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Examining the Relationship between Financial Ratios and Firm Performance: Evidence from Listed Cement Companies in Bangladesh

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Abstract
The effectiveness of selected financial ratios in explaining the financial performance of the listed cement companies in Bangladesh is the main concern of this study. The study aims to determine the financial ratios that have significant relationship with the firm performance and analyze the implications for financial decision making. The quantitative research method was applied and annual reports and financial statements of the five listed cement firms in Bangladesh were used as secondary data sources for the last decade (2016-2025). Firm performance variables were Return on Equity (ROE), Return on Assets (ROA) and Net Profit Margin (NPM) while explanatory variables were Current Ratio (CR), Quick Ratio (QR), Debt to Equity Ratio (DER), Asset Turnover Ratio (ATO) and Inventory Turnover Ratio (ITO). To analyse the relationship between the variables, descriptive statistics, Pearson correlation analysis and multiple regression analysis were used. The results show that the relationships between financial ratios and the measures of firm performance vary. The regression results show that ITO has a statistically significant negative effect on ROE ($\beta = -0.383$, $p = 0.041$), while DER has statistically significant negative effects on ROA ($\beta = -0.405$, $p = 0.008$) and NPM ($\beta = -0.415$, $p = 0.003$). On the other hand, the CR, QR and ATO variables do not statistically significantly affect the performance measures in the regression models. The models account for 25.8% of the variation in ROE, 42.8% of the variation in ROA and 51.8% of the variation in NPM. The study findings indicate that the management of leverage is the crucial factor to the financial performance of the cement companies, and inventory management is a factor that deserves the attention of the managers. The results have some implications for managers, investors and other stakeholders in the financial performance and financial decisions in the cement industry of Bangladesh.

Keywords: *Financial Ratios; Firm Performance; Cement Industry; Return on Equity; Return on Assets; Net Profit Margin; Debt-to-Equity Ratio; Bangladesh.*

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I. Introduction

Cement industry is one of the key industries of the construction and infrastructural industry, plays an important role in the economic development of a nation. Cement industry is playing a pivotal role in the country of Bangladesh because of the increasing demand for housing and commercial structures, rapid urbanization and infrastructural development. Consequently, this sector has contributed significantly to the economic development of the nation, especially in the construction industry. But it has to deal with many issues like fluctuating economic conditions, competition in the market and increasing raw material prices.

Financial ratios have been used extensively in the cement industry of Bangladesh for the purpose of performance evaluation of the companies, but there are few studies available that can predict future performance of cement companies by using financial ratios effectively. Despite its growth, the industry has a number of threats that can impact its financial stability such as changing raw material prices worldwide, currency devaluation in the local market and high competition. Hence, it is important to identify these important financial ratios that can predict the financial performance of the cement companies in Bangladesh, to improve the process of strategic decision making and to enhance the operational efficiency.

Bangladesh cement industry is in the midst of several problems such as price volatility in raw material, competition and fluctuating demand. Even with these difficulties, businesses in the industry frequently don't have reliable and precise ways to predict their financial results and make decisions. The aim of this research is to provide an understanding of the use of financial ratios to forecast firm performance and therefore enhance the efficiency and profitability of the firms.

Managers, investors, and regulators can use the research to better evaluate the health of companies, using practical tools. It is also a valuable part of knowledge in the area of financial management, especially emerging markets like Bangladesh. Further, this research is dedicated to giving policy recommendations to enhance the financial performance and sustainability of firms in the cement industry.

II. Literature Review

The significant performance in profitability is financial ratios. Agbata et al., (2021) concludes that current ratio negatively affects firm performance and debt-equity ratio positively affects ROA. The study suggests brewery companies should be able to best utilize some blend of debt and equity to maximize financial performance. The study by Le Thi Kim et al., (2021) explores the effects of micro and macroeconomic variables on financial performance of the listed food processing companies in Vietnam. The study reveals that both total assets turnover and sales growth have a significant impact on the financial performance while leverage has a negative impact on return on sales. The authors advocate the need to be more efficient with assets and to manage debt at the company level to improve financial results, and to consider management changes at state-owned enterprises (SOEs) to boost their performance. Praveen Kumar (2019) in a study explores the importance of financial ratios in assessing the financial performance of companies. It focuses on the importance of ratios such as liquidity, profitability, and efficiency to the investor or analyst to analyze a company's market performance, liquidity, and sustainability. The study recommends that the ratio analysis should become one of the key tools of comparing the companies and analyzing the state of their finances, and recommends adjusting the business strategies, depending on the data obtained with the help of ratios. Lubis (2023) discusses the financial performance measurement tool through financial ratios for PT. ABC, which is an SOE in Indonesia. The results of the research indicate that the liquidity ratios (current ratio and cash ratio) are good, and the solvency ratio (debt to equity ratio and debt to asset ratio) is also satisfactory. Profitability ratios (return on equity and net profit margin) were slightly less favorable, and activity ratios (fixed asset turnover and total asset turnover) were slightly less favorable. Overall, the study indicates that the company could benefit from boosting its profits and efficiency in the use of assets to improve its overall financial performance. The financial ratios affect the profitability of the Iraqi banks listed on the Iraqi Stock Exchange, according to Thabet et al., (2021). The results indicate that the three variables, namely the earnings per share (EPS), Interest repetition (IR) and current ratio (TR), have statistically significant positive effect on return on assets (ROA) which is used as an index of profitability. Book Value per share (BV) on the other hand has a significant negative impact. The study aims to highlight important financial ratios in assessing the financial health of banks in Iraq. This study is Borhan et al. (2014) which examined the relationship between financial ratios and financial performance of chemical firm LyondellBasell Industries (LYB). The results indicate that liquidity ratios (current ratio and quick ratio) and leverage ratios (debt ratio) are positively related with profitability; profitability ratios (net profit margin) are also positively related with performance. Profitability ratios are found to be the most important in determining the financial performance of LYB followed by liquidity and leverage ratios, the study shows. In this study, Yousaf et al. (2022) explore the optimum proxy to measure a firm's performance using financial ratios using CHAID. It covers 287 Czech companies in the automotive, construction and manufacturing industries between 2016 and 2020. The study shows that ROA is the most strong indicator of the firm's performance, followed by ROE and ROCE. The results indicate that ROA is the best indicator/measure for the performance prediction in the selected proxies and financial ratios. Azaro et al. (2020) examines the effect of firm size, leverage, profitability and price-earnings ratio on the firm value of manufacturing companies listed at the Indonesian Stock Exchange (IDX) in the consumer goods sector. The results indicate that profitability and price earnings ratio have a significant impact on firm value, but firm size and leverage do not. The study shows that investors should take into account profitability, price-earnings ratio for evaluating the firms since these factors determine the value of the company. Myšková et al., (2017) discusses financial ratios and linguistic analysis of annual reports as indicators of financial performance of a firm. It not only performs financial ratio analysis, but it also performs sentiment analysis using topic dictionaries to correlate the management's comments to the actual financial performance. The study finds high correlations between the profitability, liquidity and leverage ratios and the linguistic indicators. The study suggests that financial and linguistic analysis is able to give a more comprehensive picture of firm performance when both are used together. The study by Utami et al. (2023) focuses on the relationship between financial ratios and Economic Value Added (EVA) on the firm value of multi-finance companies traded on the Indonesian Stock Exchange (IDX) during the period 2015 to 2021. It shows that current ratio, return on asset, return on equity and debt to equity ratio have significant effect on the firm value whereas EVA does not have significant effect on the firm value. The findings of the study indicate that investors need to consider the profitability and liquidity ratios more than the value of the company. Barnes (1987) identifies the analysis and application of financial ratios to the evaluation of firm performance and presents two objectives: to analyse the financial stability of a firm and to predict what may happen in the future. It highlights the need to control for size and industry factors when using ratios. Financial ratios play an

important role in predicting financial distress and financial performance, but there is a need for methodological developments in order to make more reliable applications to predict financial performance. In the analysis of the relationship between financial ratios and net income, Cladea (2018) analyzed the data of companies listed in the S&P 500 in the period 1990–2010. The results indicate that some of the financial ratios such as liquidity, asset utilization, and sales effectiveness are significantly correlated with the variation in the net income, also the auditor's opinion is an important aspect. The study finds that financial ratios can be helpful in forecasting a firm's net income, but their usefulness may change from year to year and from company to company. In the study by Alarussi et al. (2021), they examine the correlation between financial ratios and efficiency amongst the listed companies in Malaysia. The results reveal that profitability, working capital and productivity have positive relationships with efficiency, whereas leverage, liquidity and firm tangibility have negative relationships with efficiency. From the study, it is recommended that companies pay attention to improving the profitability and controlling the use of Working Capital properly to make the company more efficient.

III. Methodology

3.1 Research Design and Data Source

The study is quantitative in nature and tries to see the relationship between the selected financial ratios and the financial performance of the listed cement companies in Bangladesh. Only secondary data from Annual Reports and Financial statements of the selected companies is used in the study. The financial statements offer data for computing the financial ratios used in this report. The financial statements include information relating to the companies' balance sheets, income statements and other financial information necessary to calculate the ratios of interest.

To capture changes in financial performance of the selected firms over time, the study looks at a 10-year period, from 2016 to 2025. Secondary financial data is suitable for analysing the historical relationship between financial ratios and company performance.

3.2 Sample Selection

The population of the study comprises cement manufacturing companies operating in Bangladesh. According to the information presented in the dissertation, 42 cement manufacturing companies/plants were in operation, of which seven were listed on the Dhaka Stock Exchange (DSE) or Chittagong Stock Exchange (CSE). From the listed companies, five firms were selected for the study based on the availability of financial information and their significance in the Bangladeshi cement industry.

- Premier Cement Mills PLC
- Crown Cement PLC
- Heidelberg Cement Bangladesh Ltd.
- LafargeHolcim Bangladesh PLC
- Meghna Cement Mills PLC

The study therefore consists of 50 firm-year observations, representing five companies over ten years. The sample selection and study period provide a basis for examining the relationship between financial ratios and firm performance within the Bangladeshi cement industry.

3.3 Variables and Measurement

Firm performance is measured using three accounting-based indicators: Return on Equity (ROE), Return on Assets (ROA), and Net Profit Margin (NPM). These variables represent different dimensions of profitability and are used as the dependent variables in the empirical models.

Five financial ratios are considered explanatory variables (Table 1). Current Ratio (CR) and Quick Ratio (QR) represent liquidity; Debt-to-Equity Ratio (DER) represents leverage; while Asset Turnover Ratio (ATO) and Inventory Turnover Ratio (ITO) represent operational efficiency.

Table 1: Variable description under study

Category	Variable	Abbreviation
Dependent	Return on Equity	ROE
Dependent	Return on Assets	ROA
Dependent	Net Profit Margin	NPM
Independent	Current Ratio	CR
Independent	Quick Ratio	QR
Independent	Debt-to-Equity Ratio	DER
Independent	Asset Turnover Ratio	ATO
Independent	Inventory Turnover Ratio	ITO

3.4 **Hypothesis Developed**
H1: Liquidity ratios (Current Ratio, Quick Ratio) positively affect firm performance.
H2: High leverage (Debt-to-Equity Ratio) negatively affects firm performance.
H3: Efficiency ratios (Asset Turnover, Inventory Turnover) positively impact firm performance.

3.5 Econometric Models
Three multiple linear regression models are estimated to examine whether the selected financial ratios explain variations in firm performance. The models are specified as follows:
Model 1: $ROE = \beta0 + \beta1CR + \beta2QR + \beta3DER + \beta4ATO + \beta5ITO + \varepsilon$
Model 2: $ROA = \beta0 + \beta1CR + \beta2QR + \beta3DER + \beta4ATO + \beta5ITO + \varepsilon$
Model 3: $NPM = \beta0 + \beta1CR + \beta2QR + \beta3DER + \beta4ATO + \beta5ITO + \varepsilon$
Here, $\beta0$ is the intercept, $\beta1$–$\beta5$ are the regression coefficients, and ε is the error term.

3.6 Data Analysis Techniques
The field study is in 3 phases. Then descriptive statistics are used to present the central tendency and dispersion of the variables. Second, Pearson correlation coefficients are used to measure the direction and magnitude of the bivariate relationships between the variables. Third, multiple regression analysis is used to analyze the individual impacts of financial ratios on ROE, ROA and NPM.
Data analysis was done using SPSS and MS Office Excel and at 5% level of significance.4. Findings and Analysis

4.1 Descriptive Statistics
The descriptive statistics suggest that there is substantial variation in the performance of the firms and their financial ratios over the 50 firm-year observations (Table 2). ROE has an average level of 8.88%, and the range is large, from −17% to 31%, showing that there are significant variations in the returns to shareholders from firm to firm and year to year. The mean ROA is 4.32%, ranging from −4% to 17%, while the mean NPM is 5.33%, with a minimum of −8.1% and a maximum of 19%.
The mean of the explanatory variables are: Current Ratio = 1.184 and Quick Ratio = 0.935. To have a sense of the differences in leverage, the average Debt-to-Equity Ratio is 1.715 with the highest ratio of 8.41. The Asset Turnover Ratio average is 0.850 and the average of Inventory Turnover Ratio is 8.077.

Table 2: Descriptive statistics of the variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROE	50	−0.17	0.31	0.0888	0.09508
ROA	50	−0.04	0.17	0.0432	0.05069
NPM	50	−0.081	0.19	0.05334	0.05919
CR	50	0.50	3.21	1.1844	0.60507
QR	50	0.20	2.74	0.9354	0.53685
DER	50	0.00	8.41	1.7152	2.05697
ATO	50	0.24	1.91	0.8496	0.30322
ITO	50	3.66	15.05	8.077	2.51627

Based on the descriptive results, it can be seen that the financial characteristics of the cement companies selected are not the same. The relatively high standard deviation for DER suggests that there was considerable variation in capital structure, and the high standard deviation for the profitability measures suggests that the financial performance of the firms differed significantly over the period of the study.

4.2 Correlation Analysis

There are several significant findings from the Pearson correlation results. The correlation among ROE, ROA and NPM is high and positive. ROE is strongly correlated with ROA ($r=0.917$, $p<0.01$) and NPM ($r=0.854$, $p<0.01$), while ROA and NPM have an even stronger correlation ($r=0.947$, $p<0.01$). These correlations show that the three performance measures tend to go in the same direction. Both liquidity measures are positively related to firm performance. CR is positively correlated with ROE ($r=0.355$, $p<0.05$), ROA ($r=0.519$, $p<0.01$), and NPM ($r=0.584$, $p<0.01$). Similarly, QR is positively correlated with ROE ($r=0.325$, $p<0.05$), ROA ($r=0.464$, $p<0.01$), and NPM ($r=0.530$, $p<0.01$). In contrast, DER has significant negative correlations with ROE ($r=-0.348$, $p<0.05$), ROA ($r=-0.525$, $p<0.01$), and NPM ($r=-0.550$, $p<0.01$). This indicates that the relationship between financial leverage and profitability is inverse, implying that companies with high financial leverage have lower profitability.

There is no statistically significant correlation between any of the three performance indicators and ATO. ITO, however, is negatively correlated with ROE ($r=-0.295$, $p<0.05$), ROA ($r=-0.352$, $p<0.05$), and NPM ($r=-0.360$, $p<0.05$). It is important to note, however, the very high positive correlation between CR and QR ($r=0.975$, $p<0.01$). It means that there is a strong correlation between the two liquidity variables, and they could be potential multicollinearity problems if they are both put into the regressions.

4.3 Regression Analysis

4.3.1 Effect of Financial Ratios on ROE

The value of R^2 using regression model is 0.258, which means that the five factors used to determine the ROE can explain about 25.8% of the variation of ROE. The adjusted R^2 is 0.174.

In the list of the explanatory variables, only the coefficient of ITO is statistically significant. The coefficient of ITO is −0.383 which has a p-value of 0.041 and shows significant negative association with ROE. CR ($\beta=-1.484$, $p=0.155$), QR ($\beta=1.692$, $p=0.095$), DER ($\beta=-0.296$, $p=0.081$), and ATO ($\beta=0.191$, $p=0.240$) are statistically insignificant at the 5% level.

The effect of financial ratios on ROA is shown as follows:

The ROA model is a better model to explain than ROE model. The R2 for the model is 0.428, meaning that 42.8% of the variance in ROA is accounted for by the financial ratios used in the model and the adjusted R2 is 0.363. DER is the only one of the determinants of ROA that is statistically significant. Its coefficient is −0.405, with a t-value of −2.782 and a p-value of 0.008. So, the greater the leverage, the lower the returns on assets are significantly. The coefficients for CR ($\beta=-0.500$, $p=0.581$), QR ($\beta=0.804$, $p=0.361$), ATO ($\beta=0.017$, $p=0.906$), and ITO ($\beta=-0.287$, $p=0.080$) are statistically insignificant.

4.3.3 Effect of Financial Ratios on firm performance

The NPM model provides the highest explanatory power among the three models. The R^2 is 0.518, while the adjusted R^2 is 0.464 (Table 3). Thus, the selected financial ratios jointly explain approximately 51.8% of the variation in NPM. DER again emerges as the only statistically significant explanatory variable. It has a coefficient of −0.415, a t-value of −3.106, and a p-value of 0.003. This indicates that greater leverage is significantly associated with lower net profit margins.The effects of CR ($\beta=0.105$, $p=0.899$), QR ($\beta=0.233$, $p=0.773$), ATO ($\beta=-0.182$, $p=0.167$), and ITO ($\beta=-0.233$, $p=0.120$) are statistically insignificant.

Table 3: Regression result of the different financial ratios

Variable	ROE, β (p-value)	ROA, β (p-value)	NPM, β (p-value)
CR	−1.484 (0.155)	−0.500 (0.581)	0.105 (0.899)
QR	1.692 (0.095)	0.804 (0.361)	0.233 (0.773)
DER	−0.296 (0.081)	−0.405 (0.008)	−0.415 (0.003)
ATO	0.191 (0.240)	0.017 (0.906)	−0.182 (0.167)
ITO	−0.383 (0.041)	−0.287 (0.080)	−0.233 (0.120)
R^2	0.258	0.428	0.518
Adjusted R^2	0.174	0.363	0.464

Note: Values in bold in the source interpretation are statistically significant at the 5% level.

V. Discussion

From the results of this empirical study it has been found that the financial ratios studied do not have a uniform impact on the three types of firm performance measure. Instead, it is their impact on a given dimension of performance that matters. This would be of significance, as ROE, ROA, and NPM measure different aspects of profitability.

The correlation analysis first results show that higher level of liquidity is correlated with better firm performance. There are strong positive correlations between the returns on equity, returns on assets and net profit margin of both CR and QR. The multiple regression results however do not support that either liquidity measure has an independent significant effect. Although liquidity seems to be associated with better firm performance at the bivariate level, it is no longer a statistically significant predictor if the other financial ratios are included in a simultaneous model.

There is a very high correlation ($r=0.975$) between CR and QR which may explain the lack of significant regression coefficients. Both ratios measure similar measures of short-term liquidity and including both ratios can introduce multicollinearity and result in a difficult separation of their effects. The issue should therefore be taken into account when interpreting the results of the regression.

The one thing that is the most consistent is leverage. The negative impact of DER on ROA and NPM is significant, but not at 5% level for ROE. This means that high debt ratios can have a negative impact on asset profitability and profit margin.

The discovery of ITO is also interesting. The effect of ITO on ROE is statistically significant and negative, and the effect on ROA and NPM are also negative but non-significant. Therefore, the positive relationship between inventory turnover and performance is not substantiated.

ATO has no significant impact on each of the three performance measures. This implies that the variations in profitability of the selected cement companies may not be due to differences in asset turnover.

In general, the regression results show that leverage, ROA and NPM are the financial-ratios that have the most stable relationship with DER. The explanatory power of the models is also quite different: the ratios chosen account for 25.8% of the variation in ROE, 42.8% of the variation in ROA and 51.8% of the variation in NPM.

5.1 Hypothesis Results

The results support the proposed hypotheses to a certain extent. A test of the liquidity hypothesis is performed by testing the regression effects of CR and QR, and it is concluded that there are no statistically significant regression effects for both CR and QR, which is the reason why the liquidity hypothesis is rejected. The leverage hypothesis is partially supported, as NPM has significant negative coefficient on DER, while ROA has a significant negative coefficient, whereas ROE doesn't have a significant coefficient. The efficiency hypothesis is not supported as ATO is insignificant in all models and ITO has a significant negative effect on ROE instead of positive.

VI. Conclusion

This study investigated the effectiveness of the selected financial ratios as an explanation of the financial performance of five listed cement companies of Bangladesh during 2016-2025. The linear relationships among the measures of liquidity, leverage, efficiency ratios, and three measures of firm performance—ROE, ROA, and NPM—were evaluated over the 50 firm-year observations.

The empirical results suggest that financial ratios can be helpful in studying the financial performance of cement firms, depending on the measure of performance that is used. The regression results indicate that the Inventory Turnover has a significant negative impact on ROE, while Debt to Equity Ratio has a significant negative effect on ROA and NPM. However, the Current Ratio, Quick Ratio and Asset Turnover do not show statistically significant effects in regression models.

The results in particular draw attention to the importance of dealing with leverage. Both ROA and NPM show strong negative correlation with DER, indicating that high dependence on debt financing could negatively affect profitability. Concurrently, the negative and significant ITO effect on ROE shows the need for attention in the management of inventory.

Based on the above study, it may be concluded that financial ratio analysis is a valuable tool for the management, investors and other stakeholders to evaluate the financial situation of cement companies. But there is no single ratio that can account for all aspects of firm performance. Consequently, managers should adopt a balanced method of financial management with the use of leverage, liquidity, inventory management and asset utilization.

Among the sampled cement companies, special focus should be placed on managing excessive leverage, better inventory management, and the appropriate liquidity ratio, as well as using assets efficiently.

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