Working Capital Solvency Level and Profitability - Evidence from Iran

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**ABSTRACT**

Working capital management has an important role to play on a firm’s success or failure because of its effect on a firm’s performance and liquidity. This study was based on secondary data collected from 120 manufacturing firms listed on Tehran Stock Exchange Market for the period of 8 years 2003-2010 with an attempt to investigate working capital adequacy level and performance of the firms. The results demonstrate that firms with adequate working capital achieved significant better performance than those firms which have less working capital in relation to their operational sizes.

**KEYWORD**

Working capital management, Relative Solvency Ratio, Profitability, adequate working capital

**INTRODUCTION**

Working capital management is an important component of management of corporate finance; since it directly influences firm’s profitability as well as liquidity in everyday activities. In any business organization, it is obvious that there must be sufficient working capital to run day to day operation. Therefore, to operate the business activities smoothly, working capital of firms must be sufficient. In this regard, the concern of working capital management is setting sufficient (optimal) level of working capital and managing short term assets and liabilities of firms within a specified period of time, usually one year. It is obvious that, the importance of efficient working capital management is unquestionable to all business activities given the fact that business capability relies on its ability to effectively use (manage) receivables, inventories and payables [6].

Working capital management involves managing current assets and current liabilities of firms. The current assets are cash and cash equivalents, marketable securities, accounts receivable and inventories. The current liabilities are accounts payable, expenses payable, including accrued wages and taxes and notes payable. A narrower definition for the working capital is inventory + accounts receivable – accounts payable. So according to this definition, working capital management is managing inventory, accounts receivable and accounts payable.

The knowledge and use of effective working capital management is very important in a firm because it affects the performance and liquidity of the firm [16]. The main objective of working capital management is to reach optimal balance between all working capital management components [7]. The efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholders’ value [12]. Therefore firms try to keep an optimal level of working capital that maximizes their value [5].

Inefficient working capital management not only reduces the profitability of business but also ultimately lead to financial crises [3]. For survival of firms in the long run, efficient working capital management is an important factor. Sometimes, even a profitable business may fail, if it does not have adequate cash flow to meet its liabilities when request come from suppliers.

**LITERATURE REVIEW**

Sagan (1955) showed that the working capital management has a vital effect on the health of the firm. Moreover it is still one of the most important issues that affect the short term investment decisions; the working capital management process needs very important decisions regarding cash required for investing in the optimal level of inventories, and managing credit and debtors’ accounts [4].

Mukhopadhyay (2004) stated that firms are badly constrained to smoothly run the day to day operations if there is negative working capital and also difficult to settle short term obligations.

Singh (2004) opined that the liquidity position of any firm mainly depends upon accounts receivable collection and payables deferred policy as well as inventories conversion
period of firms. Kim, Mauer & Sherman (1998) examined the determinants of corporate liquidity of 915 US industrial firms for the period of 1975 to 1994 by using panel data and different model. They found that firms with large market to book ratio have significantly larger position in liquid assets. In addition firm size tends to be negatively related to liquidity. Their finding revealed that there is positive relationship between liquidity and cost of external financing to the extent that market to book ratio and firm size are reasonable proxies for the cost of external financing. They also found that firms with more volatile earnings and lower return on physical assets relative to those on liquid assets tend to have significantly larger position in liquid assets.

Mehar (2001) studied the impact of equity financing on liquidity of 225 firms listed in Karachi Stock Exchange for the period 1980 to 1994 by using a pooled data. The finding of the study depicted that equity financing plays an important role in determining the liquidity position of firms. From this finding it is concluded that equity and fixed assets have positive relationship with working capital, in the long term, however, the liquidity position will be deteriorated with increase in paid up capital. Hsiao & Tahmiscioglu (1997) in their study revealed that liquidity may be affected by substantial differences across firms in their investment behavior and firms characteristics.

Enyi (2006) studied the relative solvency level of 25 sample firms. The finding of the study revealed that the gap created by the inability of traditional liquidity measurement of solvency level, like current ratio, quick ratio and other solvency ratio to effectively determine the proper size or volume of working capital is fulfilled by the relative solvency level model. In addition the study revealed that firms with adequate working capital related to their operational size performed better than firms which have less working capital relative to their operational size.

Bhunia (2007) studied liquidity management of two public sector Iron and Steel enterprises in India. He found that the actual values of working capital was lower than the estimated value of working capital for both companies under study and poor liquidity position was indicated in the case of both companies.

**VARIABLES DEFINITIONS**

**Relative Solvency Ratio (RSR)**

In this study, our cardinal divergence is to use the relative solvency ratio measurement to study how adequate working capital relative to operational size of firms affects their profitability. The relative solvency ratio can help the organization to determine when external sources of financing working capital are needed and when they are no longer desirable. The most important significance of the RSR is that it can be used to predict the likelihood of insolvency and the possible stage that insolvency is expected to occur [6].

Relative solvency ratio (RSR) is the ratio of available working capital to the required working capital. To calculate a firm’s required working capital, we first calculate the firm’s operational break-even point (OBEP) using the formulae given by [6] as follows:

$$\text{OBEP} = \frac{1 + m}{2m}$$

Where,

$$m = \text{mark-up rate}$$

$$\text{Where,}$$

$$\text{PBT} = \text{Profit Before Tax}$$

$$\text{TOC} = \text{Total Operating Cost}$$

$$\text{Where,}$$

$$\text{TI} = \text{Total Income}$$

$$\text{PBT} = \text{Profit Before Tax}$$

$$\text{TR} = \text{Total Turnover}$$

$$\text{Where,}$$

$$\text{TR} = \text{Total Turnover}$$

$$\text{OI} = \text{Other Incomes}$$

$$\text{Working Capital Required (WCR)} = \text{OBEP} \times \frac{\text{TOC}}{12}$$

The relative solvency ratio (RSR) can then be calculated using the following formula:

$$\text{RSR} = \frac{\text{CURA} - \text{CURL}}{\text{WCR}}$$

Where,

$$\text{CURA} = \text{Available Current Assets}$$

$$\text{CURL} = \text{Existing Current Liabilities}$$

$$\text{WCR} = \text{Working Capital Required at OBEP}$$

**Profitability**

Profitability can be defined as the final measure of economic success achieved by a company in relation to the capital invested in it. This economic success is determined by the magnitude of the net profit accounting [16].

The assessment of profitability done through the Return On Assets (ROA) is regarded as the ultimate measure of economic success (Return on Assets = Net Income / Total Assets).

**Description of Relative solvency ratio variable in study population:**

Information related to 120 companies divided to 20 industries in study period of 2003-2010 (8 years), some as indicators of central tendency and dispersion.

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.34</td>
<td>-0.3</td>
<td>-0.7</td>
<td>2.55</td>
<td>1.59</td>
<td>0.67</td>
<td>0.97</td>
<td>1.31</td>
</tr>
<tr>
<td>Median</td>
<td>0.26</td>
<td>0.20</td>
<td>0.03</td>
<td>0.40</td>
<td>0.28</td>
<td>0.40</td>
<td>0.44</td>
<td>0.28</td>
</tr>
</tbody>
</table>
The finding shows maximum mean value of RSR variable for companies listed on Tehran stock exchange for the year 2006 as 2.55; while the lowest mean value of - 0.77 was recorded for 2005. Other findings show that maximum RSR of 161.9 happened in 2006, whilst the minimum RSR of -77.6 happened in 2005.

Tab.2. Description of RSR divided to industry
According to tab.2 highest RSR mean value for companies listed on the Tehran Stock Exchange for the period 2003-2010 was recorded by metal ores industry at 9.84 while lowest mean value of -33.72 was recorded by the computer industry; also in the same period the minimum value of RSR relates to the computer industry (-77.69) while the maximum value of 161.93 is related to metal ores industry. The figures also indicate that minimum value range changes with 1.52 in RSR for companies in the wood production industry while the maximum value range changes of 218.33 in RSR was recorded for metal ores industry.

(Fig.1) show figures related to RSR variable in Tehran stock exchange period of 2003-2010, compared with a normal distribution.

If companies with RSR>1 or RSR=1 as solvent and companies with RSR<1 are introduced as insolvent companies, a comparative chart can be observed as follows:

It also is remarkable that a survey of the position of RSR in all of member companies in Tehran stock exchange in (Fig.4) shows that the companies experience the worst situation in 2005, but there was a turnaround for the companies in 2006 which peaked in RSR, but gradually declined for 3 years (until 2009). It was also noted that the companies began positive growing in RSR again after 2009.
HYPOTHESIS OF THE STUDY

We shall be guided in this study by the need to test how relative solvency ratio has been able to establish a relationship between adequate working capital and a firm’s profitability, as expressed in the following hypotheses.

**Hypothesis**: There is no significant difference in solvency level of production companies listed on the Tehran Stock Exchange.

We shall make use of parametric test for comparing multi-social (ANOVA) in this analysis. Statistical hypothesis is restated as:

\[
\begin{align*}
H_0 & : \mu_1 = \mu_2 = \cdots = \mu_0 \\
H_1 & : \text{Mean value of RSR in industries on Tehran stock exchange is similar.} \\
& \text{Mean value of RSR in industry on Tehran stock exchange is not similar}
\end{align*}
\]

Tab.3 and 4 below show the analysis of outputs of the SPSS software for estimating statistical hypothesis:

<table>
<thead>
<tr>
<th>RSR</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>14877.443</td>
<td>19</td>
<td>783.023</td>
<td>10.988</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>66987.431</td>
<td>940</td>
<td>71.263</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>81864.874</td>
<td>959</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the parametric test comparing the mean of multi-social (ANOVA) that analyzed the source of variations or variances in 2 section, within groups (member of companies in industries) and between groups (industries in Tehran stock exchange); we can observe that the sum of variations mean of RSR between 20-fold groups in industries is 14877.443 and sum of variations mean of RSR between 120 member companies in Tehran stock exchange is 66987.431, also, according to statistical test F score of 10.988 with p=0.000 significance at 95% - 99% confidence levels, we reject the Null hypothesis; and we conclude that there is a significant differences in RSR between groups of companies/industries listed on the Tehran stock exchange. Tab.4 shows the result in a Turkey HSD test using 3 groups of companies with level of RSR homogeneity under 95% confidence level.

**Hypothesis 2**: There is no significant difference in profitability between solvent and insolvent companies listed on the Tehran Stock Exchange.

This second hypothesis emphasize profitability and tries to establish whether there are differences in profitability between solvent and insolvent firms for companies listed on the Tehran stock exchange.

To analyze this hypothesis, we compare the means of the profit ratios of the 2 groups using the following notations:

\[
\begin{align*}
H_0 & : \mu_1 = \mu_2 \\
H_1 & : \mu_1 \neq \mu_2
\end{align*}
\]

According to the finding, first group in respect of RSR has its weakest group in computer technology, same can be said of the cement industry, wood production, food except sugar, oil production, automobile, metal production, textiles, basic metal, rubber, sugar, electrical machine, ceramic tiles, pharmaceutical, communication, chemical, other mines, machinery in second group and oil production, automobile, metal production, textiles, basic metal, rubber , sugar, electrical machine, ceramic files, pharmaceutical, communication, chemical, other mines, machinery, and metal ores in the third group. A remarkable note about the grouping that suggest proper arrangement like in the first and second groups is that they are statistically more significant than the third group because the p measures of significance in the first and second group (100% and 11.5%) are greater than the third group’s (5.6%) which is more relevant at the confidence level of 5%.

**Hypothesis 2**: There is no significant difference in profitability between solvent and insolvent companies listed on the Tehran Stock Exchange.
There is a significant difference in profitability between solvent and insolvent companies.

Where \( \mu_1 = \text{mean profit of insolvent companies} \) and \( \mu_2 = \text{mean profit of solvent companies} \).

For this test we also use the SPSS for estimating statistical hypothesis of equality variance and means to analyze the profits survey from the studied companies as in Tab.5. Tab.5 shows that both the F and t measurements are significant at \( p=0.003 \) and \( p=0.015 \) respectively at the 95% confidence level. Therefore, we reject the Null \( H_0 \) and conclude that there is a significant difference in profitability between insolvent and solvent companies listed on the Tehran Stock Exchange.

Table 5. Analysis of mean profits between insolvent and solvent companies

<table>
<thead>
<tr>
<th>Levene’s Test</th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.90</td>
<td>.004</td>
<td>-</td>
<td>3</td>
<td>95</td>
<td>.015</td>
<td>-33</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>.000</td>
<td>273</td>
<td>1</td>
<td>2</td>
<td>.124</td>
<td>-33</td>
</tr>
</tbody>
</table>

More importantly, we can say that despite the negative ups and downs, the mean profit ratio for the second group is more than the first group mathematically as shown below:

\[-0.60168 \leq \mu_1 - \mu_2 \leq -0.06569\]

**Conclusion**

Thus, we can safely conclude that this study has succeeded in establishing the fact that companies with adequate working capital in relation to their operational size can and have performed better than those companies which have less working capital in relation to their operational size. The study also found that majority of companies which have less working capital than the required in relation to their operational size during the study period performed less well than those with adequate working capital.

**References**


