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Impact of Working Capital Management on Profitability of Indian Cement Industry: Evidence from BSE

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Abstract: *The purpose of this study is to explore the impact of working capital management on corporate profitability of the selected cement companies during the period 2009-10 to 2018-19. The sample size of the study consists of ten companies that have been selected by following a purposive sampling procedure from the Bombay Stock Exchanges (BSE) on date 31.12.2019. The finding of the study reveals that the failure to draw any definite relationship between Return on Capital Employed (ROCE) and Current Ratio (CR) of the selected cement companies. Moreover, the study shows that the significant relationship between ROCE and Quick Ratio (QR), Inventory Turnover Ratio (ITR), Debtors Turnover Ratio (DTR) of the selected cement companies. The study also shows that CR, QR, ITR and DTR have a significant joint impact on the ROCE of selected cement companies under the study period.*

Keywords: ***Current Ratio (CR), Quick Ratio (QR), Inventory Turnover Ratio (ITR), Debtors Turnover Ratio (DTR), Return on Capital Employed (ROCE).***

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I. INTRODUCTION:

The firm's success and failure both are depended on how to control the day to day operation of the firm. Operation of the firm means the primary business transactions that help to earn the income of the firm. These business operations are connected to purchase, production and sales of the firm. Purchase, production and sales are a direct impact on working capital. Working capital means that money which is required for the day-to-day production of goods to be sold by a firm (Akinsulire, 2008). The working capital is derived from several operations such as inventory management, debtors management, cash management and creditor management, etc. It is actually required to run the wheels of the firm (Mandal and Goswami, 2010). So, working capital is the main part of business operations. This working capital is the main key to the activating of the firm. The working capital is not adequate for the firm, while the firm cannot purchase raw material, cannot pay the workers' fees and unable to meet other daily needs. Both the low and extra – working capital constrain the way in the financial progress of the firm. The extra working capital indicates the capital stuck in non-performing work and low working capital indicates the closure of the normal operation of the firm. The firm success depends on the ability of the financial managers to effectively manage receivables, inventory and payables (Filbeck and Krueger, 2005) Therefore, working capital management is important to the firm.

With the notable transformation in the business environment from the post-liberalization era 1991, the earning trends, cost behavior pattern, financing strategies and working capital police in the Indian corporate sector have also changed radically. Consequently, the working capital management (WCM) practices in the Indian cement industry has witnessed notable changes. In this backdrop, the present study seeks to impact of working capital management on the profitability of selected companies in the cement industry during the period 2009-10 to 2018-19.

The remainder of this paper is organized as follows. Section II relates to the review of related literature. Section III narrates the objectives of the study. Section IV explains the methodology adopted in this study. In Section V the limitations of the study are mentioned. Section VI discusses the empirical results. In Section VII concluding observations are presented.

II. REVIEW OF RELATED LITERATURES

Before identifying the research gap of a study it is necessary to review the existing literature on the issue addressed in the study. The following paragraphs in this section present a brief description of some of the notable studies carried out in the recent past in India and abroad on the topic considered in the present paper.

Khatick and Singh (2003) conducted a study to analyze the efficiency of liquidity management on Eicher Ltd., during the period 1994-95 to 1998-99. The study revealed a positive impact of inventory management of the company to improve the efficiency of liquidity management.

Ghosh and Maji (2004) carried out a study to analyze the efficiency of working capital management on the Indian cement industry during the period 1992-93 to 2001-02. This study revealed that no consistency regarding the improvement of efficiency in working capital management of the selected companies.

Sur et al. (2007) in their study attempted to analyze the efficiency of asset management of Colgate-Palmolive (India) Ltd. during the period 1980-81 to 2003-04. The study showed a significant negative impact of the company's inventory management on its profitability during the post-liberalization period.

Azhagaiah and Gejalakshmi (2007) examined the efficiency of working capital management of thirty selected Indian textile companies during the period 1995-96 to 2005-06. The study revealed that the efficiency of managing current assets of the companies under study was one of the contributory factors towards improving their profitability.

Appuhami (2008) revealed that capital expenditure has an important impact on working capital management.

Falope and Ajilore (2009) examined the relationship between working capital management and corporate profitability on 50 Nigerian firms for the period 1996 to 2005. The study revealed that a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period, and cash conversion cycle for the selected firms.

Mathuva (2009) in his study concluded the impact of working capital on corporate profitability on 30 firms listed in the Nairobi Stock Exchange during the period 1993 to 2008. The study revealed that a highly significant negative relationship between the accounts collection period and corporate profitability whereas a highly significant positive association between the average payment period and profitability of the study. Moreover, the study showed a highly significant positive relationship between the inventory conversion period and the profitability of the selected firms.

Sur et al. (2013) examined the liquidity management on BHEL during the period 2000-01 to 2011-12. The study revealed that the significant impact of liquidity management on the overall performance of BHEL**.**

Singh and Kaur (2017) conducted a study to analyze the relationship between working capital management and profitability on 40 steel manufacturing companies in India during the period 2004 to 2016. The study revealed that the receivables collection period, inventory holding period, and Cash Conversion Cycle had a symbolic impact on the profitability of companies.

Goel and Jain (2017) examined the impact of working capital management on the profitability of the top 10 Indian textile companies listed in national stock exchange during the period 2012 to 2016. The study revealed that a negative correlation between return on assets and debtor's collection period, inventory holding period, creditor's payment period, and cash conversion cycle.

Paul and Mitra (2018) conducted of study to analyze the effect of working capital management on profitability of the selected steel companies during the period 2000 to 2016. The study revealed that a significant positive relationships between return on assets and quick ratio, debtors turnover ratio of the selected steel companies.

Research Gap

Though a large number of studies on working capital management have been carried out during the last few decades and a considerable number of studies on the issue relating to the analysis of the impact of working capital management on profitability have also been conducted during the same period, however, a very few studies on the above-mentioned issue have been made during the post-liberalization era. By careful scrutiny of the studies of working capital management in the Indian Corporate sector, it can inferred that no in-depth study on this issue in connection with the impact of working capital management on corporate profitability of the cement industry. Working capital is very important for generating revenue. It is providing force for the generation of revenue as well as maintenance of good financial performance. It is, therefore, high time deal with the issue relating to the analysis of the impact of working capital management on corporate profitability in Indian cement industry during the post-liberalization era.

III. OBJECTIVES OF THE STUDY

1. To analyze the relationship between the component working capital management and corporate profitability of selected companies under study.
2. To examine whether the Current Ratio, Quick Ratio, Inventory Turnover Ratio, and Debtors turnover Ratio of the selected companies influence their profitability under study.

IV. METHODOLOGY OF THE STUDY

(i) Sample Design

The study was based on ten companies (see appendix 1) in Indian cement industry from Bombay Stock Exchanges (BSE) on date 31.12.2019 and purposive sampling procedure was followed.

(ii) Collection of Data

The data of the selected ten companies in Indian cement industry for the period 2009-2010 to 2018-2019 used in this study were collected from secondary source i.e. Published Annual Reports of the companies.

(iii) Analysis of Data

The ratios relating to the analyze of effective working capital management which were used in this study are: (a) Current Ratio(CR), (b) Quick Ratio(QR), (c) Inventory Turnover Ratio(ITR), (d) Debtors turnover Ratio(DTR). The ratio relating to the measure of profitability which was used in this study is Return on Capital Employed(ROCE). While analyzing the data used in the study statistical techniques, such as Pearson's simple correlation, coefficient of multiple determination and Ordinary Least Square (OLS) model. The study was applied to popular statistical tools like the Z test, T-test, F test, etc at appropriate places.

V. LIMITATIONS OF THE STUDY

1. The study was only followed by the published financial statements of the selected companies.
2. The study was not considered an inflation factor.
3. The study was considered only 4 independent variables of the selected companies.
4. The study was analyzed only 10 year data of the selected companies.

VI. RESULT AND DISCUSSION

A. In Table 1 it was attempted to assess the relationship between the component of working capital and profitability of the selected companies through Pearson's simple correlation coefficient In order to test whether these coefficients were statistically significant or not, a t-test was used. This table shows that all the four correlation coefficients between ROCE and the components of working capital management were positive but the correlation coefficient between CR and ROCE was not found to be statistically significant even at 0.05 level. Thus, the study made in Table 1 provides strong evidence of the positive relationship between ROCE and QR, ITR, DTR. The net outcome derived from the analysis, therefore, conforms to the theoretical argument that the higher the QR, ITR, and DTR, the higher is the profitability. However, no definite relationship between CR and profitability was statistically established from this study although a positive correlation between them is theoretically desirable.

Table 1: Correlation Coefficients between component of working capital management and ROCE in the Indian Cement Industry

Correlation Coefficient between / Measure	CR and ROCE	QR and ROCE	ITR and ROCE	DTR and ROCE
Pearson	0.106	0.203*	0.399**	0.356**
*Significant at 0.05 level, **Significant at 0.01 level				
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19				

B. Test of multi- colinearity

The correlation between ROCE and each of CR, QR, ITR and DTR in the selected companies were showed very small therefore justify the absence of multi-colinearity in the analysis. However, the study again tested for multi-colinearity using the Variance Inflation Factor (VIF). Table 5 exhibits that values of VIF were all below 10 and the tolerance values are above 0.10. In general VIF more than 10 and tolerance value less than 0.10 is assumed to indicate a possible multi-colinearity problem. Therefore, the results conform to the absence of multi-colinearity among the independent variables in the study.

Table 2:Testing the Multi- colinearity

Variables	Collinearity Statistics	
	VIF	1/VIF
CR	2.68	0.377
QR	2.63	0.381
ITR	1.06	0.939
DTR	1.03	0.971
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19		

C. Unit- root Test

After the test of multi- colinearity, the justify the data was 'stationary or not stationary' for applying panel data regression. Under the Levin- Lin- Chu test, table 4 shows that all p- values were less than 5 percent of the study and the null hypothesis was rejected. It indicates that the data was stationary at levels. So, the panel data regression has been carried out for the purpose of analysis.

Table 3: Levin- Lin- Chu Unit- root Test Results		
Variables	Adjusted t- statistics	p- value
ROCE	-11.415	0.000**
CR	-2.349	0.009**
QR	-10.832	0.000**
ITR	-37.305	0.000**
DTR	-6.295	0.000**
*Significant at 0.05 level, **Significant at 0.01 level		
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19		

D. Panel Data Regression Analysis

The model developed for analysing the effect of working capital management on corporate profitability of the firm considers the time series element(t) and cross sectional element(i).

The model is tested as follows:

$$ROCE_{it} = b_0 + b_1.CR_{it} + b_2.QR_{it} + b_3.ITR_{it} + b_4.DTR_{it} + e_{it}$$

Where b_0 is the constant intercept, b_1, b_2, b_3 and b_4 are the partial coefficients and e is the random disturbance term. The partial coefficients and the coefficient of multiple determination (R^2) were tested by t-test, F test etc. respectively.

The panel data regression results can be analysed only after finalizing the model which I can apply. The following model is adopted for this purpose:

(i). Test of Pooled OLS Regression Model

Table 4 shows the impact of working capital on the corporate profitability of the selected firms that used the pooled OLS model. This model discloses that for one unit increase in each ITR and DTR, the ROCE increased by 0.257 units and 0.247 units respectively which were found to be statistically significant at a 1 percent level. It indicates that the outcome corroborates with the generally accepted principle that the higher the ITR or DTR, the higher the return. However, the ROCE increased by 5.154 unit for one unit increase in QR and the ROCE decreased by 2.376 unit for one unit increase in CR which ware not found to be statistically significant even at 0.05 level. These outcomes mismatches with the theoretical argument that the higher the CR and QR, the higher the return. This table also reveals that the selected influencing factors CR, QR, ITR and DTR contributed 26.70 percent of the variation in the ROCE. The model shows that the calculated probability value of F statistics was less than 5 percent that indicates rejection of the null hypothesis. That means data not be pooled for regression purposes.

Table 4: Pooled OLS Regression Results								
Model Specification	CR Coefficient	QR Coefficient	ITR Coefficient	DTR Coefficient	Constant Coefficient	R^2	Test	p- value
Data pooled and common intercepts and slopes (p- value)	-2.376 (0.548)	5.154 (0.221)	0.257 (0.000)**	0.247 (0.001)**	-0.452 (0.411)	0.267	F	0.000**
*Significant at 0.05 level, **Significant at 0.01 level								
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19								

(ii). Test of Fixed Effect Regression Model

Under the fixed effect regression model, table 5 shows that for one unit increase in each ITR and DTR, the ROCE increased by 0.272 units and 0.245 units respectively during the period which was found to be statistically significant at 1 percent level. It reveals that the outcome corroborates with the general principle that the higher the ITR or DTR, the higher the return. Another outcome shows the CR and QR were no significant impact on ROCE during the study period. This table also reveals that 27.7 percent of the variation in the ROCE of the selected companies was contributed by CR, QR, ITR and DTR during the study period. The calculated probability value of F statistics was less than 5 percent of the study period under this model, which indicates rejection of the null hypothesis. It indicates that the model was fitted well and the coefficients were not equal to zero.

Table 5: Fixed Effect Regression Results								
Model Specification	CR Coefficient	QR Coefficient	ITR Coefficient	DTR Coefficient	Constant Coefficient	R^2	Test	p- value
Common slopes with cross section specific intercept (p- value)	-2.444 (0.559)	5.687 (0.217)	0.272 (0.000)**	0.245 (0.003)**	-0.434 (0.446)	0.277	F	0.000**

*Significant at 0.05 level, **Significant at 0.01 level
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19

(iii). Test of Random Effect Regression Model

Under random effect regression model, table 6 discloses that for one unit increase in each ITR and DTR, the ROCE increased by 0.257 units and 0.247 units respectively during the study period which was found to be statistically significant at 1 percent level remaining coefficients of the study like CR and QR shows that the not significant effect on ROCE during the study period. This table also reveals that 27.7 percent of the variation in the ROCE of the selected companies was contributed by CR, QR, ITR and DTR during the study period. The calculated probability value of Wald Chi-squared statistics was less than 5 percent of the study period under this model that indicates rejection of the null hypothesis. It indicates that the model was fitted well and the coefficients were not equal to zero.

Table 6: Random Effect Regression Results

Model Specification	CR Coefficient	QR Coefficient	ITR Coefficient	DTR Coefficient	Constant Coefficient	R^2	Test	p-value
Common mean value for the intercept (p-value)	-2.376 (0.546)	5.154 (0.218)	0.257 (0.000)**	0.247 (0.001)**	-0.452 (0.409)	0.277	Wald Chi squared	0.000**
*Significant at 0.05 level, **Significant at 0.01 level								
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19								

(iv). Hausman Test

Under the Hausman test, the checked what model (fixed effect/ random effect) was better of the study. Table 7 shows that the calculated probability value of chi-squared was more than a 5 percent level of significance which means accepts the null hypothesis. It indicates that the random effect model was better than the fixed effect model of the study.

Table 7: Fixed Effect versus Random Effect: Hausman Test

Model Specification	CR Coefficient	QR Coefficient	ITR Coefficient	DTR Coefficient	Constant Coefficient	R^2	Test	p-value
To check whether the model is fixed effect or random effect	-	-	-	-	-	-	Chi squared	0.967
*Significant at 0.05 level, **Significant at 0.01 level								
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19								

(v). Breusch- pagan Lagrange Multiplier Test

Under Breusch- pagan Lagrange Multiplier Test, the checked what model (random effect/ pooled regression) was better of the study. Table 8 shows that the calculated probability value of chi-squared was more than a 5 percent level of significance which means accepts the null hypothesis. It indicates that the pooled OLS regression model was better than the random effect model of the study.

Table 8: Pooled OLS versus Random Effect: Breusch- pagan Lagrange Multiplier Test

Model Specification	CR Coefficient	QR Coefficient	ITR Coefficient	DTR Coefficient	Constant Coefficient	R^2	Test	p-value
To check whether the model is pooled regression effect or random effect	-	-	-	-	-	-	BP LM (Chi squared)	1.000
*Significant at 0.05 level, **Significant at 0.01 level								
Source: Complied and Computed from published Annual Reports of selected Cement companies for the period 2009-10 to 2018-19								

Therefore, the pooled regression model is more appropriate for analysing the data of the study. In table 4 pooled the OLS model shows that for one unit increase in CR, the ROCE decrease by 2.376 units but these changes were not found to be statistically significant.

When QR increased by one unit, the ROCE stepped up by 5.154 units but this outcome was not noticed during the study period.

For one unit increase in each ITR and DTR, the ROCE increased by 0.257 units and 0.245 units respectively which were found to be statistically significant at 0.01 levels. These outcomes again corroborate the theoretical argument that the higher the degree of ITR or DTR, the higher the profitability.

This table also reveals that the selected influencing factors CR, QR, ITR and DTR contributed 26.70 percent of the variation in the ROCE.

VII. CONCLUDING OBSERVATIONS

This study was aimed at investigating the impact of working capital management on profitability of the selected ten companies from 2009-10 to 2018-19.

1. The correlation coefficient between CR and ROCE was not strong evidence during the study period. The partial OLS coefficient of ROCE on CR was negative but not to be found statistically significant during the study period. As a result, the outcome failed to convey any information regarding the nature of the association between CR and ROCE in the selected companies during the study period.
2. The association between QR and ROCE was significantly positive during the period under study. The partial OLS coefficient of ROCE on QR was positive strong evidence of such a relationship was totally absent during the period under study. Thus, the outcome of the study showed weak evidence to the theoretical argument that the higher the efficiency of liquid assets management, the higher is the profitability.
3. The outcome of the study shows that the relationship between ITR and ROCE was a significant positive and the partial OLS coefficient of ROCE on ITR was positive during the period. So, these results corroborate the theoretical argument that the higher the efficiency of inventory management, the higher is the earning capability.
4. The correlation coefficient between DTR and ROCE was significantly positive during the study period. The partial OLS coefficient of ROCE on DTR was positive during the study period was noticed. Thus, the outcome of the study showed strong evidence to the theoretical argument that the higher the efficiency of debtor management, the higher is the profitability.
5. Result of multiple determination of ROCE on CR, QR, ITR and DTR reveals that the joint impact of the selected variables on ROCE was found to be statically significant during the study period.

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Appendix- 1

SI. No.	Company Name
1	Ultra Tech Cement Ltd (Ultra Tech)
2	Shree Cement Ltd. (Shree)
3	Ambuja Cement Ltd. (Ambuja)
4	ACC Ltd. (ACC)
5	Ramco Cement Ltd. (Ramco)
6	J. K. Cement Ltd. (JK Cement)
7	Heidelberg Cement Ltd. (Heidelberg)
8	Star Cement Ltd. (Star)
9	JK laskhmi Cements Ltd. (JK Laskhmi)
10	India Cements Ltd. (India Cement)