CHAPTER VII

Interrelationship between Working Capital and Profitability
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7.1. Introduction

Working capital management is a very important component for steel companies finance because it directly affects the liquidity and profitability of a company. “The management of short-term assets is as important as management of long-term financial assets, since efficient management of short-term assets directly contribute to the maximization of a firm’s profitability and total performance” says Smith (1980), who first signaled the importance of trade-off between the dual goals of working capital management - liquidity and profitability.

A firm’s profitability is determined mainly by way of its working capital management. In recent years, working capital has not been given due importance since adequate funds flow from banks. “Excessive levels of current assets can easily result in a firm realizing a low return on asset. However, firms with too small asset in current assets may incur shortages and difficulties in maintaining smooth operations”, says Horne and Wachowicz (2000). In the words of Eljelly (2004) “efficient working capital management involves planning and controlling current assets and liabilities in a manner that eliminates the risk of inability to meet short-term obligations on the one hand and avoid excessive assets in these assets, on the other”.

James Van Horne (1969) observes, that, “profitability suggests a low proportion of current assets to total assets and high proportion of current liabilities to total liabilities”. Deloof (2003) says “the way in which working capital is managed has a significant impact on profitability of firms”, and his study reveals that there is a certain level of working capital requirement which potentially maximizes returns. Though the ultimate objective of any firm is to maximize profit, preserving liquidity is equally an important objective. The problem is that increase in profits at the cost of liquidity can bring serious problems to a firm and therefore, there must be a trade-off between these two objectives. If a firm does not care about profit, it cannot survive for a longer period. On the other hand, a firm that neglects liquidity faces the problem of insolvency. For these reasons, working capital management should be given proper consideration, else it will ultimately affect the profitability of a firm. The efficient management
of working capital is likely to yield significant results and its neglect can be highly dangerous to any firm. Smith (1973) observes that “a large number of business failures have been attributed to the inability of the financial managers to plan and control properly the current assets and current liabilities of their respective firms”. The literature on firm’s failure contains a rich set of evidences, to establish poor working capital management as an important factor of firm’s collapse. Altman’s (1968) multivariate predictor model, based on US firms, includes working capital as one of the components. Taffler (1977) has developed a four variable model of failure prediction including working capital as a component. Parosh and Tamari (1978) in their predictor model for Israeli companies included the current ratio as one of the variables. Mishra and Biswasroy (1994) have designed a six variable model of failure prediction based on data drawn from the Private Steel Sector in India. Out of the six variables, three variables relate to working capital.

Many research studies have emphasized the need for appropriate working capital policy due to the existence of a close connectivity between management of working capital and profitability. Vijay Kumar and Venkatchalam (1995) in their study concluded that liquidity was negatively associated with profitability. Shin and Soenen (1998) found a strong negative relation between cash conversion cycle and profitability for a large sample of listed American firms for the period from 1975 to 1994. Govind Rao and Rao (1999) studied the impact of working capital on profitability in Indian cement industry and found both positive as well as negative correlations between working capital-related ratios and profitability. Sur, Biswas and Ganguly (2001) revealed in their study of Indian aluminium producing industry a very significant positive association between liquidity and profitability. Marc Deloof (2003) in his study of 2000 Belgian firms for the period 1991-1996 found that there is a significant negative relation between gross operating income and the number of days accounts receivable, inventories and accounts payable. Narware (2004) reported both positive and negative association between working capital and profitability. Santanu Kumar Ghosh and Santi Gopal Maji (2004) indicate in their study that there is a relationship between effective utilization of current assets and profitability of the companies under study although there seemed to be a wide range in the degree of such relationship from one company to the other. Mukhopadhyya (2004) indicated that Loans & Advances and Other Current Assets have hardly any role to contribute in income generation.
Bardia (2004) concluded that there is a positive relationship between liquidity and profitability. Amit Mallik, Debashish Sur and Debdas Rakshit (2005) studied the relationship between working capital and profitability in the context of Indian pharmaceutical industry and concluded that no definite relationship can be established between liquidity and profitability. Lazaridis and Tryfonidis (2006) discovered in their study that a statistically significant negative relationship existed between profitability and cash conversion cycle.

Significance of efficient management of working capital is equally felt by all types of industries-manufacturing or service. Steel companies are no exception to this and as such they need to pay a good attention to the way in which working capital is managed as it influences profitability. If a steel firm does not care about profit, it cannot survive for a longer period and neglect of liquidity, will force it to face insolvency. For these reasons, working capital management should be given proper consideration otherwise it would ultimately affect the profitability of companies. Adequate working capital provides a cushion against the adverse effect of shrinkage in the value of current assets ensuring to a great extent the maintenance of a firm’s credit worthiness and enables meeting emergencies. While conducting its day-to-day business activities, a firm is required to maintain a balance between liquidity and profitability. Liquidity is a pre-condition to ensure that companies are able to meet their short-term obligation. Specific research studies exclusively on the impact of working capital management on profitability of steel companies in India are scanty. Considering the potential contribution of steel companies to the economy of India, an attempt to measure and analyze the association between efficient management of working capital and profitability of steel companies has been made.

7.2. Choice of Variables

Working capital management is sure to influence the level of profitability of a firm. Several Ratios are used to examine the status of working capital management in a firm. Traditional working capital ratios may be classified according to whether they measure working capital position, working capital activity or leverage (Emery 1984; Lovemore and Brumer, 1993). Working capital position ratios – typically, the current and quick ratios – measure the degree to which a firm’s currently maturing obligations are covered by currently maturing assets.
The current ratio is regarded as a broad measure of liquidity. Quick ratio is considered to be a narrow measure of liquidity. Working capital activity ratios attempt to measure the relative efficiency of a firm’s resources by linking level of asset in different current assets to the level of operations (Gallianger and Healey, 1991). Based on the studies conducted earlier by Narware (2004), Beaumont Smith (1997), Shin and Soenen (1998), Malik and Sur (1998), Deloof (2003), Solano and Teruel (2006), Kessevan Padachi (2006) Amir Shah and Aish Sana (2006), Lazaridis and Tryfonidis (2006), Vishnani and Shah (2006), Abdul Raheman and Mohamed Nasr (2007), independent variables representing working capital have been identified to assess their impact on profitability. These variables are Current Ratio, Quick Ratio, Inventory Turnover Ratio, Debtor’s Turnover Ratio, Creditors Turnover Ratio, Cash Turnover Ratio, Cash Conversion Cycle, Size, Leverage and Growth. The dependent variable ‘profitability’ is measured in terms of Return on Asset (ROA) ratio. A brief description of the variables is given in the paragraphs that follow.

A. Independent Variables

A select ten independent variables are tested for their influence on the profitability of steel companies.

i. Current Ratio (CR)

Current ratio shows the relationship between current assets and current liabilities. It is a measure of general liquidity of a concern and is ascertained by dividing current assets by total current liabilities. A relatively high current ratio is an indication of firm’s better liquidity position. Conventionally, the standard norm for this ratio is 2:1. Higher the liquidity, lower will be the profitability.

ii. Quick Ratio (QR)

Quick ratio represents the relationship between quick assets and current liabilities. Current assets sans inventory represent quick assets. This ratio is calculated by dividing the total of quick assets by current liabilities. A ratio of 1:1 is considered satisfactory. It is a more rigorous test of liquidity. Higher liquidity leads to lower profitability.
iii. Inventory Turnover Ratio (ITR)

The success or failure of a business to a large extent depends upon its inventory management. Inventories occupy a predominant position in the components of working capital. Known as stock turnover ratio/stock velocity, this ratio is a general measure for assessing how effectively inventory has been utilized. Inventory turnover expresses the number of times the inventory is turned over on an average, during a period. Inventory turnover has a direct relationship with profitability of an enterprise. In general, higher the rate of inventory turnover, larger the amount of profit and smaller shall be the amount of working capital. In the words of Kuchal (1982), “Inventory turnover expresses the frequency with which average level of inventory asset is turned over through operations”. This ratio is obtained for companies by dividing sales by average inventory.

iv. Debtors Turnover Ratio (DTR)

Eugene M. Lerner (1971) defines debtors turnover ratio as “the ratio of total sales to outstanding receivables.” Debtors turnover ratio, also called ‘debtors velocity’ shows how many times debtors are converted into cash in an accounting year, which in turn increases the profitability. A firms’ liquidity position would be considered as efficiently managed, when debtors turnover ratio is very high and days of the outstanding debtors are fewer. This ratio in case of steel firm is obtained by dividing sales by average debtors. Higher the value of debtors turnover, more efficient is the management of debtors. A very low ratio, on the other hand, indicates that the amount of receivables is high in comparison with sales.

v. Creditors Turnover Ratio (CTR)

The average payment period ratio represents the number of days taken by the firm to pay its creditors. A high creditor’s turnover ratio or a lower credit period ratio signifies that the creditors are being paid promptly. This situation enhances the credit worthiness of the company. However a very favorable ratio to this effect also shows that the business is not taking the full advantage of credit facilities allowed by the creditors.
vi. Cash Turnover Ratio (CTR)

Cash turnover is an efficiency ratio that allows a company to determine how it uses cash to generate sales. The cash turnover ratio is also a benchmark tool. This ratio indicates the period for which cash remains unused on an average. In other words, it reveals the number of times cash flows out for payment to creditors. A high cash turnover indicates low cash balance in hand and low ratio means idle cash balance. This ratio is computed by dividing total current liabilities by cash balance.

vii. Cash Conversion Cycle (CCC)

The cash conversion cycle is a proxy for working capital management efficiency. It is the flow of cash from the suppliers to inventory to accounts receivable and back into cash. It is therefore an additive measure of the number of days funds are committed to inventories and receivables less the number of day payment are deferred to suppliers. It has been interpreted as a time interval between the cash outlays that arise during the production of output and the cash inflows that results from the sale of the output and the collection of the accounts receivable. However, shortening the cash conversion ratio creates its own risks: while a firm could even achieve a negative cash conversion ratio by collecting from customers before paying suppliers, a policy of strict collections and lax payments is not always sustainable.

viii. Control Variables

Steel firm’s profit is influenced not only by the efficient management of working capital but also by a few other important factors. They are (i) Size of the firm, (ii) Growth in operating income and (iii) Leverage. Size of a firm refers to total assets. In this analysis, natural log of assets is taken for measuring size. Growth in operating income is calculated by subtracting previous year’s operating income from current year’s operating income and then dividing it by previous year’s operating income. Leverage is computed by dividing total debt by total assets. Total debt refers to short-term loans plus long-term loans. Since these three factors have the greatest influence over earning capacity of a firm, they are properly introduced as control variables in measuring the impact of working capital on profitability of steel companies in India.
B. Dependent Variable

Return on Asset (ROA) is the dependent variable used to represent profitability in the present study. Operating profit divided by assets employed results in return on Asset. Gross capital includes fixed assets and current assets, as defined by Batty (1974). The dependent variable ROA is used in the analysis relating to all companies.

C. Rationale of Dependent Variables

Though there are different ways to measure profitability, return on asset is chosen to represent profitability in this study since a firm is deemed to be efficient by investors if it can generate an adequate return while using the minimum amount of assets. ROA is the primary test of success of any business. Ray H. Garrison (1976) considers ROA as the only measure which can be said to show satisfactorily the return obtained from assets employed. It is this ratio which enables investors to understand how effectively the assets are deployed to generate reasonable returns to them. Consequently, the return on assets employed is considered a critical one for determining a firm's overall level of operating efficiency.

7.3. Working Capital and Return on Asset—All Companies

An examination of the impact of working capital on profitability of steel companies in India is carried out in this chapter. A three stage analysis consisting of correlation, multiple regression and stepwise regression is done for this.

7.3.1. Variables Associated with Return on Asset

Pearson's Correlation analysis has been performed to find out the nature and strength of relationship between working capital measures and return on asset. The levels of confidence chosen for 'r' statistic is five per cent. When the value of 'r' is significant at five per cent level, the relationship is inferred as highly significant.

Table 7.1 gives details of variables associated with Return on Asset and values of correlation coefficients and coefficient of determination.
Table 7.1

Variables Associated with Return on Asset - All Companies

Correlation Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation Coefficient (r)</th>
<th>Coefficient of determination (r²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>0.020</td>
<td>0.000</td>
</tr>
<tr>
<td>Quick Ratio</td>
<td>0.006</td>
<td>0.000</td>
</tr>
<tr>
<td>Debtors Turnover Ratio</td>
<td>0.302*</td>
<td>0.091</td>
</tr>
<tr>
<td>Inventory Turnover Ratio</td>
<td>0.198*</td>
<td>0.039</td>
</tr>
<tr>
<td>Creditors Turnover Ratio</td>
<td>0.091*</td>
<td>0.008</td>
</tr>
<tr>
<td>Cash Turnover Ratio</td>
<td>-0.212*</td>
<td>0.045</td>
</tr>
<tr>
<td>Cash Conversion Cycle</td>
<td>-0.178*</td>
<td>0.032</td>
</tr>
<tr>
<td>Size</td>
<td>0.277*</td>
<td>0.077</td>
</tr>
<tr>
<td>Growth</td>
<td>0.392*</td>
<td>0.153</td>
</tr>
<tr>
<td>Leverage</td>
<td>-0.406*</td>
<td>0.165</td>
</tr>
</tbody>
</table>

* Significant at five per cent level.

It is observed from the Table (7.1) that variables representing working capital measures exhibit both positive and negative relationship with return on asset. In the following paragraphs, only those variables exhibiting significant association with return on assets are discussed.

i. Debtors Turnover Ratio

Debtors turnover ratio denotes the relationship between sales and debtors. It is linearly related to profitability. This ratio shows a positive correlation with return on asset. The correlation coefficient between debtors turnover ratio and return on Asset is 0.302, describing low positive correlation. The relationship is highly significant. Higher the debtor’s turnover more will be the profit for steel companies. Nearly nine per cent of variation in profitability is explained by debtors turn ratio as evidenced by its coefficient of determination.
ii. Inventory Turnover Ratio

Inventory turnover ratio denotes the relationship between sales and average inventory. It is linearly related to profitability. This ratio shows a positive correlation with return on asset. The correlation coefficient between inventory turnover ratio and return on asset is 0.198, describing low positive correlation. The relationship is highly significant. Higher the inventory turnover more will be the profit for companies. Nearly nine per cent of variation in profitability is explained by inventory turnover ratio as shown by the coefficient of determination.

iii. Cash Turnover Ratio

Correlation coefficient between cash turnover ratio and return on asset is -0.212 showing inverse relationship between these two variables, which is significant at one per cent level. Negative association implies that increase in cash turnover ratio decreases profitability. It is observed that a five per cent of variation in profitability is explained by this ratio as evidenced by its coefficient of determination.

iv. Cash Conversion Cycle

Cash conversion cycle shows a negative association with profitability. Coefficient of correlation between cash conversion cycle and return on Asset is -0.178. It indicates a negative association with profitability. The value of correlation coefficient is found to be significant at five per cent level. The negative correlation implies that as cash conversion cycle increases, profitability decreases. Coefficient of determination explains three per cent of variation in profitability is due to this variable.

v. Size

Size and return on asset are positively associated with each other. The value of correlation coefficient is 0.277 indicating a low positive association between these two variables. This value is significant at five per cent level. It implies that if steel companies increase their size, they will get higher profit. Around eight per cent of variation in profitability is due to the size of a firm.
vi. Growth

Growth and return on asset are positively associated with each other. The value of correlation coefficient is 0.392 indicating a low positive association between these two variables. This value is significant at five per cent level. It implies that if steel companies increase their growth, they will get higher profit. Around fifteen per cent of variation in profitability is due to the growth of a firm

vii. Leverage

Correlation coefficient between leverage and return on asset is -0.406 showing inverse relationship between these two variables, which is significant at five per cent level. When debt capital increases profitability decreases. Nearly sixteen per cent variation in profitability is due to leverage which is explained by coefficient of determination.

7.3.2. Determinants of Return on Asset

Multiple regression technique has been applied to study the combined influence of the selected ratios relating to working capital management on the profitability of steel companies. All the variables used in correlation analysis are introduced in the regression equation shown below:

\[
\text{ROI}_t = a + b_1 \text{CR}_t + b_2 \text{QR}_t + b_3 \text{ITR}_t + b_4 \text{DTR}_t + b_5 \text{CRTR}_t + b_6 \text{CTR}_t + b_7 \text{CCC}_t + b_8 \text{GR}_t + b_9 \text{Lev}_t + b_{10} \text{size}_t + e
\]

where,

- ROA = Return on Asset
- a = Intercept term
- b_1, b_{13} = Regression coefficients
- t = time period
- CR = Current ratio
- QR = Quick ratio
- ITR = Inventory turnover ratio
- DTR = Debtors turnover ratio
- CRTR = Creditors turnover ratio
- CCC = Current cash conversion cycle
- GR = Gross profit
- Lev = Leverage
- size = Size of the firm

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CTR = Cash turnover ratio
CCC = Cash conversion Cycle
GR = Growth rate
Lev = Leverage
size = Size
e = Error term

The significance of the regression coefficient is tested through 't' statistic. R² value, calculated to ascertain the goodness of fit of the regression equation, has been tested for its significance through 'F' statistic. The levels of confidence chosen for 't' and 'F' statistics are five per cent. If the regression coefficient is significant at five per cent level, then the association is said to be highly significant. Same methodology is followed for r² also.

Table (7.2) consolidates the result of multiple regression analysis. Only significant variables are taken up for discussion.
Table 7.2
Determinants of Return on Asset-All Companies
Multiple Regression Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Regression coefficient</th>
<th>Standard error</th>
<th>t (df=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>0.031*</td>
<td>0.014</td>
<td>2.262</td>
</tr>
<tr>
<td>Quick Ratio</td>
<td>-0.056*</td>
<td>0.018</td>
<td>-3.075</td>
</tr>
<tr>
<td>Debtors Turnover Ratio</td>
<td>0.000</td>
<td>0.000</td>
<td>1.037</td>
</tr>
<tr>
<td>Inventory Turnover Ratio</td>
<td>0.010*</td>
<td>0.003</td>
<td>4.008</td>
</tr>
<tr>
<td>Creditors Turnover Ratio</td>
<td>0.000</td>
<td>0.001</td>
<td>-0.111</td>
</tr>
<tr>
<td>Cash Turnover Ratio</td>
<td>0.000</td>
<td>0.000</td>
<td>0.468</td>
</tr>
<tr>
<td>Cash Conversion Cycle</td>
<td>0.000</td>
<td>0.000</td>
<td>1.649</td>
</tr>
<tr>
<td>Size</td>
<td>0.001*</td>
<td>0.000</td>
<td>4.809</td>
</tr>
<tr>
<td>Growth</td>
<td>0.028*</td>
<td>0.004</td>
<td>6.389</td>
</tr>
<tr>
<td>Leverage</td>
<td>-0.223*</td>
<td>0.027</td>
<td>-8.229</td>
</tr>
</tbody>
</table>

Constant | 0.002
Std. Error of Estimate | 0.039
Adj. R² | 0.442
R² | 0.466*

* Significant at five per cent level.

i. **Current Ratio**

A positive association is found between current ratio and return on asset. For one unit of increase in current ratio, profitability of the company is increased by 0.031 units which is significant at five per cent level. But in this study the result is contrary to the general theory. Research carried out by Narware (2004), Mallick and Sur (1988) and Shah and Sana (2006) corroborate this findings.
ii. Quick Ratio

A negative association is found between quick ratio and return on Asset. For one unit of increase in quick ratio, the profitability of the company decreases by 0.056 units which is significant at five per cent level.

iii. Inventory Turnover Ratio

Inventory turnover ratio shows a significant positive association with return on Asset. The regression coefficient is 0.010. A unit of increase in inventory turnover ratio increases the return on asset by 0.010 unit which is significant at five per cent level.

iv. Size

Regression analysis reveals a positive association between size and return on Asset. The regression coefficient is 0.001 which is significant at five per cent level. An unit of increase in the size increases profitability by 0.001 unit.

v. Growth Rate

Regression analysis shows a highly significant positive association at five per cent level between growth rate and return on asset. The regression coefficient is 0.028. A unit of increase in growth rate increases profitability by 0.028 unit.

vi. Leverage

A highly significant negative association is found between leverage and return on asset. This is significant at five per cent level. A unit of increase in leverage reduces profitability by 0.223 units.

It is evident from the value of $R^2$ that, the independent variables account for 46.6 per cent of variation in the profitability of steel companies. The value of $R^2$ is found to be highly significant indicating that the regression equation framed is the best fit.
7.3.3. Variables Prominently Associated with Return on Asset

In order to examine the factors that are prominently associated with profitability, stepwise regression analysis has been performed. Table (6.3) consolidates the results.

Table 7.3
Variables Prominently Associated with Return on Assets – All Companies
Step-wise Regression Analysis

<table>
<thead>
<tr>
<th>Step</th>
<th>Constant</th>
<th>Leverage</th>
<th>Growth</th>
<th>Size</th>
<th>ITR</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.278</td>
<td>-0.176</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.165</td>
</tr>
<tr>
<td>2</td>
<td>0.052</td>
<td>-0.175</td>
<td>0.030</td>
<td>-</td>
<td>-</td>
<td>0.315</td>
</tr>
<tr>
<td>3</td>
<td>0.024</td>
<td>-0.181</td>
<td>0.031</td>
<td>0.001</td>
<td>-</td>
<td>0.407</td>
</tr>
<tr>
<td>4</td>
<td>0.220</td>
<td>-0.189</td>
<td>0.029</td>
<td>0.001</td>
<td>0.006</td>
<td>0.429</td>
</tr>
</tbody>
</table>

Leverage is the variable introduced in step one. It explains 16.5 per cent of variation in profitability. Growth rate is the second variable that is introduced. It has increased the contribution by fifteen per cent. Size a third variable, has increased the contribution from 31.5 per cent to 40.7 per cent. This variable alone accounts for an increase of contribution to the extent of 92 per cent. Inventory turnover ratio the next variable, which is introduced in step four, increases the contribution by 2.2 per cent to 42.9 per cent.

7.4. Summary

Correlation analysis reveals that both positive and negative association between independent variable and return on asset. Of the ten variables, seven variables namely, current ratio, quick ratio, debtors turnover ratio, inventory turnover ratio, size, and growth exhibit a positive association and the remaining variables cash turnover ratio, cash conversion cycle, and leverage – show a negative association with return on asset. Among independent variables only seven variables are significantly associated with return on asset. They are debtors turnover ratio, inventory turnover ratio, cash turnover ratio, cash conversion cycle, size, growth and leverage.
Among the ten variables leverage has the highest influencing effect on profitability of steel companies.

From the regression analysis it is evident that an increase of one unit in quick ratio, and leverage decreases profitability by 0.0056 and 0.223 units respectively.

Studies carried out by Shin and Sonen (1998), Deloof (2003), Solano and Ternal (2006), Amin Shah P Aish Sana (2006) and Lazawadis and Try fonidis (2006) corroborate this findings. It is also evident from the value of $R^2$ that the independent variables explain 46.6 per cent of variation in profitability of steel companies.

A positive association is found between current ratio, debtors turnover ratio, inventory turnover ratio, cash conversion cycle, and cash turnover ratio. Hence steel companies have to pay more attention to increase the turnover of debtors, creditors, cash and stock for increasing profitability which would ultimately increase the value of steel companies.

Step wise regression analysis has identified four prominent variables that significantly influence profitability. The variables are leverage, growth, size and inventory turnover ratio and 42.9 per cent variation in profitability are explained by these variables.
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