

Deconstruction of ROE: An Implementation of DuPont Model on Selected Bangladeshi Commercial Banks

Md. Zahidur Rahman*

Department of Business Administration, Lecturer of Finance, City University, Dhaka, Bangladesh

Rubel Mia

Dhaka, Bangladesh

Abstract

This study attempts to measure the financial performance of selected Bangladeshi commercial banks for the period 2010-2016 through using the DuPont model which is an important tool for measuring profitability and judging the financial performance of any financial entity. The modified DuPont model disaggregates ROE (which is an indication of the earning power of the firm) into five components: tax burden, interest burden, profit margin, total asset turnover, and equity multiplier ratios. Empirical results exhibit that Dhaka Bank has performed best in every aspect and secured the first position due to highest average ROE. On the other hand, AB Bank is the least performer among all the banks due to its lowest average ROE. Finally, this study suggests that a company can have high ROE if it has high operating margin, lower interest, lower income tax, efficient use of assets and high use of debt in its capital structure.

Keywords: DuPont; ROE; Tax burden; Interest burden; EBIT margin; Asset utilization, Equity multiplier.



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1. Introduction

In the age of modern civilization bank is playing its spending role to continue the economic activity. Banks and other financial institutions are a unique set of business firms whose financial statements, regulations, economic functions and other operations make them an important subject of research, particularly in the conditions of the emerging financial sectors. Banks need special analysis to evaluate financial performance, monitoring and control needs special analysis in respect to their operations. Financial ratio analysis is one of the logical ways to evaluate a bank's performance. Therefore, financial statements analysis and interpretation of these financial statements through ratio analysis has now become an important technique for performance measurement because the investors, owners, regulators, clients, financial experts, management executives and the bankers are always rely on these financial ratios to make important decisions. For any business in the private sector there are numerous of models to describe how well the business is running. Different versions of analysis based on financial ratios are used for the bank's performance measurement. Among these, the usage of a modified version of DuPont model for assessment of ROE is discussed in the article. Return on equity (ROE) is a basic test of how effectively a company's management uses investors' money. It shows whether management is growing the company's value at an acceptable rate and also measures the rate of return that the firm earns on stockholder's equity. Practically, return on equity (ROE) reflects the profitability of the firm by measuring the investors' return (Griffin and Mahon, 1997). However, this model will give an idea about the performance of selected banks in terms of ROE. This study will help investors and creditors, financial analysts, and others in their decision-making processes related to other financial instruments. The objective of this study is to assess past performance, reveal current financial position and compare the performances of these sample banks based on DuPont analysis. This study will also help policy markers of the selected banks in the identifying the financial strengths and weaknesses and provide support in short-term and long-term forecasting, rising profit from related factors and taking corrective actions to financial stability.

2. Literature Review

Almazari (2012) attempted the DuPont system of financial analysis which is based on analysis of return on equity model to measure the financial performance of the Jordanian Arab commercial bank for the period 2000-2009. They found that the financial performance of Arab Bank is relatively steady and reflects minimal volatility in the return on equity. Net profit margin and total asset turnover show relative stability for the period from 2001 to 2009. The equity multiplier also shows almost stable indicators for the period from 2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets. Nissim and Penman (2001) suggested using a modified version of the traditional DuPont model in order to eliminate the effects of financial leverage and other factors not under the control of those managers. They argue that using operating income to sales and asset turnover based on operating assets limits the performance measure of management to those factors over which management has the most control. They opined that the modified DuPont model has become widely recognized in the financial analysis literature. See, for example, Pratt and Hirst (2008), Palepu and Healy (2008), and Soliman (2008). Brigham and

*Corresponding Author

Houston (2001) opined that modified model of DuPont is a powerful tool to illustrate the interconnection of a firm's income statement and its balance sheet, and to develop straight-forward strategies for improving the firm's ROE. Hawawini and Viallet (1999) suggested another modification to the DuPont model. This modified DuPont model disaggregates ROE into five components. They also acknowledged that the financial statements that firms prepare for their annual reports (which are of most importance to creditors and tax collectors) are not always useful to managers making operating and financial decisions. Soliman (2004) opined that the validity of industry-specific ratios have increased and also argued that industry-specific DuPont formative components provide more effective valuation than economy-wide components and. Prendergast *et al.* (2006) attempted DuPont analysis and demonstrated how a modified DuPont approach to ratio analysis can be used to access to the true cause of financial performance related problems in a small manufacturing business. Milbourn and Haight (2005) presented examples of using DuPont analysis in both a business and classroom settings. Thorpe and Holloway (2008) opined that the financial objectives of a profit-oriented business primarily concern about the needs of the external suppliers of debt and equity capital. The economic returns to shareholders comprise dividends and capital gains on the market value of their shares. As earnings determine how much to be paid out as a dividend, in the long run, shareholders are primarily concerned with financial measures like earnings, ROS, ROA, ROE, ROI. Sur and Chakraborty (2006) attempted to measure the financial performance of the Pharmaceutical Industry taking top three companies like Cipla, Dr. Reddy's Laboratories, and Ranbaxy for the period 2003-2012. They found DuPont analysis (ROI and ROE) is an important tool for judging the operating financial performance. They concluded that return on equity (ROE) and return on investment (ROI) are the most comprehensive measures of profitability of a firm because these ratios consider the operating, investing, financing and tax-related decisions. Herciu *et al.* (2011) attempted a study based on DuPont method and aimed to demonstrate that in most cases the most profitable companies are not the most attractive. They took top twenty most profitable companies in the world as a sample in 2009. By using DuPont analysis, they found the result that the ranking is not realized when indicators such as ROA, ROI, ROE, and ROS are taken into consideration for the study.

3. Methodology of the Study

3.1. Model Identity: DuPont Model

The DuPont model breaks down Return on Equity (ROE) into a more detailed expression which overcomes the shortcomings or loopholes of conventional ROE. It is used to analyze a company's ability to increase its return on equity. In the other words, this model breaks down the return on equity ratio to explain how company can increase their return for investors. It was developed by DuPont Corporation in the 1920s. DuPont analysis interprets the basic ROE ratio in such a manner so that it provides a great insight into the performance of the bank. Regarding this fact, the researchers have taken the challenge to use this model for measuring performance in terms of profitability of selected commercial banks in Bangladesh.

3.2. Sample Size and Methodology

The present study has been conducted to analyze the financial performance in terms of profitability of 15 private commercial banks in Bangladesh. This study is mainly based on secondary data which has been collected from the financial statements and annual reports of respective banks for the period (2010-2016). The modified DuPont model has been used in this study to measure the ROE and rank the selected banks based on their performances. To fulfill the purpose, five sub-parameters under DuPont model have been considered to calculate ROE and measure bank's performance. The DuPont analysis computes variables from the income statement and balance sheet to determine firm's return on equity (ROE). The extended DuPont formula consists of five components instead of three. The main difference between the original DuPont formula and the extended DuPont formula is that the extended formula breaks down net profit margin to show the effects of taxes and interest on ROE, which can be considered as very important in company analysis. The modified DuPont formula can be expressed as:

$$\text{ROE} = \frac{\text{Net Profit After Taxes}}{\text{Earnings Before Taxes}} \times \frac{\text{Earnings Before Taxes}}{\text{Earnings Before Interest and Taxes}} \times \frac{\text{Earnings Before Interest and Taxes}}{\text{Total Revenue}} \\ \times \frac{\text{Total Revenue}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Total Equity}}$$

Alternatively, the modified DuPont formula can be written as follows:

$$\text{ROE} = [\text{Tax Burden Ratio} \times \text{Interest Burden Ratio} \times \text{EBIT Margin Ratio} \times \text{Asset Turnover Ratio} \times \text{Equity Multiplier Ratio}]$$

4. Empirical Results and Interpretation

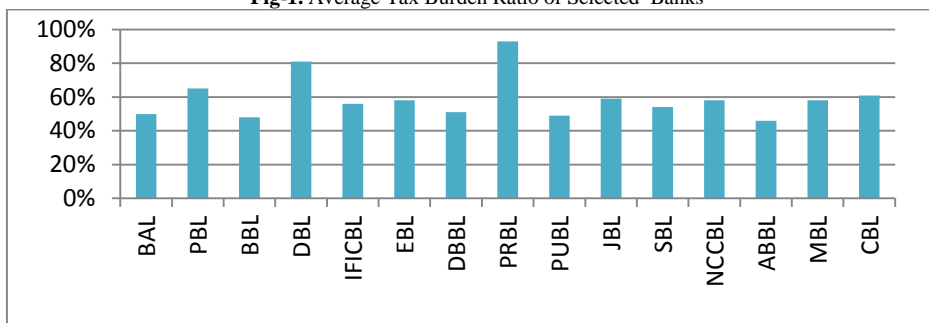
In this study DuPont model has been used with the intension of ranking the selected banks. Based on this model financial performance of selected banks has been evaluated in much easier and sophisticated way. This method has evaluated the performance of each bank relative to the performance of others. However, selected banks have been ranked based on their performances on return on equity (ROE) which has been calculated through multiplying the sub-parameters. The researchers have arrived at the final ranking using simple average technique.

Table-1. Calculation of Tax Burden Ratio of selected banks for the period (2010-2016)

	2016	2015	2014	2013	2012	2011	2010	Mean
Bank Asia	0.47	0.62	0.52	0.41	0.33	0.56	0.54	0.50
Prime Bank	0.94	0.78	0.73	0.53	0.51	0.54	0.55	0.65
Brac Bank	0.48	0.53	0.50	0.44	0.27	0.55	0.57	0.48
Dhaka Bank	0.53	0.60	0.63	0.63	0.49	1.45	1.36	0.81
IFIC Bank	0.58	0.55	0.58	0.50	0.79	0.40	0.52	0.56
Eastern Bank	0.60	0.65	0.53	0.53	0.54	0.61	0.61	0.58
Dutch Bangla Bank	0.55	0.48	0.49	0.56	0.48	0.47	0.54	0.51
Premier Bank	0.68	0.56	0.58	0.61	0.66	0.66	2.75	0.93
Pubali Bank	0.35	0.48	0.50	0.43	0.41	0.58	0.65	0.49
Jamuna Bank	0.63	0.75	0.73	0.50	0.50	0.54	0.52	0.59
Standard Bank	0.49	0.61	0.57	0.43	0.52	0.55	0.58	0.54
NCC Bank	0.59	0.62	0.60	0.49	0.52	0.54	0.73	0.58
AB Bank	0.65	0.46	0.32	0.34	0.45	0.45	0.58	0.46
Mercantile Bank	0.64	0.53	0.52	0.61	0.58	0.58	0.56	0.58
City Bank	0.72	0.81	0.62	0.50	0.43	0.58	0.62	0.61

Source: Author's computation

Fig-1. Average Tax Burden Ratio of Selected Banks



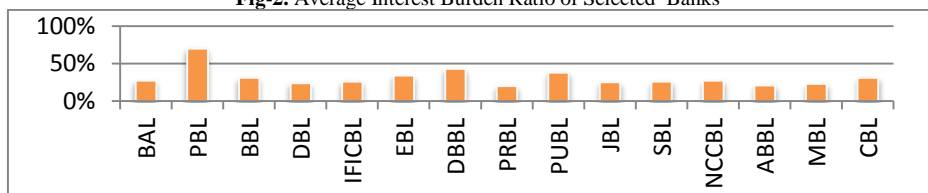
Tax burden ratio measures how much of the pretax profits remain with the company after paying taxes. Similarly, an increase in tax burden will decrease the tax burden ratio, which in turn will decrease the ROE. Table-1 shows that average tax burden ratio of Prime bank is 65%, which is highest among all banks indicating better performance in managing tax efficiency where AB Bank's average tax burden ratio is 46%, which is lowest among all banks indicating the bank as least performer in managing tax efficiency.

Table-2. Calculation of Interest Burden Ratio of selected banks for the period (2010-2016)

	2016	2015	2014	2013	2012	2011	2010	Mean
Bank Asia	0.23	0.27	0.28	0.24	0.22	0.29	0.39	0.27
Prime Bank	0.57	0.65	0.69	0.69	0.74	0.80	0.76	0.70
Brac Bank	0.50	0.35	0.31	0.22	0.16	0.27	0.34	0.31
Dhaka Bank	0.23	0.19	0.23	0.20	0.12	0.32	0.37	0.24
IFIC Bank	0.20	0.15	0.24	0.24	0.15	0.29	0.55	0.26
Eastern Bank	0.35	0.26	0.30	0.33	0.32	0.39	0.44	0.34
Dutch Bangla Bank	0.37	0.51	0.40	0.32	0.41	0.48	0.52	0.43
Premier Bank	0.24	0.19	0.17	0.16	0.13	0.12	0.39	0.20
Pubali Bank	0.27	0.34	0.33	0.31	0.32	0.49	0.57	0.38
Jamuna Bank	0.29	0.21	0.17	0.22	0.21	0.28	0.36	0.25
Standard Bank	0.24	0.26	0.20	0.21	0.26	0.28	0.37	0.26
NCC Bank	0.32	0.21	0.21	0.19	0.23	0.31	0.42	0.27
AB Bank	0.11	0.14	0.21	0.17	0.20	0.22	0.45	0.21
Mercantile Bank	0.25	0.18	0.17	0.21	0.18	0.27	0.32	0.23
City Bank	0.36	0.31	0.29	0.17	0.19	0.41	0.42	0.31

Source: Author's computation

Fig-2. Average Interest Burden Ratio of Selected Banks



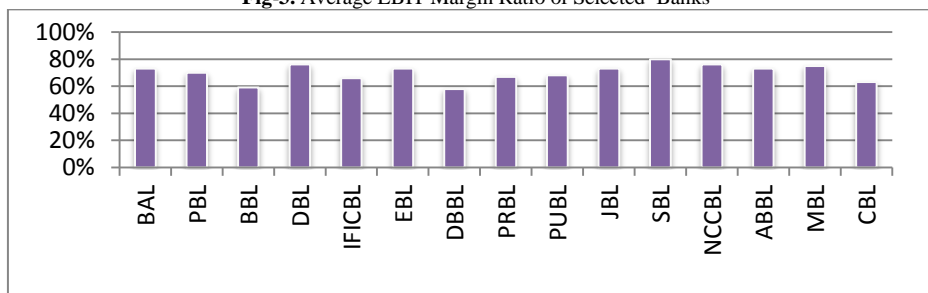
Interest burden ratio measures how much of the company's operating profits are left over after making interest payments. An increase in interest payments will increase the interest burden and lower the interest burden ratio as the EBT in the numerator will be much smaller than the EBIT in the denominator. A lower interest burden ratio will result in decrease the ROE. However, it is found from Table-2 that average interest burden ratio of Prime bank is 70%, which is highest among all banks indicating better performance in managing interest efficiency where AB bank's average interest burden ratio is 21%, which is lowest among all banks indicating the bank as least performer in managing interest efficiency.

Table-3. Calculation of EBIT Margin Ratio of selected banks for the period (2010-2016)

	2016	2015	2014	2013	2012	2011	2010	Mean
Bank Asia	0.65	0.71	0.73	0.75	0.71	0.79	0.74	0.73
Prime Bank	0.57	0.65	0.69	0.69	0.74	0.80	0.76	0.70
Brac Bank	0.58	0.56	0.59	0.61	0.58	0.61	0.61	0.59
Dhaka Bank	0.67	0.74	0.79	0.82	0.76	0.81	0.75	0.76
IFIC Bank	0.61	0.62	0.69	0.75	0.65	0.64	0.64	0.66
Eastern Bank	0.64	0.67	0.68	0.76	0.74	0.74	0.86	0.73
Dutch Bangla Bank	0.41	0.57	0.55	0.54	0.64	0.68	0.68	0.58
Premier Bank	0.67	0.69	0.71	0.73	0.71	0.64	0.56	0.67
Pubali Bank	0.58	0.69	0.72	0.70	0.65	0.73	0.68	0.68
Jamuna Bank	0.66	0.68	0.72	0.76	0.75	0.79	0.78	0.73
Standard Bank	0.72	0.77	0.73	0.81	0.84	0.86	0.82	0.80
NCC Bank	0.71	0.69	0.75	0.77	0.78	0.84	0.76	0.76
AB Bank	0.67	0.71	0.70	0.72	0.75	0.74	0.82	0.73
Mercantile Bank	0.68	0.73	0.71	0.79	0.78	0.78	0.76	0.75
City Bank	0.63	0.63	0.64	0.60	0.58	0.67	0.65	0.63

Source: Author's computation

Fig-3. Average EBIT Margin Ratio of Selected Banks

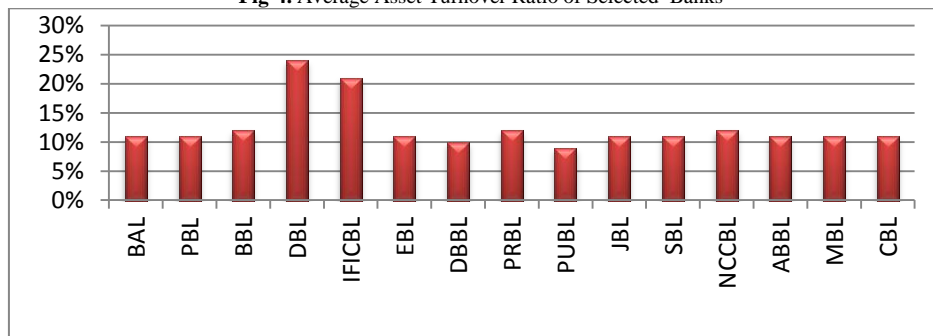


EBIT margin measures the effect of earnings before interest and tax (or EBIT margin) on ROE. This ratio evaluates the effect of a company's core business operations on its ROE. It measures how much EBIT a firm can generate from total revenue. It is a measure of bank profitability that gives information about a bank's earning ability. Increase in EBIT margin is mainly due to growth of revenue and good cost control. Decrease in EBIT Margin in largely result from reduction in revenue and higher operating cost. It is found from table-3 that Standard Bank's average EBIT margin is 80%, which is better than other banks. On the other hand, Dutch Bangla Bank's average EBIT margin is 58%, which leads the bank to take the last position among other banks.

Table-4. Calculation of Asset Turnover Ratio of selected banks for the period (2010-2016)

	2016	2015	2014	2013	2012	2011	2010	Mean
Bank Asia	0.08	0.10	0.11	0.12	0.11	0.12	0.11	0.11
Prime Bank	0.08	0.10	0.11	0.12	0.11	0.12	0.11	0.11
Brac Bank	0.10	0.11	0.11	0.13	0.12	0.14	0.12	0.12
Dhaka Bank	0.39	0.27	0.23	0.17	0.12	0.22	0.28	0.24
IFIC Bank	0.17	0.14	0.20	0.20	0.10	0.36	0.33	0.21
Eastern Bank	0.09	0.10	0.11	0.12	0.11	0.12	0.13	0.11
Dutch Bangla Bank	0.08	0.08	0.10	0.11	0.12	0.11	0.10	0.10
Premier Bank	0.09	0.10	0.11	0.12	0.13	0.13	0.12	0.12
Pubali Bank	0.08	0.09	0.10	0.11	0.11	0.10	0.10	0.09
Jamuna Bank	0.09	0.11	0.11	0.12	0.12	0.13	0.11	0.11
Standard Bank	0.08	0.10	0.12	0.12	0.12	0.13	0.12	0.11
NCC Bank	0.09	0.10	0.12	0.13	0.12	0.13	0.12	0.12
AB Bank	0.09	0.10	0.11	0.12	0.12	0.12	0.13	0.11
Mercantile Bank	0.10	0.11	0.12	0.13	0.11	0.12	0.11	0.11
City Bank	0.09	0.11	0.11	0.12	0.12	0.11	0.12	0.11

Source: Author's computation

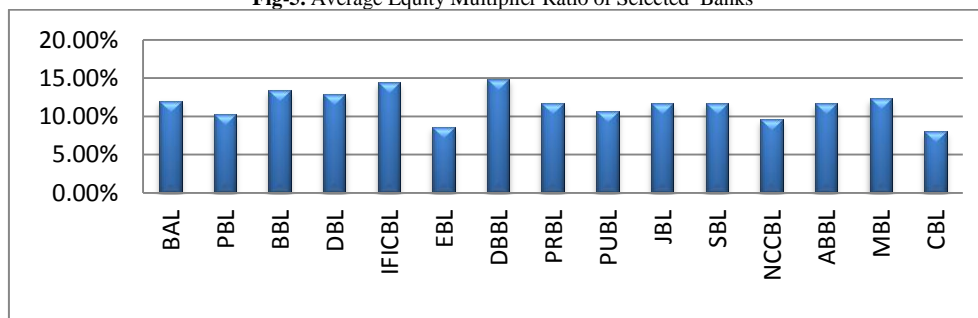
Fig-4. Average Asset Turnover Ratio of Selected Banks

Asset turnover ratio is used to determine how efficiently a company uses its assets to generate revenue. As a general rule, the higher the ratio the better the company is performing. Lower Asset turnover ratio indicated that the company isn't using its asset efficiently and most likely have management problems. This gives investors and creditors an idea of how a company is managed and uses its assets to generate revenue. Table-4 reveals that Dhaka Bank's average asset turnover ratio is 24%, which is highest and Pubali Bank's average asset turnover ratio is 9%, which is lowest among all the banks. However, the calculated results also show that most of the banks' average turnover ratio is 11%.

Table-5. Calculation of Equity Multiplier Ratio of selected banks for the period (2010-2016)

	2016	2015	2014	2013	2012	2011	2010	Mean
Bank Asia	13.30	11.82	10.84	11.20	12.55	9.43	14.90	12.00
Prime Bank	10.15	9.55	10.42	10.59	11.39	10.47	9.13	10.24
Brac Bank	11.59	11.93	11.52	15.12	17.10	13.87	12.45	13.37
Dhaka Bank	13.99	13.17	12.45	12.15	13.75	11.36	13.70	12.94
IFIC Bank	15.35	15.30	14.71	14.52	14.80	13.94	12.10	14.39
Eastern Bank	10.27	9.25	8.57	8.56	8.60	8.16	6.79	8.60
Dutch Bangla Bank	15.68	16.52	14.89	14.68	14.36	13.79	14.45	14.91
Premier Bank	12.97	12.29	12.39	11.08	11.41	11.23	10.87	11.75
Pubali Bank	12.74	11.48	10.87	11.25	10.26	9.09	8.93	10.67
Jamuna Bank	10.63	9.09	12.90	12.97	13.17	11.96	10.93	11.66
Standard Bank	12.15	11.53	12.13	11.75	11.52	10.91	11.84	11.69
NCC Bank	10.44	9.35	9.49	9.35	10.37	9.14	8.93	9.58
AB Bank	13.62	12.50	12.75	12.28	10.84	10.30	9.57	11.70
Mercantile Bank	12.14	11.78	12.46	11.52	13.97	12.07	12.13	12.30
City Bank	10.25	8.42	7.67	7.97	7.25	6.48	7.89	7.99

Source: Author's computation

Fig-5. Average Equity Multiplier Ratio of Selected Banks

Equity multiplier ratio measures financial leverage of a company. The equity multiplier ratio indicates whether a company finances its assets through debt or equity. The higher the equity multiplier, the more leveraged the company is, or the more debt it has in relation to its total assets. However, the decrease in leverage ratio will decrease the ROE due to non-optimal use of leverage. Table-5 reveals that Dutch Bangla Bank's average equity multiplier ratio is 14.91% which is highest among all the banks. On the other hand, City Bank's average equity multiplier ratio is 7.99%, which is lowest among all the banks.

Table-6. Final Ranking of Banks based on their ROE Performance

Bank's Name	Tax Burden Ratio	Interest Burden Ratio	EBIT Margin Ratio	Asset Turnover Ratio	Equity Multiplier Ratio	Modified ROE using DuPont Model	Final Ranking
	NI/EBT	EBT/EBIT	EBIT/REV	REV/TA	TA/TE		
	Mean	Mean	Mean	Mean	Mean		
Bank Asia	0.50	0.27	0.73	0.11	12.00	13.01	12
Prime Bank	0.65	0.70	0.70	0.11	10.24	35.87	2
Brac Bank	0.48	0.31	0.59	0.12	13.37	14.09	7
Dhaka Bank	0.81	0.24	0.76	0.24	12.94	45.88	1
IFIC Bank	0.56	0.26	0.66	0.21	14.39	29.04	3
Dutch Bangla Bank	0.51	0.43	0.58	0.10	14.91	18.96	4
Eastern Bank	0.58	0.34	0.73	0.11	8.60	13.62	10
Premier Bank	0.93	0.20	0.67	0.12	11.75	17.57	5
Pubali Bank	0.49	0.38	0.68	0.09	10.67	12.16	13
Jamuna Bank	0.59	0.25	0.73	0.11	11.66	13.81	8
Standard Bank	0.54	0.26	0.80	0.11	11.69	14.44	6
NCC Bank	0.58	0.27	0.76	0.12	9.58	13.68	9
AB Bank	0.46	0.21	0.73	0.11	11.70	9.08	15
Mercantile Bank	0.58	0.23	0.75	0.11	12.30	13.54	11
City Bank	0.61	0.31	0.63	0.11	7.99	10.47	14

Therefore, an increase in either of these component ratios will increase the ROE. The final ranking on Table-6 shows that Dhaka Bank has achieved highest average ROE of 45.88% and secured the first position followed by Prime Bank 35.87% and IFIC Bank 29.04%. On the other hand, AB Bank has achieved lowest average ROE of 9.08% and therefore secured the last position among the selected banks.

5. Conclusion

ROE is one of the most widely used profitability ratios which indicate a company's ability to generate net income through shareholder's equity. It is a quick measure of management efficiency. Investors will be able to determine the actual drivers behind a company's ROE using DuPont analysis. The model suggests that the comparison of ROE and its drivers should be with other companies in the same industry rather than against all companies. In conclusion, DuPont model is the most comprehensive measure of profitability of a firm and also useful tool that can be used as a compass in the process by directing the analyst toward significant areas of strength and weakness evident in the financial statements. It considers the operating and investing decisions made as well as the financing and tax-related decisions.

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