

Determinants of Profitability: A Study on Ceramic Industry in Bangladesh

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Abstract

This study aimed to establish the key determinants of the profitability of ceramic companies. For this purpose the data of all ceramic companies were selected from DSE. The research period covered from 2015-16 to 2020-21. Return on Assets (ROA) and Return on Equity (ROE) were used as the indicators of profitability, while Management efficiency, Capital intensity, Firm size, Sales growth, Liquidity, Working capital, Leverage, Annual inflation and GDP annual growth were used as the independent variables. Pearson's correlation and ordinary least squares regression models were used to establish the relationship between profitability and its different determinants. The regression analysis results showed that liquidity and firm size have a statistically significant positive impact on profitability along with sales growth, capital intensity, management efficiency. On the other hand, working capital had a negative impact on profitability; others had no significant impact on profitability. Therefore, this research concludes that we should give more emphasize on liquidity and firm size for increasing ceramic companies' profitability.

Keywords: Profitability, Ceramic industry, DSE, Bangladesh, ROE, ROA

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I. Introduction

Profit is considered one of the most important objectives of any business entity that management strives to achieve in addition to secondary objectives such as increasing market share and sales volume. Profit can serve as an indicator of the level of efficiency of a business. High profit indicates that a business efficiently utilizes its funds (Aparna, 2015).

Al-Jafari and Samman (2015) mentioned that the magic word "Profitability" refers to earnings of companies that are generated from revenues and after deducting all expenses incurred during a given period. It is considered one of the most important goals that the management of every company strives to achieve and without it companies will cease.

Ifeduni and Charles (2018) stated Effectiveness and efficiency of a firm is sometimes measured by its profitability. Profit is significant; more profit reflects more effective management of resources, and low profits can slow the pace at which a firm progresses and certain obligations or targets may not be met.

According to Bangladesh Investment Development Authority, the ceramic industry started its journey in 1958 and currently consists of around 65 producers. The total domestic market consumption for ceramic products amounted to USD 660 million in FY2017-18 and local production meets the demand for 96% of tableware, 77% of tiles and 89% of sanitary ware. Over the last decade, the Bangladeshi ceramic industry has witnessed multi-dimensional growth in both domestic (20% average annual growth) and export markets (26% during the last three years), and approximately 200% growth in production capacity in the last five years. The sector directly employs around 48,000 people and is estimated to employ over 500,000 people indirectly. Bangladeshi ceramics products are exported to more than 50 countries.

For this reason, this paper highlights the 5 ceramic companies enlisted in Dhaka Stock Exchange (DSE) and attempts to determine the profitability determinants. The study's research period covers 2015-16 to 2020-21.

II. Literature review

Profit is one of the core objectives of any firm for its long-term reputation and survival. Profitability is the profit-making ability considered an essential factor for the perpetual existence of firms. Measuring a firm's profitability or determining how well a business is being run is challenging (Fareed et al., 2016).

Fareed et al.(2016) mentioned that Return can measure profitability on Asset (ROA), Return on Equity (ROE), Net Interest Margin (NIM) and Return on Capital Employed (ROCE) Variables but they took ROA as the dependent variable for their study. Rezina, Ashraf, and Khan (2020);Prasetyantoko and Rachmadi (2008) ; Khan, Shamim, and Goyal (2018); Pratheepan (2014); Ehi-Oshio, Adeyemi, and Enofe (2013); Nanda and

Panda (2018); Aissa and Lefa (2016); Liuspita and Purwanto (2019) also taken ROA as the proxy of profitability.

On the other side, Zaid, Wan Muhd, and Zulqernain (2014); Demsetz & Villalonga (2001); Gugler et al.(2004) selected ROE as measure of profitability.

However, Ifeduni and Charles (2018); Sivathaasan et al. (2013); Akben-Selcuk (2016); Hossain (2020) accepted ROE and ROA both as the proxy of profitability.

This research focused on ROE and ROA both as the proxy of profitability.

Hossain (2020) stated that profitability not only depends on the product's success but also on the development of the market for the product and many other internal and external factors. He examined manufacturing companies' profitability determinants. Some researchers addressed firm size, leverage, current assets and sales growth as important determinants of profitability.

Prempeh, Sekyere, and Amponsah Addy (2018) examined the determinants of profitability of manufacturing companies in Ghana. They explored that leverage and interest rates have a negative relationship with profitability. In contrast, liquidity and firm size have a significantly positive relationship with profitability but tangibility and GDP have shown no significant relationship with profitability.

Ehi-Oshio, Adeyemi & Enofe, (2013) investigated the determinants of corporate profitability in developing economies, mainly focusing on the Nigerian context. They found a positive relationship between firm size & corporate profitability and financial leverage & corporate profitability. However, capital structure and cash liquidity exhibited negative relationships with corporate profitability.

Sivathaasan et al. (2013) investigated factors determining profitability in selected manufacturing companies listed on Colombo stock exchange. They found that capital structure and non-debt tax shield have statistically significant impacts on profitability and that working capital, growth rate and firm size have nonsignificant effects on profitability.

Pratheepan (2014) studied on factors determining the profitability of companies. The findings revealed size is statistically significant of positive relationship with profitability whereas tangibility shows a statistically significant inverse relationship with profitability but leverage and liquidity indicate insignificant impacts on profitability.

Zaid, Ibrahim and Zulqernain (2014) examined the determinants of public-based construction companies' profitability in Malaysia. The result showed that liquidity and size have a significant relationship with profitability. The negatively insignificant relationship between capital structure and profitability as well as term premium, interest rate and Gross Domestic Product (GDP) showed nonsignificant relationship.

Al-Jafari & Samman (2015) This study investigates the determinants of profitability for industrial firms in Oman. The result was positive statistically significant relationship present between profitability and firm size, growth, fixed assets ratio & working capital. On the other hand, the average tax rate and the financial leverage variables showed a negative relationship with profitability.

Fareed et al. (2016) researched the impact of key determinants of power and energy sector profitability in Pakistan. The empirical results suggested that firm size, firm growth, and electricity crisis positively impact profitability. However, firm age, financial leverage and productivity negatively influenced the firm profitability. This study also proposed that during the electricity crisis the profitability of power sector is increased even production of this sector is very low.

Khan, T., Shamim, M., & Goyal, J. (2018) examined the profitability of Indian telecom companies. The study's findings revealed that size and growth directly correlate with profitability, whereas leverage had an inverse relationship. Tangibility, Non-Debt Tax Shields, liquidity and Bankruptcy probability indicated an insignificant impact on profitability.

Ifeduni & Charles (2018) examined the determinants of profitability of manufacturing organizations in Nigeria. They concluded that size, lagged profitability, productivity and financial leverage are essential determinants. They also commented that this sector's profitability is significant not only in the view of the objective of shareholders, but also in growing the Nigerian Economy as a whole.

Pervan, Pervan & Ćurak (2019) examined the influence of different factors on a firm's profitability. The result revealed that a firm's age, labor cost, industry concentration, G.D.P. growth and inflation have a significant influence on a firm's profitability.

Liuspita & Purwanto (2019) investigate what are factors that determine the profitability. The study found that profitability is positively influenced by size, age, lagged profitability, growth, and productivity of the companies.

Rezina, Ashraf & Khan (2020) examined the impacts of firm-specific and macroeconomic factors in determining the profitability of the cement industry in Bangladesh. The study found that Firm size, age, GDP growth rate, and real interest rate have a positive impact whereas expenses to revenue ratio, leverage, and inflation have a negative impact on the profitability.

Hossain (2020) aimed to establish the crucial determinants of the profitability of manufacturing companies listed on the Dhaka Stock Exchange (DSE). The research showed that liquidity and leverage have a statistically significant negative impact on profitability. On the other hand, managerial efficiency, sales growth and capital intensity have a statistically significant positive impact on profitability. The study also found that firm size, working capital, annual inflation and GDP growth have no significant impact on profitability.

Egbunike and Okerekeoti (2018) explored the interrelationship between macroeconomic factors, firm characteristics and financial performance of quoted manufacturing firms in Nigeria. They measured financial performance measured as return on assets (ROA). They found a significant effect of inflation and GDP growth rates on ROA.

III. Research Methodology

3.1 Sample design

There are 5 companies in the ceramic industry in DSE and all are selected for this research. The companies are Fu-Wang Ceramic Industries Limited, Monno Ceramic Industries Limited, RAK Ceramics (Bangladesh) Limited, Shinepukur Ceramics Limited, and Standard Ceramic Industries Ltd. .

3.2 Data collection

The data were collected from the selected companies' 2020-21 to 2015-16 annual reports.

3.3 Variables

To assess firms' profitability, return on assets (ROA) and return on equity (ROE) are used as profitability indicators. Here, ROA and ROE are used as dependent variables.

The following table describes the selected variables-

Variable	Type	Abbreviation	Measurement
Return on asset	Dependent	ROA	Profit before WPPF / Total asset
Return on equity	Dependent	ROE	Profit before WPPF / Total equity
Management efficiency	Independent	ME	Total revenue / Total asset
Capital intensity	Independent	CI	Total asset/ Total revenue
Firm size	Independent	FS	Ln (Total asset)
Sales growth	Independent	SG	$(S_1 - S_0) / S_0$
Liquidity	Independent	LIQ	Current asset/ Current liability
Working capital	Independent	WC	Current asset- current liability
Leverage	Independent	LEV	Total liability/Total asset
Annual inflation	Independent (External Level)	AI	Annual average increase in the Bangladeshi CPI
GDP annual growth	Independent (External Level)	GDPG	Annual real GDP growth rate

3.4 Hypothesis

The study will test the following hypotheses:

- a. H_{01} : There is a statistically significant relationship between management efficiency (ME) and profitability.
- b. H_{02} : There is a statistically significant relationship between capital intensity (CI) and profitability.
- c. H_{03} : There is a statistically significant relationship between firm size (FS) and profitability.
- d. H_{04} : There is a statistically significant relationship between sales growth (SG) and profitability.
- e. H_{05} : There is a statistically significant relationship between liquidity (LIQ) and profitability.
- f. H_{06} : There is a statistically significant relationship between working capital (WC) and profitability.
- g. H_{07} : There is a statistically significant relationship between leverage (LEV) and profitability.
- h. H_{08} : There is a statistically significant relationship between annual inflation (AI) and profitability.
- i. H_{09} : A statistically significant relationship exists between GDP annual growth (GDPG) and profitability.

3.5 Regression model

$$ROA_{it} = \beta_0 + \beta_1 LEQ_{it} + \beta_2 LEV_{it} + \beta_3 SG_{it} + \beta_4 ME_{it} + \beta_5 CI_{it} + \beta_6 FS_{it} + \beta_7 WC_{it} + \beta_8 AI_{it} + \beta_9 GDPG_{it} + \epsilon_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 LEQ_{it} + \beta_2 LEV_{it} + \beta_3 SG_{it} + \beta_4 ME_{it} + \beta_5 CI_{it} + \beta_6 FS_{it} + \beta_7 WC_{it} + \beta_8 AI_{it} + \beta_9 GDPG_{it} + \epsilon_{it}$$

Here “ β ” is the regression model coefficient, “i” indicates firms and “t” indicates years.

IV. Results And Discussion

4.1 Descriptive statistics: The descriptive analysis shows the mean and standard deviation.

	N	Mean	Std. Deviation
Return on Asset (ROA)	30	.082780	.2162452
Return on Equity (ROE)	30	.048213	.1392828
Management Efficiency (ME)	30	.492653	.3919789
Capital Intensity (CI)	30	3.071497	1.5375258
Firm Size (FS)	30	9.431847	.5937219
Sales Growth (SG)	30	.035190	.2009444
Working Capital (WC)	30	691804199.166667	1425598227.0787208
Liquidly (LIQ)	30	1.283443	.5926178
Annual Inflation (AI)	30	252.881667	23.8837590
GDP Annual Growth (GDPA)	30	6.751667	1.6108406
Leverage (LEV)	30	.417223	.1399919

Table 2 shows the summarized form of the independent and dependent variables of the 30 firm years. The average ROA and ROE are 8.28% and 4.82%, and the standard deviations of the variables are 21.62 % and 13.93 %.

The average and deviation of working capital and sales growth are above Tk. 69 crore and above 140 crores respectively as well as 3.52% and 20.09% respectively

The summary shows the mean of management efficiency and capital intensity 49.27% and 3.07 respectively where the standard deviations are 3.92% and 1.54. In addition, liquidity and leverage are 1.28 and 0.4172 with deviations 0.5937 and 0.1400.

4.2 correlation analysis:

	ROA	ROE	ME	CI	FS	SG	LIQ	WC	LEV	AI	GDPA
ROA Sig. (2-tailed)	1										
ROE Sig. (2-tailed)	.319	1									
ME Sig. (2-tailed)	-.008	.060	1								
CI Sig. (2-tailed)	-.149	-.112	.881**	1							
FS Sig. (2-tailed)	-.008	.289	.781**	.535**	1						
SG Sig. (2-tailed)	.317	.418*	.148	-.283	.021	1					
LIQ Sig. (2-tailed)	.738**	.402*	-.211	-.056	.231	.121	1				
WC Sig. (2-tailed)	.101	.412*	-.009	-.337	.494**	.155	.498**	1			
LEV Sig. (2-tailed)	-.363*	-.302	.689**	-.636**	-.561**	.105	-.412*	.072	1		
AI Sig. (2-tailed)	-.306	-.225	-.152	.188	.075	.123	-.165	.096	.298	1	
GDPA Sig. (2-tailed)	.281	.462*	.164	-.242	-.033	.543**	.128	-.029	-.197	-.480**	1
	.133	.010	.386	.198	.865	.002	.500	.879	.296	.007	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 3 shows that ROA is positively correlated with sales growth, liquidity, working capital and GDP annual growth. Additionally, it is negatively correlated with management efficiency, capital intensity, firm size, leverage and annual inflation. Furthermore, the correlation coefficient of liquidity has the highest positive correlation with ROA and LEV has the highest negative correlation with ROA. From table number 3, it is also noticeable that ROE is positively correlated with all independent variables other than capital intensity, leverage and annual inflation. In addition, GDP annual growth has the highest positive correlation and leverage has the highest negative correlation with ROE.

4.3 Regression analysis-

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	Sig.
1	.918	.842	.771	.1033877	2.493	11.874	0.000

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.922	1.721		-2.278	.034
	GDP annual growth	-.031	.020	-.233	-1.588	.128
	Annual inflation	.000	.001	-.025	-.172	.865
	Leverage	.055	.332	.036	.166	.870
	Working capital	-1.911E-10	.000	-1.260	-3.898	.001
	Liquidity	.450	.076	1.233	5.890	.000
	Sales growth	.250	.152	.232	1.642	.116
	Firm size	.405	.146	1.112	2.766	.012
	Capital intensity	-.067	.047	-.478	-1.432	.168
	Management efficiency	.366	.214	.663	1.713	.102

a. Dependent Variable: return on asset

For testing hypotheses, the regression analysis was conducted to determine whether there is a significant relationship between the dependent and independent variables. Table 4 R = 0.918 indicates a high degree of positive correlation among the variables in the regression model. R squared is 0.842, indicating that the independent variables can explain 84 percent of the total variation of the dependent variable in the model and the remaining 16 percent variation can be explained by the variables not included in the model. The Durbin-Watson value is showing 2.49 where 2 indicates no autocorrelation. Here, the F value is 11.87 and the p-value is 0.00, indicating that the independent variables reliably predict the dependent variable.

Table 5 shows the coefficient value of the regression analysis. These coefficients explain to what extent each independent variable impact ROA. The beta coefficient of Liquidity is -1.233 with a p-value of 0.000, which is statistically positively significant at the 5% level and it is also supported by Egbunike and Okerekeoti (2018); Prempeh et al. (2018); Chowdhury and Amin (2007) and Zaid et al. (2014), Akben-Selcuk (2016), Hossain (2020). Prempeh, Sekyere and Amponsah Addy (2018) but not supported by Khan (2020).

The beta coefficient of firm size is 1.112 with a P value of 0.01, which is statistically significant at 5% level, supporting Rezina, Ashraf, and Khan (2020), Egbunike and Okerekeoti (2018), Khan, T., Shamim, M., & Goyal, J. (2018), Akben-Selcuk (2016) Al-Jafari & Samman (2015), Prempeh, Sekyere, and Amponsah Addy (2018) and varying Ifeduni & Charles (2018) and Hossain (2020)

The beta coefficient of working capital is -1.26 where the p value is 0.001 (at 5% level), supporting Nusbantoro et al. (2018) but opposing Al-Jafari & Samman (2015).

The beta coefficient of GDP annual growth, annual inflation, leverage, sales growth, capital intensity and management efficiency are -0.233, -0.025, +0.036, +0.232, -0.478 & +0.663 with p-values of 0.128, 0.865, 0.870, 0.116, 0.168 and 0.102 respectively, which are not statistically significant.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	Sig.
1	.901	.812	.727	.0727971	2.543	9.573	0.000

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.068	1.212		-2.532	.020
	GDP annual growth	.017	.014	.197	1.232	.232
	annual inflation	-.001	.001	-.097	-.618	.544
	leverage	-.086	.234	-.086	-.368	.717
	working capital	1.904E-11	.000	.195	.551	.587
	Liquidity	.127	.054	.539	2.356	.029
	sales growth	.227	.107	.327	2.120	.047
	firm size	.228	.103	.971	2.207	.039
	capital intensity	.145	.033	1.600	4.379	.000
	management efficiency	.819	.150	2.306	5.446	.000

a. Dependent Variable: return on equity

Then again for testing hypotheses, the regression analysis was conducted to determine the mentionable significant relationship between the dependent variables and independent variables. Table 6 R = 0.901 indicates a high degree of positive correlation among the variables in the regression model. R squared is 0.812, indicating 81 percent of the total variation of the dependent variable can be explained by the independent variables and the remaining 19 percent variation can be explained by the variables not included in the model. The Durbin Watson value is showing 2.54 where 2. Here F value is 9.57 and p value is 0.00, it indicates the independent variables reliably predict the dependent variable.

Table 7 shows the coefficient value of the regression analysis. These coefficients explain to what extent each independent variable impact ROE. The beta coefficient of Liquidity is 0.539 with a p-value of 0.029, which is positively significant at the 5% level and it is also supported by Akben-Selcuk (2016); Zaid, Ibrahim and Zulqernain (2014), but disagreed by Hossain (2020).

The beta coefficient of SG is 0.327 with a p-value of 0.047, which is statistically significant at the 5% level. This means the sales growth has a significant positive impact on ROE, supporting Hossain (2020).

The firm size's beta coefficient is 0.971 with p value of 0.039, this is statistically significant and it is also agreed by Ifeduni & Charles (2018), Akben-Selcuk (2016), Zaid, Ibrahim & Zulqernain (2014) and Hossain (2020).

The beta coefficient of capital intensity is 1.60 (p value 0.000) which is also statistically significant and the result is also accepted by Goldar & Aggarwal (2005) and Hossain (2020) but opposed by Dickinson & Sommers (2012)

The beta coefficient of management efficiency is 2.306 (p value 0.000) which means this is also statistically significant and the result is also same by Jamali & Asadi, (2012) and Hossain (2020).

The beta coefficient of GDP annual growth, annual inflation, leverage and working capital are +0.197, -0.097, -0.086 and +0.195 with p-values of 0.232, 0.544, 0.717 and 0.587 respectively, which are not statistically significant.

V. Conclusion

This study focused on identifying the remarkable factors that control the ceramic sector's profitability and the extent to which these determinants impact on profitability. Here ROA and ROE are taken as the proxy of profitability.

First, liquidity shows a significant positive impact on profitability, supporting Egbunike and Okerekeoti (2018); Prempeh et al. (2018); Chowdhury and Amin (2007); Hirsch and Hartmann (2014); Hirsch et al. (2014) and Zaid et al. (2014) but varying from Eljelly (2004) and Hossain (2020).

Second, firm size also shows a significant positive impact on profitability. It is supported by Rezina, Ashraf, and Khan (2020), Egbunike and Okerekeoti (2018), Khan, T., Shamim, M., & Goyal, J. (2018), Akben-Selcuk (2016) Al-Jafari & Samman (2015), Prempeh, Sekyere, and Amponsah Addy (2018) and contradicted by Ifeduni & Charles (2018) and Hossain (2020).

Third, Sales growth is showing statistically significant impact on profitability, supporting Jamali & Asadi (2012), McGivern & Tvorik (1997) and Hossain (2020).

Fourth, capital intensity presented a statistically significant relationship with profitability. The exact relationship is also found by Goldar & Aggarwal (2005) and Hossain (2020) but the opposite relationship was found by Dickinson & Sommers (2012).

Fifth, management efficiency also positively connected, supporting Jamali & Asadi, (2012) and Hossain (2020).

Sixth, working capital shows a negative relationship with profitability. It is supported by Nusbantoro et al. (2018) but opposed by Al-Jafari & Samman (2015).

Seventh, Annual inflation has insignificant negative relationship with profitability, supporting Hossain (2020) and Hassan & Muniyat (2019) but varying from Pervan et al. (2019).

In addition GED annual growth is not statistically significant, varying from Rezina et al. (2020); Hassan and Muniyat (2019) and Egbunike and Okerekeoti (2018). Lastly, leverage is not statistically significant and it varies from Ifeduni and Charles (2018) and Al-Jafari and Samman (2015), Sivathaasan et al. (2013) and Ehi-Oshio et al. (2013).

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