high leverage ratio represents greater financial risk than a firm with relatively less risk. If competition equalizes earnings, then high debt should result in higher return on net worth. It is argued that firms have low debt because they operate in industries with high degree of business risk and thus expect a negative relation between leverage and profitability, the owners are risk averse. It seems that the relationship between leverage and rate of return is indeterminate apriori. In an intra-industry study, business risk is assumed to be the same and leverage must be a better measure of risk. The debt equity ratio as the measure of leverage has been employed in this study.

Current ratio

The management of working capital involves decisions about the amount and composition of current assets and how they are financed. Such decisions involve a trade-off between solvency and profitability. In inter-firm comparison, the firm with higher current ratio has better liquidity. A high ratio of current assets to current liabilities may be indicative of slack management practices, as it might signal poor credit management in terms of over-extended accounts receivables. A low ratio is also not desirous since there will be an inadequate margin of safety.

Inventory turnover ratio

Another variable, which can influence the profitability is the inventory turnover ratio. It is the ratio of sales to inventory which indicates the number of times inventory is replaced during the year. Instead of taking year end stock of inventory, an average of the opening and closing stock of inventory is

considered. A high ratio implies good inventory management. But low inventory will adversely affect the ability of a firm to meet customer demand and in turn will affect profitability. On the other hand, a very low inventory turnover ratio signifies excessive inventory or over investment in inventory and high carrying cost. The sign of inventory coefficient is ambiguous.

Fixed assets turnover ratio

Another variable influencing the profitability of the industry is fixed assets turnover ratio which is defined as the ratio of sales to fixed assets. It indicates the relationship between the amount invested in fixed assets and results in accruing in terms of sales. It is expected that an increase in this ratio would result in increase in profitability. The capital employed of a firm includes both current and fixed assets. The fixed assets provide the productive base and earning capacity for the firm. But an efficient utilization of the earning capacity calls for an optimum use of working capital.

Operating expenses to sales ratio

Operating expenses ratio is included as an explanatory variable in this study. A low operating ratio is by and large a test of operational efficiency. The implication of low operating expenses ratio is that relatively a high percentage share of sales is available for meeting financial liabilities like interest, taxes and dividends. Therefore, a negative relationship is expected between operating expenses and profitability.

Vertical integration

Firm-specific vertical integration motivated by considerations such as the avoidance of costs incurred in using the market of organize production, government policies and also consideration of market power is an important determinant of profitability. The costs of using the market alternatively known as transaction costs include search cost, cost of drawing up contracts, monitoring costs, etc.,. In our context, government policies assume an important role in determining vertical integration. The degree of vertical integration is sought to be measured by the value added to sales ratio in the analysis. Value added is defined as total sales revenue less costs of purchased inputs, repair charges and customs and excise duty.

Past profitability

In operational terms it would mean the current level of business success measured in terms of profitability should, to a large extent, depend on the success achieved in the preceding years. The implicit assumption underlying the postulate is that under normal situation a firm in a given year tries to achieve at least the profitability level of the preceding year. Past profitability of a particular year of a firm has been taken on the profitability in the respective previous year of that firm.

Growth rate of assets

The other variable, which is considered, is growth of firm. Growth is essential to a firm even if it is not among the firm's major objectives. The reason is that growth helps in providing the firm finances for attaining its objective by increasing the size of its profit growth, by providing room for initiatives and exercise managerial ability, stimulates managerial efficiency leading to a lower capital output ratio and consequently higher profit rate. It is thus, likely to have positive association with profitability. Growth rate is measured in this study by the ratio of simple growth rate of assets.

Liquidity

The ratio of current assets to total assets has been used as the liquidity indicator and the ratio of return on average capital employed has been taken as the profitability parameter. The review includes the study of Eljelly (2004), Santimoy Patra (2005), Luthur (2007), Joon Chae and Albert Wang (2009), Rajni Sofat (2010), Aruna Saini and Ram Dhar Saini (2010) which provide direct evidence of using current assets to total assets and return on average capital employed. Liquidity implies conversion of current assets into cash during the normal course of business, and to have regular uninterrupted flow of cash to meet outside current liabilities as and when due and payable. A concern should have a requisite degree of liquidity essential for the very survival of the concern. It should neither be excessive nor inadequate. In this test, a method of ranking has been applied to arrive at more comprehensive assessment of liquidity.

Determinants of profitability

The question of determination of profit is of great importance. The profit of a business may be measured by studying the profitability of investment in it. Profitability is a relative term and its measurement can be achieved by profit and its relation with the other objects by which the profit it affected. It is the test of efficiency, powerful motivational factor and the measure of control in any

business. Actually profitability is a highly sensitive economic variable which is affected by a host of factors operating through a variety of ways. Some of them affect product prices and quantities, some affect the cost of production while others make changes in capital stock, size, market share and growth of the firm. Further, corporate policy relating to various functions will affect profitability. Some of them are relevant in short- run while others have impact in the long-run. It is doubtful to build a theory of profitability, which accounts for all such factors. Because of these difficulties, it is quite natural to analyze the variation in profitability by taking the partial approach i.e., to find the effect of certain major variables, ignoring the implications of other left out independent variables at a time. In this part, an attempt is made to identify the major determinants of profitability of the selected companies in Indian cement industry with the help of empirical data for the year from 1995-96 to 2009-10.

There are a number of cross sectional studies which provide direct evidence about the determinants of profitability. These studies include Chandrasekaran (1993), Vijayakumar and Venkatachalam (1995), James Ted McDonald (1997), Sidhu and Bhatia (1998), Vijayakumar (1998), Govinda Rao and Mohana Rao (1999), Simon Feeny (2000), Debashish Rei and Debashish Sur (2001), Vijayakumar (2002) and Vijayakumar and Kathirvel (2003). The review of the above empirical works facilitates the understanding of various structural and non-structural variables that determine profitability. It gives an idea of extensive and diverse works on determinants of profitability. Determinants of profitability are analyzed using the technique of ordinary least squares. Based on existing theories and relevant econometric empirical works, variables are selected. The variables occurring in the models and their measurement are described in the methodology. While using the regression technique, efforts are made to reduce the problem of multi-collinearity and auto correlation.

Specification of profitability model

In order to explain the profitability of the selected Indian cement industry, the model specified profitability function is as follows:

$$P = b_0 + b_1 S_{ij} + b_2 L_{ij} + b_3 CR_{ij} + b_4 ITR_{ij} + b_5 FATR_{ij} + b_6 OESR_{ij} + b_7 VI_{ij} + b_8 PP_{ij} + b_9 GRA_{ij}$$

Where,

S_{ij} - Size – Natural logarithm of sales for firm (i) in year (j)

L_{ij} - Leverage – Debt equity ratio for firm (i) in year (j)

CR_{ij} - Current Ratio – for firm (i) in year (j)

ITR_{ij} - Inventory Turnover Ratio - for firm (i) in year (j)

$FATR_{ij}$- Fixed Assets Turnover Ratio - for firm (i) in year (j)

$OESR_{ij}$- Operating Expenses to Sales Ratio-for firm (i) in year (j)

VI_{ij} - Vertical Integration - for firm (i) in year (j)

PP_{ij} - Past Profitability - for firm (i) in year (j)

GRA_{ij} - Growth Rate of Assets - for firm (i) in year (j)

Analysis of results

The model described above has been estimated for Indian cement industry and the results are presented from Table 2. It presents the beta co-efficient and t values of the variables. For the whole cement industry, Table 2 shows the results of multiple regression relationship between the dependent variable (i.e., profit margin on sales) and nine independent variables. The analysis shows that the Indian cement industry had the explanatory variables which jointly account for about 95 per cent of variation in profitability. The adjusted R^2 is close to R^2, this indicates that no new variable needs to be added. The co-efficient of size, leverage, current ratio, inventory turnover ratio, operating expenses to sales and past profitability were positively related to the profitability. The co-efficient of fixed assets turnover ratio and vertical integration was negatively related to profitability. Among the nine explanatory variables, the current ratio highly influenced profitability.

It is evident from the result that co-efficient of size shows an increase of 6.40 per cent in profitability as a result of one per cent increase in size, which is statistically significant at one per cent level. The co-efficient of leverage, current ratio and operating expenses to sales ratio registered an increase of 0.61 per cent, 18.50 per cent and 0.04 per cent profitability respectively for one per cent increase of such ratios. All these co-efficients are statistically significant at 5 per cent level. The co-efficient of inventory turnover ratio and past profitability indicates that the increase of 1.86 per cent and 0.29 per cent in profitability during the study period, which is significant at one per cent level. However, one per cent increase in fixed assets turnover ratio shows 0.07 per cent decrease in profitability, which is statistically not significant. Further, it is inferred that one per cent increase in vertical integration indicates 0.56 per cent decrease in profitability which is statistically significant at one per cent level. In model 2, Table 3 shows that profit margin on total assets has been used as a dependent variable instead of profit margin on sales for the Indian cement industry. Fixed assets turnover ratio, operating expenses to sales, vertical integration, past profitability, growth rate of assets were positively related to

profitability. The co-efficient of leverage was negatively related to profitability. Among nine explanatory variables, the current ratio highly influenced profitability.

It is evident from the result that co-efficient of size, current ratio and vertical integration shows an increase of 0.94 per cent, 14.47 per cent and 0.04 per cent profitability respectively during the study period, which is significant at one per cent level. The co-efficient of leverage indicates that the decrease of 0.42 per cent in profitability as a result of one per cent increase in leverage which is significant at one per cent level. It is also apparent from the table that co-efficient of inventory turnover ratio, fixed assets turnover ratio and past profitability show increase of 1.82 per cent, 0.73 per cent and 0.12 per cent profitability respectively during the study period, which is significant at 5 per cent level. The analysis shows that the Indian cement industry had the explanatory variables which jointly account for about 96 per cent of variation in profitability.

Conclusion

The determinants of profitability in Indian cement industry during the study period are analyzed using the technique of ordinary least square. The analysis reveals that current ratio is the strongest determinant of profitability of Indian cement industry. The overall analysis of determinants of profitability reveals that current assets turnover ratio, size, inventory turnover ratio, leverage, past profitability, operating expenses to sales, growth rate of assets and vertical integration significantly explain the profitability of Indian cement industry during the study period. The overall explanatory power of regression appears to be good. This may be inferred from the co-efficient of determination (R^2) which is the measure of the extent of movement in the dependent variable that is explained by the independent variables.

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Table 1
List of sample companies included in the present study

Sl. No.	Companies	Year of Incorporation	Market Share (%)
1	Associated Cement Companies Limited	1936	10.16
2	Birla Corporation Limited	1919	2.69
3	Chettinad Cement Corporation Limited	1962	1.91
4	Dalmia Cement Limited	1951	2.12
5	Grasim Industries Limited	1946	5.42
6	India Cements Limited	1947	9.71
7	Madras Cements Limited	1957	3.32
8	Shree Cement Limited	1979	3.8
	Total		**39.13**

Source: PROWESS Database

Table 2

Determinants of profitability in Indian cement industry - Multiple Regression Model
[Dependent Variable: Ratio of profit margin on sales (P_1)]
[P= -30.90 + 6.40S+ 0.61L + 18.50CR + 1.86ITR – 0.07FATR + 0.04OESR +0.56VI + 0.29PP]

Variables	Beta co-efficient	t - value	Significant/ Not significant
Constant	-30.90	-1.21	
Size	6.40	3.06	Significant*
Leverage	0.61	2.34	Significant**
Current Ratio	18.50	1.93	Significant**
Inventory Turnover Ratio	1.86	4.78	Significant*
Fixed Assets Turnover Ratio	-0.07	-0.07	Not Significant
Operating Expenses to Sales	0.04	2.19	Significant**
Vertical Integration	-0.56	2.83	Significant*
Past Profitability	0.29	4.03	Significant*
Growth Rate of Assets	0.01	3.75	Significant*
R^2 = 0.95			
Adj R^2 = 0.87			
F = 11.41			

***-significant at 0.01 level; **-significant at 0.05 level; *** -significant at 0.10 level**
Source: Computed

Table 3

Determinants of profitability in Indian cement industry- Multiple Regression Model
[Dependent Variable: Ratio of profit margin on total assets (P_2)]
[P= -37.90 + 0.94S-0.42L + 14.47CR + 1.82ITR + 0.73FATR + 0.09OESR + 0.04VI + 0.12PP]

Variables	Beta co-efficient	t value	Significant/ Not significant
Constant	-37.90	-1.02	
Size	0.94	4.11	Significant*
Leverage	-0.42	3.16	Significant*
Current Ratio	14.47	2.93	Significant*
Inventory Turnover Ratio	1.82	2.52	Significant**
Fixed Assets Turnover Ratio	0.73	1.93	Significant**
Operating Expenses to Sales	0.09	0.28	Not Significant
Vertical Integration	0.04	3.08	Significant*
Past Profitability	0.12	2.29	Significant**
Growth Rate of Assets	0.01	3.53	Significant*
R^2 = 0.96			
Adj R^2 = 0.88			
F = 12.76			

***-significant at 0.01 level; **-significant at 0.05 level; *** -significant at 0.10 level**
Source: Computed