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# THE EFFECT OF SELECTED FINANCIAL RATIOS ON PROFITABILITY: AN EMPIRICAL ANALYSIS OF LISTED FIRMS OF CEMENT SECTOR IN BANGLADESH

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**ABSTRACT**

*The plinth emergence of infrastructures sector in Bangladesh cardinally hinges upon the growth and development of the Cement industry. The Bangladesh cement industry is most cost competitive in the world due to availability of raw material and Fuel at very low prices by the government. This has encouraged the researchers to analyze the relationship between profitability and selected financial ratios of cement industry in Bangladesh. The research paper makes an endeavor to determine the profitability of listed cement companies in Bangladesh with five years accounting period from 2012 to 2016. The paper encompasses six variables, namely, Debt to Equity Ratio (DER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR) and Net profit Margin (NPM). Profitability as a dependent variable is exhibited by Net profit Margin (NPM) while the selected ratios DER, ITR, DTR, CRSV, TATR and CRSV are expressed as independent variables. Based on the findings of the study, it is cogently revealed that there is a significant relationship between the three selected ratios and Net Profit Margin (NPM) of cement companies in Bangladesh.*

**KEYWORDS**
Profitability, Financial ratios, Cement industry.

**JEL CODE**
G17.

## 1. INTRODUCTION

Profitability is the state of yielding a financial gain. It is the primary goal of all enterprises. Without profitability, the business will not continue in the long run. Increasing profitability is one of the most important tasks of the entrepreneur. They constantly look for ways to change the business to improve profitability. So measuring yesteryear profitability and projecting future profitability is very important. A variety of Profitability Ratios can be used to assess the financial health of a business. These ratios, created from the income statement, can be compared with industry benchmarks. Profitability ratios manifest an enterprise's ability to spawn earnings relative to sales, assets and equity. These ratios gauge the ability of an enterprise to yield earnings, profits and cash flows relative to some indicator, often the capital invested. Profitability is outcome of a numerous policies and decisions. In sum, the profitability ratios expose the blended outcome of liquidity, asset management and debt on the efficiency of the enterprise. Examples of profitability ratios are

- Return on Sales
- Return on Investment
- Return on Equity
- Return on Capital Employed (ROCE)
- Cash Return on Capital Invested (CROCI)
- Gross Profit Margin
- Net Profit Margin

The above mentioned ratios educate about the company performance at earning profits relative to a select standard of measurement. Higher values for most of these ratios convey that the company is providing satisfactory balance in generating profits, revenues and cash flows. Net profit ratio gives a good indication of the overall level of profitability of the company. This ratio quantifies how much of each dollar obtained by the company is transformed into profits. The higher the net profit margin is, the more effective the company is at converting revenue into actual profit. Net profit margin provides evidence to the company's policies& decisions, cost framework and production efficiency. Different strategies cause the net profit margin to vary among different companies. The higher the margin is, the more effective the company is in converting revenue into actual profit.

Cement is a man-made powder that, when mixed with water and aggregates, produces concrete, which uses in building infrastructures. Infrastructures are the basic physical and organizational structure needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. So cement plays a key role in the development of an economy.

## 2. REVIEW OF RELEVANT LITERATURE

Many studies have described multi-facets of financial management in order to study the profitability of an organization. Research papers have educated that there are multiples of variables, which contribute into play varying degree of influence on the profitability of the organization. Therefore, it is desirable for the financial managers to gauge the prime variables exerting substantial influence on the profitability.

Saleem and Rehman (2011) studied the kinship between liquidity and profitability of oil and gas companies of Pakistan. The results reported that there is a significant effect of only liquid ratio on ROA while there is insignificant effect on ROE and ROI; thus, the study found that liquidity and profitability are closely related because as one increases the other decreases. Innocent *et al.* (2013) studied the relationship between the financial ratio analysis and profitability of the Nigerian Pharmaceutical industry over the past eleven (11) years period from 2001- 2011. The researcher's advocate that the financial ratio analyses has tremendous potentials to help organizations in enhancing their revenue generation ability as well as minimization of costs. The study covered five (5) variables for the analyses such as: Inventory Turnover Ratio (ITR); Debtors' Turnover Ratio (DTR); Creditors' Velocity (CRSV); Total Assets Turnover Ratio (TATR) and Gross Profit Margin (GPM). Profitability as a dependent variable is expressed by Gross Profit Margin (GPM) while financial ratio analysis represents as ITR, DTR, CRSV and TATR for independent variables. The study reported that there is a negative relationship between all independent variables with profitability in the Nigerian pharmaceutical industry. Dave (2012) examined the link between financial management and profitability of the Indian Pharma sector for a period of 10 years. The study covered six variables viz. Long term Debt to Equity Ratio (LTDER), Inventory Ratio (IR), Debtors Ratio (DR), Creditors Velocity (CRSV), Total Assets to Sales Ratio (TASR) and Profit after Tax to Sales Ratio (PATSR). These variables are calculated for 64 public limited pharmaceutical companies. The results proved that TASR and CRVS are the central variables for enhancing the profitability of the enterprise. Napompech (2012) studies the effects of working capital management on profitability. The results exposed a negative relationship between the gross operating profits and inventory conversion period and the receivables collection period. Ajanthan (2013) studies the relationship between dividend payout and firm profitability among stock listed hotels and restaurant companies in the Colombo Stock Exchange. The study proved that dividend payout was a crucial factor affecting firm performance. Velnampy and Niresh (2012) analyze the relationship between capital structure and profitability of ten Stock exchange listed Srilankan banks period from 2002 to 2009. The research shows that there is a negative association between capital structure and profitability. Quayyum (2012) studied the relationship between working capital management and profitability of manufacturing enterprises. The author encompasses companies enlisted with the Dhaka Stock Exchange the year 2005 to 2009.The outcome of the paper clearly present that except food industry, all other covered industries have a significant level of relationship between the profitability indices and various working capital components. Okwo *et al.* (2012) studied the link between firm financial management techniques and profitability in selected Pharmaceutical firms in Nigeria. The authors covered six variables including Long-Term-Debt to Equity Ratio (LTDER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR) and Net Profit Margin (NPM). Profitability as a dependent variable is represented by Net Profit Margin (NPM) while LTDER, ITR, DTR, CRSV and TATR were the independent variables. The paper discovered a positive relationship between LTDER, DTR, TATR and profitability, while ITR and CRSV have negative relationships with profitability. Capkun *et al.* (2009) investigated the relationship between inventory performance, both total inventory (INV) and its discrete components (Raw Material (RMI), Work-in-Process (WIP)& Finished Goods (FGI)) and financial performance in manufacturing companies. The study covered the period from 1980 to 2005.The paper brought out a significant positive correlation between inventory performance and measures of financial performance for firms in manufacturing industries. Mohammadzadeh *et al.* (2013) examined the relationship between the capital structure and the profitability of pharmaceutical companies in Iran. The study includes top 30 Iranian pharmaceutical companies and the financial data were gathered for the period of 2001 to 2010. Net margin profit and debts to asset ratio were expressed as indicators of profitability and capital structure respectively, the sales growth was selected as a control variable. The research showed that there was significant negative relationship between the profitability and the capital structure. Salawu (2009) tested the impact of the capital structure on profitability of Stock listed companies in Nigeria. The study covered financial data for 50 non-financial quoted companies. The study disclosed that profitability shows a positive correlation with short-term debt and equity and an inverse correlation with long-term debt. Furthermore, the study observed a negative association between the ratio of total debt to total assets and profitability. Dănuleţiu (2010) studied the efficiency of working capital management of companies from Alba County. The paper inquired the relation between the efficiency of the working capital management and profitability covering a sample of 20 annual financial statements of companies encompassing a time frame from the year 2004 to 2008. The study concluded that there is a weak negative linear correlation between working capital management indicators and profitability rates. Lazaridis and Tryfonidis (2006) examined the relationship of corporate profitability and working capital management. The research covered 131 listed companies in the Athens Stock Exchange (ASE) for the time frame 2001 to 2004. The study described that there is statistical significance between profitability, measured through gross operating profit and the cash conversion cycle. Rehman and Anjum (2013) examined the association between working capital management and profitability with correlation; regression analysis the result proved that there is inverse and positive association between working capital management and profitability in cement industry of Pakistan.

Literature review shows that various studies have been carried on the determinants of profitability but there is a lack of studies related to effect of determinants on profitability in Cement sector in Bangladesh. In fulfilling this gap, the research paper makes an endeavor to determine the profitability of listed Cement companies in Bangladesh with five years accounting period from 2010 to 2014. The infrastructure developments in the Bangladesh largely depend upon the growth and development of the Cement industries

## 3. RESEARCH METHODOLOGY

The study uses Pearson correlation to measure the degree of association between selected variables. Further, the study encompasses multiple regression analysis techniques to examine the relationship of independent variables with dependent variable, to know the extent of influence the independent variables exercise over the dependent variable. Selection of variables is influenced by the literature review. Secondary source of data is taken for the study. The population of Cement companies in Bangladesh stock exchange is seven (7). So, the study encompasses ten (7) Cement companies. Table 2 shows the list of companies (Cement Industry). The data from the audited annual financial reports for the ten listed companies are taken for five years (2012 to 2016) in order to assess the effect of selected financial ratios on Net Profit Margin of cement companies in Bangladesh. Table 3 reveals the variables for the study. All the variables stated below have been used to test the hypotheses of the study. The dependent variable is Net profit (NP).The independent variables are commonly used financial ratios. Table 4 covers the computation of the selected variables.

**TABLE 1: LIST OF CEMENT INDUSTRY IN DSE**

| Company Name | Trading Code |
|---|---|
| MI Cement | MICEMENT |
| Lafarge Surma Cement | LAFSURCEM |
| Heidelberg Cement | HEIDELBCEM |
| Premier Cement | PREMIERCEM |
| Aramit Cement | ARAMITCEM |
| Megna Cement | MEGHNACEM |
| Cofidence cement | CONFIDCEM |

**TABLE 2: LIST OF VARIABLES**

| Dependent Variable | Independent Variable |
|---|---|
| Financial Performance<br>1. Net Profit Margin (NPM) | 1. Debt to Equity Ratio (DER)<br>2. Inventory Turnover Ratio (ITR)<br>3. Debtors' Turnover Ratio (DTR)<br>4. Creditors' Velocity (CRSV)<br>5. Total Assets Turnover Ratio (TATR) |

Through their significance, the select dependent variable and the independent variables define the multi facets of efficient financial management and therefore are considered in analyses of the sector.

Net Profit Margin (NPM): The ratio is an effective measure to check the profitability of business.

Debt to Equity Ratio (DER): It indicates the soundness of financial policies and capital structure of the company.
Inventory Turnover Ratio (ITR): This ratio indicates whether investment in inventory is efficiently used or not.
Debtors 'Turnover Ratio (DTR): It indicates the speed at which debts are being collected.
Creditors' Velocity (CRSV): It indicates the speed with which the payments for credit purchases are made to the creditors.
Total Assets Turnover Ratio (TATR): It indicates the efficient utilization of fixed assets.

**TABLE 3: LIST OF VARIABLE'S RATIOS**

| Variable | Method of Computation |
|---|---|
| Net profit Margin (NPM) | Net Profit /Sales |
| Debt to Equity Ratio (DER) | Total Debt/Shareholder Equity |
| Inventory Turnover Ratio (ITR) | Cost of Sales / Inventory |
| Debtors' Turnover Ratio (DTR) | Sales /Trade Debtors |
| Creditors' Velocity (CRSV) | Cost of Sales /Trade Creditors |
| Total Assets Turnover Ratio (TATR) | Sales / Total Assets |

The study intends to study the relation in the followings ratios:

- To study the effect of Debt to Equity Ratio (DER) on Net Profit Margin (NPM) of cement companies in Bangladesh.
- To study the effect of Inventory Turnover Ratio (ITR) on Net Profit Margin (NPM) of cements companies in Bangladesh.
- To study the effect of Debtors' Turnover Ratio (DTR) on Net Profit Margin (NPM) of cements companies in Bangladesh.
- To study the effect of Creditors' Velocity (CRSV) on Net Profit Margin (NPM) of cements companies in Bangladesh.
- To study the effect of Total Assets Turnover Ratio (TATR) on Net Profit Margin (NPM) of cements companies in Bangladesh.

### 3.1. STATEMENT OF HYPOTHESES

For better understanding of the effect of the selected ratios on the Net Profit Margin, the following hypotheses are framed.
Hypothesis 1 (H0): There is no significant relationship between Debt to Equity Ratio (DER) and Net Profit Margin (NPM) of cement companies in Bangladesh.
Hypothesis 2 (H0): There is no significant relationship between Inventory Turnover Ratio (ITR) and Net Profit Margin (NPM) of cement companies in Bangladesh.
Hypothesis 3 (H0): There is no significant relationship between Debtors' Turnover Ratio (DTR) and Net Profit Margin (NPM) of cement companies in Bangladesh.
Hypothesis 4 (H0): There is no significant relationship between Creditors' Velocity (CRSV) and Net Profit Margin (NPM) of cement companies in Bangladesh.
Hypothesis 5 (H0): There is no significant relationship between Total Assets Turnover Ratio (TATR) and Net Profit Margin (NPM) of cement companies in Bangla-desh.
The study has applied Ordinary Least Squares (OLS) method. For the purpose of analysis, the E Views software is used to examine the financial data.
The basic model estimated is as follows:
*(NPM) y = b0 + b1 (DER) + b2 (ITR) + b3 (DTR) + b4 (CRSV) + b5 (TATR) + Є*
In order to specify the analysis model, the study use the following variables as a series of indicators of financial analysis computed mainly, such as Debt to Equity Ratio (DER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR). For the evaluation of profitability, Net Profit Margin (NPM) is taken as a dependent variable (Dave, 2012).

### 3.2. DESCRIPTIVE STATISTICS

Table 5 is showing the descriptive statistics of all variables used in this model about the selected companies of the cement sector of Bangladesh over the period of 5 years from 2010 to 2014. The total no. of observations is fifty (35). Information about the ranges of the variables is contained in the Minimum and Maximum. Variability can be assessed by examining the values in the Standard Deviation column.

**TABLE 4: DESCRIPTIVE STATISTICS FOR ALL THE VARIABLES TESTED FOR SELECT COMPANIES OVER THE 5 YEAR**

| | observation | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| NPM | 35 | .02 | .12 | .0746 | .03442 |
| DER | 35 | .53 | 4.46 | 2.1442 | 1.67944 |
| ITR | 35 | 3.84 | 21.98 | 8.9921 | 6.08079 |
| DTR | 35 | 2.78 | 29.38 | 10.1380 | 8.96795 |
| CRSV | 35 | 2.41 | 44.03 | 15.5442 | 14.25121 |

**Source:** Data computed on the basis of the company's annual financial statements

### 3.3. ANALYSIS

The standard deviation measures the amount of variability in the distribution of a variable**.** The Net Profit Margin (NPM) measured by Net Profit/Sales gives positive mean values, that is 0.0746. This indicates that the companies showed overall good performance in the analyzed period. The descriptive statistics reveals that under the study period, the selected financial ratios as measured by Debt to Equity Ratio (DER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR) have a positive mean value which ranges from 10.1380 for Debtors' Turnover Ratio (DTR) to 1.0714 for Total Assets Turnover Ratio (TATR). Creditors' Velocity (CRSV) have highest standard deviation of 14.25121. This indicates that the observations in the data set are widely dispersed from the mean. So the management of Cement industry in Bangladesh should monitor their creditors.

## 4. CORRELATION STATISTICS

Table 6 indicates the relationship between the various independent variables and the dependent variable used in the study. The correlation matrix below shows that Debt to Equity Ratio (DER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR), Creditors' Velocity (CRSV) have a weak positive relationship with Net Profit Margin (NPM). The strength of their relationship is indeed at 0.325%, 0.939%, 0.560%, 0.968%, and 0.963% for Debt to Equity Ratio (DER), Inventory Turnover Ratio (ITR), Debtors' Turnover Ratio (DTR), Creditors' Velocity (CRSV), Total Assets Turnover Ratio (TATR), and Creditors' Velocity (CRSV) respectively.

**TABLE 5: CORRELATION TEST**

| | NPM | DER | ITR | DTR | CRSV | TATR |
|---|---|---|---|---|---|---|
| NPM | 1.000 | -.882 | .567 | .708 | .129 | .400 |
| DER | -.882 | 1.000 | -.549 | -.528 | -.344 | -.335 |
| ITR | .567 | -.549 | 1.000 | .872 | .083 | .924 |
| DTR | .708 | -.528 | .872 | 1.000 | -.153 | .906 |
| CRSV | .129 | -.344 | .083 | -.153 | 1.000 | -.151 |
| TATR | .400 | -.335 | .924 | .906 | -.151 | 1.000 |

### 4.1. REGRESSION STATISTICS

In Table 7(Model Results), the coefficient column for variable CRSV stands at -.050. This reveals that there is a negative relationship between NPM and CRSV, it means that increase in CRSV will also led to decrease in NPM. At the significance level of .163, it is more than 0.05, so it is statistically insignificant. The weight of evidence, therefore suggests accepting the null hypothesis and confirming that there is a no significant relation between CRSV and Net Profit Margin of cement sector companies in Bangladesh. As shown in the table, the coefficient column for variable DTR stands at +1.310. This reveals a positive relation between DTR and

Net Profit Margin; it means that an increase in DTR will also lead to an increase in the Net Profit Margin. At the significance level of 0.015, it is less than 0.05, so it is statistically significant. The weight of evidence, therefore suggests rejecting the null hypothesis. This implies that change in DTR have influence on the Net Profit Margin of cement companies in Bangladesh.

**TABLE 6: REGRESSION ANALYSIS**

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std.Error | Beta | | |
| (Constant) | .079 | .002 | | 49.471 | .013 |
| DER | -.009 | .000 | -.419 | -23.327 | .027 |
| ITR | .002 | .000 | .424 | 10.585 | .060 |
| DTR | .005 | .000 | 1.310 | 42.060 | .015 |
| CRSV | .000 | .000 | -.050 | -3.809 | .163 |
| TATR | -.052 | .002 | -1.327 | -28.749 | .022 |

As shown in the table, the coefficient column for variable DER stands at -0.419 this indicates that DER has negative relationship with Net Profit Margin. It means that an increase in DER will lead to decrease in the Net Profit Margin. At the significance level of 0.027< 0.05, it is statistically significant. The weight of evidence, therefore, suggests that null hypothesis Ho (ITR) be rejected and the alternate hypothesis H1 (DER) be accepted. This means DER exert significant influence over Net Profit Margin negatively of cement companies in. As per the table, the coefficient column for variable ITR stands at +.424. This indicates that ITR has positive relationship with Net Profit Margin. At the significance level of 0.060>0.05, it is statistically insignificant The weight of evidence, therefore, suggests that null hypothesis H0 (ITR) be accepted and the alternate hypothesis H1 (ITR) be rejected. This means ITR exert insignificant influence over Net Profit Margin of cement companies in Bangladesh. As per the table, the coefficient column for variable TATR stands at -1.327. This indicates that TATR has negative relationship with Net Profit Margin. At the significance level of 0.022 that is less than 0.05, it is statistically significant. The weight of evidence, therefore, suggests that null hypothesis H0 (TATR) be rejected and the alternate hypothesis H1 (TATR) be accepted. This means TATR does exert significant influence over Net Profit Margin of cement companies in Bangladesh.

The adjusted R2, the coefficient of multiple determinations indicate the extent to which the independent variables influence the dependent variable. The (model snapshot) demonstrates that coefficient of multiple determinations (R2) is 0.999. Thus 99% of the variations in the dependent variable are explained by the independent variables of the model. It also shows that the independent variables are the major determinants factor of net profit margin of the Cement companies in Bangladesh. While, the remaining 1.0% could be explained by other macro economic factors. F-test provided in Table 7, manifests that F = 1.960 at a significance level of 0.017. This indicates that all standardized regression coefficients will be non-zero. So, the test outputs described below provide considerable reliability to the results and the emerging multiple regression equation is as:

NPM = 0.79 + -.419(DER) +.424 (ITR) + 1.310(DTR) + -.050(CRSV) +-1.327(TATR) + Єi.

**TABLE 7: TESTING OF HYPOTHESIS**

| No. | Hypothesis | Result |
|---|---|---|
| Hypothesis 1 (H0): | There is no significant relationship between Debt to Equity Ratio (DER) and Net Profit Margin (NPM) of cement companies in Bangladesh. | **Rejected** |
| Hypothesis 2 (H0): | There is no significant relationship between Inventory Turnover Ratio (ITR) and Net Profit Margin (NPM) of cement companies in Bangladesh. | **Accepted** |
| Hypothesis 3 (H0): | There is no significant relationship between Debtors' Turnover Ratio (DTR) and Net Profit Margin (NPM) of cement companies in Bangladesh. | **Rejected** |
| Hypothesis 4 (H0): | There is no significant relationship between Creditors' Velocity (CRSV) and Net Profit Margin (NPM) of cement companies in Bangladesh. | **Accepted** |
| Hypothesis 5 (H0): | There is no significant relationship between Total Assets Turnover Ratio (TATR) and Net Profit Margin (NPM) of cement companies in Bangladesh. | **Rejected** |

## CONCLUSION

Cement industry is one of the major contributors to Bangladeshi's economy. The Bangladeshi government is actively promoting the sector's diversification and greater downstream expansion for increasing the production of value added products. This move is expected to enhance the profitability of local producers. The challenge that determines the pace and scale of future development of this industry is the profitability. Thus, the objective of this paper is to examine the selected financial ratios as a determinant of profitability in the Cement Industry in Bangladesh, so that the financial managers may gauge the prime variables exerting substantial influence on the profitability. It is revealed that the Total Assets Turnover Ratio (TATR) have the highest standard deviation of 9.945440. The management of the Cement sector have to rein in this ratio. The study covered five hypotheses. Out of the five hypotheses, it is revealed that two variables Debtors' Turnover Ratio (DTR) and Total Assets Turnover Ratio (TATR) have no significant relationship with Net Profit Margin (NPM) of Cement companies in Bangladesh. This reveals that the Debtors' Turnover Ratio (DTR) and Total Assets Turnover Ratio (TATR) are not considered as a significant determinant of the profitability of the enterprise. Based on the findings of the study, it is cogently revealed that there is a significant relationship between the three selected ratios and Net Profit Margin (NPM) of Cement companies in Bangladesh.

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