RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND PROFITABILITY: A COMPARISON OF STEEL AND CEMENT INDUSTRIES OF INDIA

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ABSTRACT

This study is an attempt to investigate the relationship between working capital management and profitability by making an inter sector comparison of two manufacturing industries i.e. steel industry and chemical industry. For this purpose, we selected 15 companies from each sector, based on market capitalization and listed on BSE-500 for a period of five years from 2009-2013. Major eight financial ratios relating to profitability as well as working capital management are taken for analysis.The study is designed to show the Profitability and Working Capital position of Steel and Cement Industries. Ratio Analysis, Correlation Matrix and Regression Analysis have been used as the research tools. The results of this study show that both the industries have a significant relationship between profitability and working capital management. Working capital management variables affect more strongly the profitability indices of Cement industry than those of Steel industry.

Keywords: Working Capital Management, profitability, Steel industry, Cement industry

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Introduction

In any business organization, a finance manager has to play three functions. These include the management of fixed or long-term assets, the management of long term sources of finance and the management of current assets and liabilities or working capital. To maximise the returns, the firm should keep the unproductive assets at the minimum level and should finance with the cheapest available sources of funds. Generally, it is advantageous for the firm to invest in short-term assets and to finance with short-term liabilities.

When there is poor management of working capital, funds may be unnecessarily tied up in idle assets. This will reduce liquidity of the company and also the company will not be in position to invest in productive assets like plant and machinery. It will also affect profitability of the company. The management ofWorking Capital is considered as the lifeblood of any business unit. Finance literature gives two concepts of working capital known as gross working capital and net working capital. The gross working capital refers to a company's funds invested in its current assets and net working capital is calculated by deducting current liabilities from current assets. Management of working capital includes different aspects of cash investment, the maintenance of certain level of inventories, managing accounts receivables and payables, cash conversion cycle etc. Excessive levels of current assets may have a negative impact on firm's profitability whereas a low level of current assets may lead to lower level of liquidity and stock-outs resulting in difficulties in maintaining smooth operation. Therefore, maintaining adequate liquidity is must to ensure smooth running of the organization and meet the short-term obligations.

In manufacturing companies, the working capital constitutes a major portion of total capital. It becomes essential to use the working capital optimally so that balance funds may be put in the productive channels to increase productivity. Therefore, the industries have to maintain a tradeoff between working capital management and profitability. In this context, this study looks at how profitability bahaves in relation to working capital practices, and examines the same for Steel and Cement industry.

1. Review of Literature

In this section, we summarize recent researches similar to ours. Similarly, Sayeda Quayyum (2012) discerned statistically significant relationship between the profitability and working capital components of several industries except food industry. Karaduman et al.(2011)

investigated the relationship between working capital management and companies' profitability in Estanbol Stock Exchange for a period of 2005-09. The results show that decrease in cash cycle has positive effect on return on assets. Shahid Ali (2011) explored the association between working capital management and the profitability of textile firms in Pakistan. He found that the inventory conversion period. Receivables' collection period, payables'deferral period and cash conversion period had a significant economic impact on profitability. Vida et al. (2011) studied the relationship between working capital management and corporate profitability for 101 firms listed on Tehran stock exchange during the period of 2004-08. Similar to previous studies, they found a negative significant relationship of cash conversiion cycle, number of days accounts payable, number of days' account receivable with corporate profitability. Charitou et al. (2010) empirically investigated the effect of working capital on profitability of firms listed on Cyprus stock exchange for a period 1998-2007. The results indicate that cash conversion cycle and all its major components are associated with the firm's profitability. Gill et al. (2010) studied the relationship between wcm and profitability on a sample of 88 companies listed on new york stock exchange and found statistically significant relationship between cash conversion cycle and profitability.

Raheman et al. (2010) investigated the impact of working capital management on firm's performance in Pakistan for a period 1998-2007. The results indicate that the cash conversion cycle, net trade cycle and inventory turnover in days significantly affect the performance of firms.

Mathuva (2010) discerned that there exists a highly significant negative relationship between the time firms take to collect cash from their customers and firm's profitability; there exists a highly's significant positive relationship between the period taken to convert firm's inventory into sales and profitability; there exists a highly significant positive relationship between the times the firm takes to pay its creditors and profitability. Ganesand (2007) suggest that efficient working capital management increases firm's free cash flow, which in turn increases the firms' growth opportunities and return to shareholders. Lazaridis and Tryfonidis (2006) investigated relationship between working capital management and corporate profitability of listed companies in the Athens Stock Exchange. The results of the article showed that there was a statistically significant relationship between profitability and cash conversion cycle. Moreover, managers could create profits for their companies by handling correctly the cash conversion cycle and

keeping each different components (accounts receivables, accounts payables, inventory) to an optimum level. Deloof (2003) surveyed on Belgian firms to find out the effect of working capital management on profitability. On the basis of his analysis, he suggested that the profitability can be increased by reducing the number of days accounts receivable and inventories to a reasonable minimum.

Shin and Soenen (1998) suggested that efficient working capital management was very important for creating value for the shareholders. The way working capital was managed had a significant impact on both profitability. They found a strong negative relationship between length of the firm's net trading cycle and its profitability. They also found that shorter net trade cycles were associated with higher risk adjusted stock returns.

Islam & Rahman (1994) conducted a study on working capital trends of enterprises in Bangladesh. They find that optimum working capital enables a business to have its credit standing and permits the debts payments on maturity date and helps to keep itself fairly in liquid position which enables the business to attract borrowing from the banks. In summary, the literature review indicated that working capital management affects the profitability of the companies. But still there is ambiguity regarding which variables might serve as proxies of working capital management. The present study reveals the relationship between some of such variables used as proxy to working capital management and profitability of two manufacturing industries i.e. Steel and Cement industries.

3. Objectives and Hypotheses

This study focuses on the relationship between working capital management and profitability in two manufacturing sector industries of similar nature i.e. steel and chemical industries. Based on the findings of the review of literature, the following hypotheses has been formulated for this study:

H_o: There is significant relationship between profitability and liquidity of the companies.

H_1: There is no significant relationship between profitability and liquidity of the companies.

4. Data and Methodology

The present study is based entirely on the use of secondary data relating to randomly sampled 15 companies each from Steel and Cement sectors. Data used in this study were sourced from company websites and moneycontrol.com for a period of five years from 2009 to 2013.

For analysis, the sampled data are subjected to descriptive statistical analysis, Pearson's correlation and linear regression. Results have been expressed in the form of regression equation as below:

$$Y_i=\alpha_i+\beta_i X_i+\varepsilon_i$$

Subscript 'i' here represents the initial of the industry it represents. Here, S represents steel and C represents cement industry.

In this research we have provided two types of data analysis: Descriptive and Quantitative.

Research Variables: The independent variables include Receivables Collection Period (RCP), Inventory Turnover Period (ITP), Payable Deferral Period (PDP), Cash Conversion Cycle (CCC), Current Ratio (CR) and Quick Ratio (QR), while dependent variables include Return on Assets (RoA) and Net Profit Margin (NPM). Expressions (1) to (8) in the table that follows reflect the methods of calculating both independent and dependent variables. The independent variables are the very basic measures of working capital management and also liquidity.

Sr. No.	Variables	Measurement
1.	Return on Assets (ROA)	Net Profit/Total Assets
2.	Net Profit Margin (NPM)	Net Profit/Sales
3.	Receivables Collection Period (RCP)	360/(Sales/Accounts Receivables)
4.	Inventory Turnover Period (ITP)	360/(COGS/Inventory)
5.	Payable Deferral Period (PDP)	360/(COGS/Accounts Payable)
6.	Cash Conversion Cycle (CCC)	RCP+ITP-PDP
7.	Current Ratio (CR)	Current Assets/Current Liabilities
8.	Quick Ratio (QR)	(Current Assets-Inventory)/Current Liabilities

5. Results

We have performed two types of analysis descriptive and quantitative, in order to find out the relationship between working capital management and profitability. The results of these two types of analyses are discussed in this section.

5.1 Descriptive Analysis

Descriptive analysis shows the mean, median and standard deviation of the different variables of interest in the study. It also presents the minimum and maximum values a variable can achieve. Table 2 and 3 provide descriptive statistics of the collected variables of steel and cement companies, respectively. The credit period granted by steel and cement companies to their clients is approximately 44 and 21 days respectively, while they paid their creditors in approximately 93 and 49 days on an average. It means that steel companies take longer than cement companies to pay their bills and they even give longer credit period to their customers relatively. Inventory took a very long duration of approximately 107 days to be sold in case of steel companies, while it took on an average just 43 days to be sold in Cement companies. It indicates that Steel companies take more time to sell their inventory. The ratio of current assets to current liabilities is 1.75 and 2.78 on an average in case of steel and cement companies. It means that cement companies are maintaining higher liquidity as compared to steel companies. Steel companies had on an average 1.7% and -2.7% return on assets and net profit margin while the figures are 6.6% and 7.6% for cement companies. It shows that profitability is higher in case of cement companies as compared to steel companies.

5.2 Quantitative Analysis

Correlation and Regression Analysis

Correlation is used to find out the nature of relationship between variables. Tables 4 and 5 represent the correlation matrix for the selected variables of steel and chemical companies respectively.

In case of Steel companies, the correlation coefficient of Net Profit Margin and Cash conversion cycle is statistically significant. It means there exists a significantly negative relationship between Net Profit Margin and Cash conversion cycle. It implies that as the cash conversion cycle increases, profitability of firms decreases. There also exists significantly negative relationship between Net Profit Margin and ITP as well as PDP. It means that longer period (number of days) of inventory turnover and the payment deferral period also have negative impact on profitability.

In case of Cement companies, ROA has significantly negative relationship with RCP. It implies that the longer time, it takes to collect cash from customers adversely affects the ROA. ROA and NPM (proxies for profitability) are in significantly negative relationship with PDP. It means that

if the companies defer the payment to their creditors, their profitability decreases. Similarly, the table shows significantly negative relationship between NPM and CCC. There also exists a negative but insignificant relationship between both profitability proxies with CR as well as QR. Relationship is insignificant but negative sign makes an economic sense that as liquidity increases profitability decreases and vice versa.

Regression Analysis

In this study, regression analysis is also used to investigate the relationship between working capital management and profitability. The results of the regression are shown in tables 6 and 7. The results show negative relationship of ROA with CCC and CR but not significant in case of Steel companies. The another profitability measure NPM is also in insignificantly negative relationship with ITP, CCC and QR. Negative sign makes a sense that inverse relation exists between liquidity and ROA. The results can be interpreted in the similar way for cement companies as well. The proxies for Profitability (ROA and NPM) both are in insignificantly negative relationship with RCP, ITP and QR. From the Table, it is clearly understood that there exists a negative relationship between ROA (proxy for Profitability) and cash conversion cycle. The co-efficient for the CCC is negative and significant at 10% level of significance. Its t-test value is -1.744, which is greater than the table value. The unstandardized co-efficient of CCC equals to -.231 and its standardised coefficient Beta value is -5.327. There also exists negative relationship between ROA and PDP as the co-efficient for PDP is negative and significant at 10% level of significance with significantly negative t-values.

6. Conclusion

Working Capital Management is very important in case of manufacturing sector companies as it constitutes a major portion of capital invested. It becomes very pertinent to manage the current assets and current liabilities well so as to augment the profitability. The results are in confirmity with the results of earlier studies conducted by Lazaridis and Tryfondis (2004), Raheman and Nasr (2007) that with the increase in CCC, Profitability decreases and vice-versa. The results are also consistent with the findings of Deloof (2003), Shahid Ali (2011) and Vida et al. (2011) that inventory conversion period, Payable's deferral period and receivables collection period has a significant economic impact on profitability.

Although the regression results show that the various working capital variables fail to predict the profitablility measures significantly but on the basis of interpretation of Correlation results and overall analysis, the relationship between Working Capital Management and Profitability is simillar in Steel and Cement industries.

DESCRIPTIVE STATISTICS

Table 2: Steel Industry

	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	1.6952	1.8800	12.98	-16.26	4.32151
NPM	-2.7216	1.6900	21.52	-223.14	33.28022
RCP	43.8040	33.4900	151.01	.00	36.15236
ITP	107.1976	73.6800	1644.59	.00	198.28454
PDP	92.9003	56.8400	1418.13	.00	173.76298
CCC	58.1020	54.7400	458.76	-291.67	99.53079
CR	1.7464	1.1900	15.22	.21	2.09219
QR	1.2659	.6400	15.22	.11	2.07460

DESCRIPTIVE STATISTICS

Table 3: Cement Industry

	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	6.5940	6.2800	22.08	-3.81	5.23797
NPM	7.5829	7.6800	23.34	-34.69	7.43949
RCP	21.2861	20.3300	69.88	.00	15.79924
ITP	42.7769	38.1900	118.43	.00	22.13440
PDP	48.9949	34.8500	425.11	.00	59.37172
CCC	15.1345	14.6500	120.36	-425.11	72.05199
CR	2.7827	1.6300	62.55	.16	7.15359
QR	2.2977	1.2300	62.55	.11	7.18535

Table 4:Correlation between Profitability Ratios and Working Capital Ratios of Steel Industry

		ROA	NPM	RCP	ITP	PDP	CCC	CR	QR
ROA	Pearson Correlation	1	.319**	-.019	-.143	-.116	-.088	.005	.018
	Sig. (2-tailed)		.005	.872	.222	.320	.453	.967	.875

	N	75	75	75	75	75	75	75	75
NPM	Pearson Correlation	.319**	1	.148	-.599**	-.343**	-.540**	.123	.095
	Sig. (2-tailed)	.005		.205	.000	.003	.000	.292	.416
	N	75	75	75	75	75	75	75	75
RCP	Pearson Correlation	-.019	.148	1	-.070	-.129	.448**	-.061	-.086
	Sig. (2-tailed)	.872	.205		.550	.270	.000	.603	.464
	N	75	75	75	75	75	75	75	75
ITP	Pearson Correlation	-.143	-.599**	-.070	1	.893**	.408**	-.192	-.162
	Sig. (2-tailed)	.222	.000	.550		.000	.000	.098	.164
	N	75	75	75	75	75	75	75	75
PDP	Pearson Correlation	-.116	-.343**	-.129	.893**	1	-.014	-.215	-.178
	Sig. (2-tailed)	.320	.003	.270	.000		.905	.064	.127
	N	75	75	75	75	75	75	75	75
CCC	Pearson Correlation	-.088	-.540**	.448**	.408**	-.014	1	-.030	-.044
	Sig. (2-tailed)	.453	.000	.000	.000	.905		.797	.707
	N	75	75	75	75	75	75	75	75
CR	Pearson Correlation	.005	.123	-.061	-.192	-.215	-.030	1	.987**
	Sig. (2-tailed)	.967	.292	.603	.098	.064	.797		.000
	N	75	75	75	75	75	75	75	75
QR	Pearson Correlation	.018	.095	-.086	-.162	-.178	-.044	.987**	1
	Sig. (2-tailed)	.875	.416	.464	.164	.127	.707	.000	
	N	75	75	75	75	75	75	75	75

Table 5: Correlation between Profitability Ratios and Working Capital Ratios of Cement Industry

		ROA	NPM	RCP	ITP	PDP	CCC	CR	QR
ROA	Pearson Correlation	1	.727**	-.320**	-.028	-.250*	.128	-.084	-.089
	Sig. (2-tailed)		.000	.005	.813	.030	.272	.473	.448
	N	75	75	75	75	75	75	75	75
NPM	Pearson Correlation	.727**	1	-.130	-.017	-.290*	.206**	-.053	-.063
	Sig. (2-tailed)	.000		.267	.887	.012	.000	.649	.592
	N	75	75	75	75	75	75	75	75
RCP	Pearson Correlation	-.320**	-.130	1	.494**	-.081	.437**	-.139	-.149
	Sig. (2-tailed)	.005	.267		.000	.491	.000	.234	.201
	N	75	75	75	75	75	75	75	75
ITP	Pearson Correlation	-.028	-.017	.494**	1	-.164	.550**	-.186	-.211
	Sig. (2-tailed)	.813	.887	.000		.161	.000	.109	.069
	N	75	75	75	75	75	75	75	75
PDP	Pearson Correlation	-.250*	-.290*	-.081	-.164	1	-.892**	-.140	-.128
	Sig. (2-tailed)	.030	.012	.491	.161		.000	.233	.274
	N	75	75	75	75	75	75	75	75
CCC	Pearson Correlation	.128	.206**	.437**	.550**	-.892**	1	.027	.008
	Sig. (2-tailed)	.272	.000	.000	.000	.000		.817	.947
	N	75	75	75	75	75	75	75	75
CR	Pearson Correlation	-.084	-.053	-.139	-.186	-.140	.027	1	.999**
	Sig. (2-tailed)	.473	.649	.234	.109	.233	.817		.000
	N	75	75	75	75	75	75	75	75

QR	Pearson Correlation	-.089	-.063	-.149	-.211	-.128	.008	.999**	1
	Sig. (2-tailed)	.448	.592	.201	.069	.274	.947	.000	
	N	75	75	75	75	75	75	75	75

Table 6: Regression Analysis for ROA in Steel and Cement Industries

Dependent Variable	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t-value	P Value
		B	Std. Error	Beta		
ROA	RCP	0.23	0.13	1.92	1.72	0.09
ROA	ITP	0.23	0.13	10.47	1.72	0.09
ROA	PDP	-0.23	0.13	-9.33	-1.74	0.09
ROA	CCC	-0.23	0.13	-5.33	-1.74	0.09
ROA	CR	-1.47	1.56	-0.71	-0.94	0.35
ROA	QR	1.43	1.57	0.69	0.91	0.36

Dependent Variable	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t-value	P Value
		B	Std. Error	Beta		
ROA	RCP	-0.55	0.64	-1.67	-0.86	0.39
ROA	ITP	-0.41	0.64	-1.73	-0.64	0.53
ROA	PDP	0.39	0.64	4.47	0.61	0.54
ROA	CCC	0.42	0.64	5.75	0.65	0.52
ROA	CR	1.72	2.18	2.35	0.79	0.43
ROA	QR	-1.84	2.18	-2.53	-0.85	0.40

Table 7: Regression Analysis for NPM in Steel and Chemical Industries

Dependent Variable	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t-value	P Value
		B	Std. Error	Beta		
NPM	RCP	0.25	0.69	0.27	0.37	0.71

NPM	ITP	-0.15	0.69	-0.89	-0.22	0.83
NPM	PDP	0.10	0.69	0.52	0.15	0.88
NPM	CCC	-0.10	0.68	-0.30	-0.15	0.88
NPM	CR	11.53	8.07	0.72	1.43	0.16
NPM	QR	-10.61	8.09	-0.66	-1.31	0.19

Dependent Variable	Independent Variable	Unstandardised Coefficients		Standardised Coefficients	t-value	P Value
		B	Std. Error	Beta		
NPM	RCP	-0.61	0.94	-1.30	-0.65	0.52
NPM	ITP	-0.60	0.95	-1.78	-0.63	0.53
NPM	PDP	0.51	0.95	4.04	0.53	0.59
NPM	CCC	0.54	0.95	5.24	0.57	0.57
NPM	CR	6.24	3.20	6.00	1.95	0.06
NPM	QR	-6.37	3.20	-6.15	-1.99	0.05

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