Measuring Financial Performance of Pharmaceutical Industry and Cement Industry of Bangladesh- A Comparative Study

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Abstract

Performance measurement is helping to achieve and sustain the competitive business advantage of any industry. In the present dynamic business environment, measuring performance is an essential part of the business. Pharmaceutical and cement are two important industries that contribute to the national economic growth of Bangladesh. The study aims to investigate the financial performance of the pharmaceutical and cement industry of Bangladesh based on accounting ratios. Data has been collected for selected accounting ratios of 11 pharmaceutical and 6 cement companies for the period of 2011-2017. The study considered 15 accounting ratios for measuring financial performance. Different statistical measures were used and a t-test has been performed to observe the significant differences in performance. A significant difference in financial performance between the pharmaceutical industry and the cement industry in terms of GP, NP, ARCP, IT and D/E, is observed. The performance measurement of companies and industries indicates that the ability of returns, profitability, financial risk, and market growth are critical underlying sources of information. These identified factors will assist investors, financial institutions, concerned authorities, and the government to make decisions for the betterment of both industries.

Keywords: Performance Measurement, Cement Industry, Pharmaceuticals Industry, Ratio Analysis, and T-test.

Introduction

Bangladesh is a country with an emerging economy. The reason for the country's rising economy is the high growth rate of industrialization and investment in different sectors. After the liberation in 1971, various industrial

sectors have developed in Bangladesh, like, garments, cement, ceramics, pharmaceuticals, leather, etc. (Rahman, et al, 2017). Pharmaceutical and cement industries are important sectors that contribute to its economic growth. The pharmaceutical industry has contributed 1.85% to the GDP in 2016-17(BBS, 2016-17). Cement is one of the prime elements of the construction sector which contributes more than 10% of GDP (Abedin, S.N., 2020). The pharmaceutical and cement industries are some of the leading industries of Bangladesh that meet the home demand as well as earn foreign currency. Bangladeshi pharmaceutical products and cement are gaining worldwide popularity. Bangladesh's medicine exports 25.60% rise to $130 million in FY19, which was $103.46 million the previous year (Ovi and Mahmud, 2021), and cement export rise 16.68% compare to the previous year (EBL, 2019). Therefore, these industries are very much prospective for expansion the economy of Bangladesh.

Performance measurement (PM) is helping to achieve and sustain their competitive advantage of any industry (Eccles, 1991; Lebas, 1995; Merchant, 1998). Performance measurement is currently attracting a great deal of interest among both industrialists and academicians (Bourne, et al., 2002). Measuring performance plays a vital role in decision making, improving efficiency, and enhancement of performance of any organization. Moreover, Ittner and Larcker (1998) noted that performance measurement plays a crucial role in the development of strategic plans and the evaluation of organizational objective. Measuring performance emphasizes the information that management requires for specific within-firm resource allocation (Sun and Scott, 2003). As a result, organizations are investing a considerable amount of resources in implementing measures that reflect all dimensions of their performance.

To sustain in the present dynamic and competitive business environment, pharmaceutical and cement industries should measure their performance. Besides, the stakeholders, especially investors of these two industries may want to compare their business performance for making proper investment decisions. However, to the best of the author knowledge, no study has been performed yet on comparison of financial performance between the pharmaceutical industry and cement industry of Bangladesh. Therefore, the study attempts to obtain the financial measures which are significantly diverse for these two leading manufacturing industries. The next section provides a brief objective of the study. In section 3 gives a short review of existing related to performance measurement of the manufacturing industries. In section 4, the research methods of this study have been discussed. Results of the study and an overall discussion of obtained results are the subject matter of section 5. Conclusion, implications, and direction of further research are also provided at the end.

Objectives of the Study

Performance measurement is usually comparing their results with other results or success. The essential function of a performance measure is to assess how well the activities are perfumed. A target level of performance is usually expressed as a quantitative standard, value, or rate (Ahmad et al., 2005). This study will help the manufacturing industry to understand their business performance and they will get information that how they meet their target stage. Research objectives quite simply answer a simple question – Why this study will be conducted? The objective of this study is to measure the financial performance of the pharmaceutical industry and the cement industry of Bangladesh and obtain the financial measures which are significantly diverse for the selected industries.

Literature Review

Performance Measurement

Performance measurement is the process of collecting, analyzing, and/or reporting information as regards the performance of an individual, group, and organization (Marshall, et al., 1999; Behn, 2003). Performance measurement is the process of evaluating the success level of a reporting entity, by the economic achievement of investment and their efficient and effective use, in attaining its objectives (Neely, et al., 2002). It is about monitoring an organization's

effectiveness in fulfilling its own predetermined goals or stakeholder requirements (Najmi and Kehoe, 2001). According to Moullin (2002) performance measurement is another process of evaluating how well organizations are managed and the value they deliver for customers and other stakeholders. In a broad sense, PM is a multifunctional process that combining key performance indicators to help evaluate business performance, ensuring management process, value creation, adaptability, and quick reaction, helping the company to improve and grow (Klovienė, 2012). Performance measurement has evolved from purely financial performance measures such as profit, cash flow, or the return on capital employed (ROCE). Today there is a greater emphasis on non-financial and multidimensional performance measures to understand and manage the performance of the organization to achieve its goals. Performance measurement estimates the parameters under which programs, investments, and acquisitions are reaching the targeted results (OCIO, 2007). PM helps ensure better informed and more effective decision-making at both strategic and operational levels. Key indicators for measuring performance are profitability, solvency, liquidity, and efficiency which demonstrated the investors were safe and provided a certain return (Babu and Kasilingam, 2014; Singhand Samuel, 2012; Arulvel and Ajanthan, 2013).

Financial Performance

An organization's vital decisions depend on financial measures, so understanding financial performance is crucial for every organization. Most of the previous studies revealed that manufacturing companies measure financial performance to evaluate the company's annual success by using ratio analysis (Majumder and Rahman, 2011; Islam and Mili, 2012; Salauddin, 2001; Chowdhury 2013; Arulvel and Ajanthan, 2013; Ahmed and Ahmed, 2014; Delen, et al. 2013; Singh and Samuel, 2012; Memon and Tahir, 2012). Financial measures are typically focused on profitability, the market value of the firm, return on assets, investment and equity, liquidity, and various other ratios (Ankrahand Mensah, 2015). Financial performance could be defined as a measurement of the results of a firm's policies and operations in monetary terms (Chowdhury, 2013). It is used to measure a firm's overall financial health over a given period and can also be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. Elizabeth and Ellot (2004) indicated that all financial performance measures as interest margin, return on assets, and capital adequacy is positively correlated with customer service quality. The measurement and presentation of financial performance are essential to accounting. For the company's own (management) accounting, the business target is supported and communicated by comprehensive policy and budgets. Managerial control then involves measuring actual performance, comparing it to planned performance, and taking proper steps to attempt to correct, in particular, difficult deviations (Abdel-Maksoud, et al., 2005). Moullac (2013) measured financial performance using ROCI, WACC, economic value added (EVA), net profit (NP), earning per share (EPS), return on equity (ROE), return on capital employed (ROCE), Share Price, price/earnings (P/E), revenue growth, etc. Besides, Wu (2009) investigated performance measurement frequencies were financial measure and those are growth in sales (GS), net profit (NP), return on assets (ROA), return on investment (ROI), return on sales (ROS), and return on equity (ROE), etc. The financial measure is most frequently used as a performance measurement tool (Ismail, 2007).

Research Methods

Sample selection and Data collection

The study is based on secondary data. Data has been collected from the annual reports of the purposively selected 11 pharmaceutical and 6 cement manufacturing companies from 2011 to 2017. Thus, a total of 119 (17 companies' ×7 years) observations were considered for this study. All the sample companies are listed and annual reports have been collected from the website of Dhaka Stock Exchange (DSE). All the annual reports are audited so they could be treated as transparent. Cross-check of data has been made where possible.

Ratios to measure financial performance

To explore the financial performance of two manufacturing industries, the following fifteen ratios have been used.

Table-1: Various ratios for measuring financial performance

Ratio	Formula	Reference
Return on Investment (ROI)	$ROI = \frac{Sales}{Total\ Assets} \times \frac{Net\ Income}{Sales}$	Moullac (2013); Ankrah and Mensah (2015); Ong and The (2008); Cvetkovs (2011); Kabajeh, et al., (2012); Azleen, et al., (2007); Ahmed and Ahmed (2014); Jusoh and Parnell (2007).
Return on Equity (ROE)	$ROI = \frac{Net\ Income}{Shareholder's\ Equity}$	Ankrah and Mensah (2015); Marimuthu (2010); Mokhtar and Muda (2012); Zayed (2017); Wahyu (2017); Delen, et al. (2013); Kabajeh, et al. (2012); Mirza and Javed (2013).
Return on Capital Employed (ROCE)	$ROCE = \frac{Net\ Income}{Capital\ Employed}$	Emmanuel, et al. (2013); Ankrah and Mensah (2015); Ahmed and Ahmed (2014); Kasie and Belay (2013).
Gross Profit (GP)	$GP = \frac{Gross\ profit}{Net\ Sales}$	Emmanuel, et al. (2013); Ankrah and Mensah (2015); Ong and The, (2008); Wahyu (2017); Ahmed and Ahmed (2014); Arulvel and Ajanthan(2013); Kasie and Belay (2013).
Net Profit (NP)	$NP = \frac{Profit\ after\ Tax}{Net\ Sales}$	Memon and Tahir (2012); Delen, et al. (2013); Azleen, et al., (2007); Wu and Ho (2007); Ahmed and Ahmed (2014); Arulvel and Ajanthan (2013).
Inventory Turnover (IT)	$IT = \frac{Cost\ of\ goods\ sold}{Average\ Inventory}$	Islam and Mili (2012); Shihabeldeen, (2018); Bayyurt and Duzu (2008).
Account Receivable Collection Period (ARCP) in Days	$ARCP = \frac{Net\ credit\ sales}{AR\ Turnover}$	Islam and Mili (2012); Bayyurt and Duzu (2008).
Assets Turnover Ratio (ATR)	$ATR = \frac{Net\ sales}{Total\ assets}$	Warrad and Omari (2015).
Cash Flow from Operating Activities (CFFOAs)	CFFOAs = [Cash received from operating activities] − [Cash payment for operating activities] ± [Other necessary non-cash transactions].	Perkins and Van Zyl (1994); Naser, et al. (2004); Frank and James (2014); Ryu and Jang (2004).
Revenue Growth (RG)	$RG = \frac{Revenue\ this\ year}{Revenue\ last\ year} - 1$	Emmanuel, et al. (2013); Ong and The (2008); Islamand Mili (2012); Jusoh and Parnell (2008); Kasie and Belay (2013).
Profit Growth (PG)	$PG = \frac{Profit\ this\ year}{Profit\ last\ year} - 1$	Emmanuel, et al. (2013).
Current Ratio (CR)	$CR = \frac{Current\ Assets}{Current\ Liabilities}$	Wahyu (2017); Islam and Mili (2012); Ahmed and Ahmed (2014); Shihabeldeen (2018).
Debt to Equity (D/E)	$D/E = \frac{Debts}{Equity}$	Marimuthu (2010); Wahyu (2017); Islam and Mili (2012); Ahmed and Ahmed (2014); Shihabeldeen (2018).
Earnings Per Share (EPS)	$EPS = \frac{Profit\ for\ ordinary\ shareholder}{No.of\ the\ ordinary\ share}$	Marimuthu (2010); Islam and Mili(2012); Ahmed and Ahmed (2014); Arulvel and Ajanthan (2013).
Net Assets Value (NAV)	NAVps = Net Asset Value (NAV) / Number of Shares Outstanding	Ennis (2012); Farkoosh, et al. (2012); Liow and Yeo (2018).

Data analysis

The very common statistical measures like mean, standard deviation, skewness,and kurtosis were used to describe the performance. Further, a sample t-test has been performed to identify the performance measuring ratios that are significantly different for these two industries. Sample t-test is a widely used statistical tool to observe the significant average difference between two groups, also practised by researchers, and academicians in business (For instance, Mokhtar, and Muda, 2012; Mohabbat, et al., 2018; Darda, et al., 2019; Kim, 2015; Yusopa, 2015; Rono, et al., 2014).

Results and Discussion

Descriptive Analysis

Table-2: Distinguishing features of the pharmaceutical industry and the cement industry

Features	Pharmaceutical	Cement	
Market Size (BDT in Millions)	76,500*	25,000**	* Bhuiyan, et al., (2019) **New Vision, (2020)

Average Company Size* (BDT in Millions)	17,069	11,910	*Basis on total assets
Average Company Age*	43	23	*Up to 2017
P/B* (Times)	4.43	2.98	*Market Price/ Net Assets Value (per share)

Table 2 presents the market size, average company size, average company age, price/book value (P/B) for the pharmaceutical industry and the cement industry. It is observed that the market size of the pharmaceutical industry (BDT. 76500 million) is higher than the cement industry(BDT. 25000 Million). Results evident that the pharmaceutical industry's average company size (BDT. 17,069 million) is larger large than the cement industry's (BDT. 11,910 million) and the average company age of pharmaceutical (43 years) is more than the cement (23 years) industry. Moreover, the P/B of the pharmaceutical industry (4.43 times) is also higher (2.98 times) than the cement industry. Therefore, the pharmaceutical industry enjoys a more competitive advantage than the cement industry.

Descriptive Statistics

Table-3: Descriptive statistics of the variables used

Ratios	Observations	Minimum	Maximum	Mean	Std. Dev.	Skewness (SK)	Kurtosis (KU)
ROI	119	1.16	16.24	6.95	1.97	0.5590	-0.6499
ROE	119	1.87	26.25	13.00	6.93	0.2499	-0.5442
ROCE	119	2.97	33.28	17.00	8.54	0.6336	-0.1430
GP	119	12.16	56.43	35.90	14.73	-0.3150	-1.4107
NP	119	1.46	21.39	10.45	5.77	0.2707	-0.7085
IT	119	0.96	10.85	4.76	3.10	0.6067	-0.7055
ARCP	119	1.14	73	44.24	20.41	-0.4786	-0.4298
ATR	119	0.12	2.17	0.81	0.49	1.3656	2.7624
CFFOAs	119	0.55	84.32	12.01	20.14	3.2514	11.5656
RG	119	1.04	36.15	14.04	8.94	1.0642	1.3837
PG	119	-4.87	95.9	25.22	25.19	1.7860	3.4151
CR	119	0.85	4.38	1.87	0.85	1.5262	3.6869
D/E	119	0.04	1.41	0.25	0.31	3.5221	13.3381
EPS	119	0.23	47.96	9.07	12.66	2.3476	5.3324
NAV	119	10.91	247.94	61.46	63.05	2.1286	4.4959

The above table shows descriptive statistics of accounting ratios used in this study. The result revealed that ROI, ranges between 1.16% and 16.24%, with a mean of 6.95% and a standard deviation (SD) of 1.97. The minimum ROE is 1.87% and the maximum is 26.25% with a mean of 13%, SD 53.27, and positive skewness of 0.2499. Looking at the ROCE, it ranges between 2.97% to 33.28%, an average of 17% with a standard deviation of 8.54. From the analysis average, GP is found 35.90% with huge (14.73) SD and negative (-0.3150) SK, revealed that Gross Profit varies from company to company. In terms of ATR (Assets Turnover Ratio), minimum turnover was observed 0.12 times and a maximum of 2.17 times with an average of 0.81 times and an SD of 0.49. The results also revealed that maximum revenue growth is 36.15% and minimum revenue growth is 1.04% with a mean of 14.04%. Looking at the D/E, it is found that, the range between 0.04:1 and 1.41:1 with a mean of 0.25:1 and Standard deviation (SD) of 0.31. SD is higher than the mean implies that the deviation over the years and companies is significant which indicates the D/E is varying for time and company. It is observed that the ranges of EPS between BDT 0.23 and BDT 47.96, where mean 9.07 and SD 12.66. Here also SD is higher than the mean which points out EPS is unstable to time and company.

Table-4: Significantly Diverse Financial Performance Measures in Selected Industries

Variable	Industry	Mean	Std. Deviation	t- value	Sig. (2-tailed)
ROI	**0**	7.14	5.32	0.561	0.575
	I	6.62	3.85		
ROE	**0**	12.84	8.64	-0.239	0.892
	I	13.22	4.84		
ROCE	**0**	17.77	11.22	1.171	0.244
	I	15.57	6.30		
GP	**0**	45.56	7.34	20.947**	0.000
	I	18.19	5.70		
NP	**0**	11.32	7.22	2.001*	0.048
	I	8.84	4.76		
IT	**0**	3.31	2.72	-8.354**	0.000
	I	7.43	2.28		
ARCP	**0**	40	24.07	-2.712**	0.008
	I	52	20.25		
ATR	**0**	0.79	0.59	0-.547	0.585
	I	0.85	0.26		
CFFOAs	**0**	12.52	25.43	0.342	0.733
	I	11.09	12.48		
RG	**0**	15.01	18.43	0.751	0.454
	I	12.25	21.65		
PG	**0**	29.77	72.67	1.050	0.296
	I	16.88	47.39		
CR	**0**	2.01	1.72	1.426	0.157
	I	1.61	0.77		
D/E	**0**	0.16	0.10	-3.646**	0.000
	I	0.41	0.60		
EPS	**0**	10.08	16.41	1.067	0.288
	I	7.21	7.22		
NAV	**0**	68.31	74.73	1.602	0.112
	I	48.90	31.81		
0= Pharmaceutical Industry, 1= Cement Industry					
** = 1% significance, * = 5% significance					

To identify variations in the financial performance between the pharmaceutical industry and the cement industry, a t-test has been performed and the results are presented in Table 4. The study found a significant difference between the pharmaceutical industry and the cement industry in terms of gross profit (GP), net profit(NP), inventory turnover (IT), accounts receivable collection period (ARCP), and debt to equity (D/E).

Referring to the GP, the result revealed that the average GP of the pharmaceutical industry is 45.56% with a standard deviation of 7.34 and the average GP of the cement industry is 18.19 % with a standard deviation of 5.70. It indicates that the GP of the pharmaceutical industry is 150.41% higher than the cement industry. The observed mean difference is also statistically significant ($p<0.01$ and $t=20.947$). From the viewpoint of NP, it is found that NP of the pharmaceutical industry is 11.32% with a standard deviation of 7.22, and NP of the cement industry is 8.84% with a standard deviation of 4.76. The mean has been compared by t-test and the result revealed that the difference of NP of the pharmaceutical industry and the cement industry is statistically significant ($p<0.05$ and $t=2.001$). It signifies that the pharmaceutical industry is more NP earner than the cement

industry. ROI, ROE, ROCE, and EPS are related to earning profitability but none of these differences are statistically significant. It is also found that market size, average company size, average age, P/B [table- 2] of the pharmaceutical industry are higher than cement industry. Industry market size, company size, and company age are influenced to earn a profit (Memon and Tahir, 2012).

In terms of using inventory, a significant difference ($p<0.01$ and $t= - 8.354$) has been found between these two industries. The mean value of IT of the pharmaceutical industry is 3.31 times, the standard deviation is 2.72 and the mean value of the cement industry is 7.43 times, the standard deviation is 2.28. The cement industry is 124% on average more efficient than the pharmaceutical industry to use inventory. The variation of the nature of raw material, availability, import or home supply, nature of production are maybe considering factors for using effective inventory.

Referring to the ARCP, there is a significant difference found ($p<0.01$ and $t= -2.712$). Results revealed that the average ARCP of the pharmaceutical industry is 40 days with a standard deviation of 24.07 and the average ARCP of the cement industry is 52 days with a standard deviation of 20.25. It implies the pharmaceutical industry collects the account receivable more effectively than the cement industry.

There is a significant difference ($p<0.01$ and $t= -3.646$) found of D/E (capital structure) between the pharmaceutical industry and the cement industry. Results revealed that the average D/E ratio of the pharmaceutical industry is 0.16:1 with a standard deviation of 0.10 and the average D/E ratio of the cement industry is 0.41:1 with a standard deviation of 0.60. This shows that the pharmaceutical industry is 156.25% more solvent than the cement industry and the cement industry is high in its debt to equity.P/B, company size, and company age may be controlled by the solvency position.

Conclusion

In this research, an attempt is made to measure the financial performance of the pharmaceutical industry and the cement industry of Bangladesh and obtain the financial measures which are significantly diverse for the selected industries. For measuring the financial performance of the pharmaceutical industry and the cement industry of Bangladesh, the study surveyed a sample of 11 listed pharmaceutical companies and 6 listed cement companies on the Dhaka Stock Exchange for the period of 2011 to 2017. The study uses fifteen different measures of industry performance viz., ROI, ROE, ROCE, GP, NP, EPS, IT, ARCP, CFFOA, RG, PG, CR, D/E, ATR, and NAV. Results revealed significant differences in financial performance indicators, namely gross profit, net profit, inventory turnover, account receivable collection period, and debt to equity. Therefore, based on the mean and variance of variables (ratios) and t-test results it can be concluded that the financial performance of the pharmaceutical industry is better than the cement industry. The production process, availability of raw materials, company size, company age, market size, the demand of the product, development capacity and policy of the government of Bangladesh (GoB), rules and regulations of GoB may be dominating factors for variation of performance of these industries.

This paper compared the financial performance of the selected industries in Bangladesh concerning profitability, efficiency, market growth, liquidity, solvency, and value. The observed results and their implications are important for industry management, investors, and policymakers. Measurement of performance provides the ability of returns, financial risk, and market growth that are critical underlying sources of information. These identified factors will assist investors, financial institutions, concerned authorities, and the government to make decisions for the betterment of both industries. Finally, the financial performance measure of various industries may be investigated by considering both the listed and non-listed companies, and the significantly diverse factors could be obtained and studied with valid reasoning. That could be an important considering matter and become a direction for further research.

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