

# Liquidity and Profitability Trade-off in Pharmaceuticals and Chemicals Sector of Bangladesh

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**Abstract:** *This study aimed to identify the relationship between liquidity and profitability in pharmaceuticals and chemicals sector of Bangladesh. To fulfill the objectives, 10 companies were selected from the concerned sector and annual reports of these companies were collected for the accounting period of 2005 to 2014. Current Ratio (CR), Quick Ratio (QR), and Working Capital Ratio (WCR) were used as the indicators of liquidity and Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE) were considered as the indicators of profitability. For analyzing the data, widely used statistical measurements i.e. correlation, regression and Spearsman's rank correlation coefficient method were used. From correlation analysis, this study found positive relation of QR and WCR with ROA, ROE, and ROCE. But, from regression analysis, it was found that there was no significant association between liquidity and profitability in pharmaceuticals and chemicals sector of Bangladesh. Spearsman's rank correlation coefficient method also made the same conclusion regarding this relationship.*

**Keywords:** Liquidity, Profitability, Relationship, Pharmaceuticals, Bangladesh

## 1. Introduction

Liquidity and profitability management are one of the most integral issues of corporate finance. Liquidity management ensures that the firm has the ability to meet current obligations and profitability management makes sure that the firm is able to earn revenue that exceeds its cost. These are viewed as the two corners of a straight line as progression to one causes the sacrifice of another [1]. Firms with high liquidity may face low liquidity risk, but, because of keeping more assets in liquid form good investment projects may face fund shortage, therefore, the firms have to accept low profit. Contrarily, firms may face difficulty in managing day to day operation if they employ all of their funds in profit generating projects. But, to run a firm in sustainable manner, both are necessary. For that reason, a firm must seek an optimal level of liquidity and profitability and maintain its position around that level for ensuring long term success of the business.

## 2. Research Objectives

The objectives of the study are as follows:

- To identify the existence of relationship between liquidity and profitability in pharmaceuticals and chemicals sectors of Bangladesh;
- To identify the direction of the relationship between liquidity and profitability.

## 3. Literature Review

The nexus between liquidity and profitability has been the interest of academics for a long time. In 2009, Konadu examined the effect of liquidity on profitability for the listed banks of Ghana Stock Exchange for 2002-2006. He incorporated, current ratio, quick ratio, cash ratio, and net operating cash flow ratio, as liquidity indicators and for profitability, he considered, net profit margin, return on

equity (ROE), return on assets (ROA) and net asset turnover ratio. His study identified a negative relationship between liquidity and profitability in Ghana's banking sector [2].

Vieira (2010) studied the relationship between liquidity and profitability of airline companies for 2005-08 in both short and medium term basis and found the existence of positive relationship in both cases. The study also observed this relationship during the financial crisis of 2008 and identified that firms with a high liquidity indicator had better performance than the less liquid ones during that period [3].

In 2011, Saleem and Rehman investigated 26 oil and gas companies of Pakistan for 2004-09 to identify the interdependency of liquidity and profitability. They found that current ratio, quick ratio and liquidity ratio had significant impact on return on investment (ROI) while only liquidity ratio affected ROA and no ratio affected ROE [4].

Niresh (2012) in his study on the cause and effect relationship between liquidity and profitability for 31 listed manufacturing firms from 2007-11 in Sri Lanka found no significant relationship between liquidity (current ratio, quick ratio, and liquid ratio) and profitability (net profit, return on capital employed, and ROE) [5]. On the other hand, Saluja and Kumar (2012) in their study on the liquidity and profitability trade off of Airtel Bharti Limited for 5 years found a negative relationship between liquidity and profitability [1].

In another study, Siame (2012) analyzed the influence of liquidity on the profitability for 120 listed companies from different industries of South African between 2000-2009 and concluded that for all industries i.e. consumer goods industry, industrial firms, resources industry, and service sector, there existed a negative relationship between profitability and liquidity as measured by the cash conversion cycle [6].

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Bolek and Wilinski (2012) studied the relation between liquidity and profitability of the construction companies listed in the index of Warsaw Stock Exchange for quarter periods in 2000-2010 and concluded that the probability of influence of quick ratio on ROA was about 98.24% which was 80.77% for cash conversion cycle [7].

In 2013, Ibe explored the impact of liquidity management on the profitability for Afribank Plc., United Bank for Africa, and Diamond Bank Plc. of Nigeria from 1995-2010 and found a significant relationship between liquidity and bank profitability. In addition, this study also identified liquidity management as a major problem for banking industry of Nigeria, therefore, recommended the engagement of competent and qualified personnel in this area [8].

Lartey, Antwi and Boadi (2013) investigated the relationship between liquidity and profitability of 7 banks listed on the Ghana Stock Exchange for the period of 2005-2010. Their time series analysis illustrated a falling trend of liquidity and profitability and regression analysis identified a very weak but positive relationship between liquidity and profitability for the selected banks [9].

Zygmunt (2013) tried to figure out the impact of liquidity on profitability for 10 listed IT companies of Poland for 2003-2011 and concluded a statistically significant correlation. He found a positive relationship of receivable conversion period and inventory conversion period with profitability (ROA, ROE and return on sales) [10].

Conversely, by studying 8 listed trading companies of Sri Lanka from 2008 to 2012, Ajanthan (2013) found a significant relationship between liquidity and profitability. He sought out that current ratio had a significant correlation with ROA and ROE and quick ratio was only significant with ROA while liquidity ratio was insignificant with both of ROA and ROE [11].

In 2014, Akter and Mahmud tried to identify the relationship between liquidity and profitability of banking sector in Bangladesh. They studied 12 banks from 4 different sectors i.e. government, islami, multinational, and private commercial banks for 2006-11 and found no significant relationship [12].

Olawejaju and Adeyemi (2015) investigated the existence and direction of interconnection between liquidity and profitability of 15 quoted deposit money banks in Nigeria for the periods of 2004-2013. They found no causal relationship between liquidity and profitability for 11 banks and unidirectional causality relationship for 4 banks [13].

Based on the above literatures it can be said that a number of studies have been done to identify the relationship between liquidity and profitability. But, no definite conclusion was found from these studies. On the other hand, the number of research works on this issue in Bangladesh context is very limited. So, this study intends to meet this research gap and tries to investigate the relationship between liquidity and profitability for the pharmaceuticals and chemicals sector of Bangladesh.

## 4. Research Methodology

### 4.1 Sample and Data Collection

To study the association between liquidity and profitability for the pharmaceuticals and chemicals sector of Bangladesh, the companies listed with Dhaka Stock Exchange (DSE) under this sector are primarily considered and from those, based on the data availability 10 companies i.e. ACI Limited, Ambee Pharma Ltd., Beximco Pharmaceuticals Ltd., Beximco Synthetics Ltd., GlaxoSmithKline(GSK) Bangladesh Ltd., The IBN SINA Pharmaceutical Industry Ltd., Renata Ltd., Square Pharmaceuticals Ltd., Kohinoor Chemicals Company (Bangladesh) Ltd., and Libra Infusions Limited, are selected. The annual reports of these firms for 2005-2014 were collected from the official websites of these companies. Moreover, this study tried to incorporate related works from different journals, books, newspapers, magazines and other reliable publications.

### 4.2 Hypothesis, Model, and Variables

The null ( $H_0$ ) and alternative hypothesis ( $H_1$ ) considered for this study are

- $H_0$ : There is no significant association between liquidity and profitability in pharmaceuticals and chemicals sector
- $H_1$ : There is a significant association between liquidity and profitability in pharmaceuticals and chemicals sector

Following model is used to test the hypothesis

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where,

- Y represents the dependent variable;
- $\beta_0$  is the intercept;
- $\beta_1, \beta_2, \beta_3, \dots, \beta_n$  are regression coefficients;
- $X_1, X_2, X_3, \dots, X_n$  are independent variables;
- e is the estimation error.

Here, Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE) are used as the indicators of profitability and Current Ratio (CR:  $X_1$ ), Quick Ratio (QR:  $X_2$ ), and Working Capital Ratio (WCR:  $X_3$ ) represent the liquidity.

**Table 1: Variables of the Study**

Dependent Variables (Y)	
• ROA	= Profit after Interest and Tax / Total Assets *100
• ROE	= Profit after Interest and Tax / Total Equity * 100
• ROCE	= Profit after Interest and Tax / Capital Employed * 100
Independent Variables (X)	
• CR ( $X_1$ )	= Current Assets / Current Liability
• QR: ( $X_2$ )	= (Current Assets - Inventory) / Current Liability
• WCR ( $X_3$ )	= Current Assets – Current Liabilities

To recognize the relationship between these variables statistical tools i.e. correlation analysis, regression analysis, and Spearsman's rank correlation coefficient method are

used where ROA, ROE and ROCE are dependent variables and CR, QR and WCR are independent variables.

## 5. Analysis and Discussions

### 5.1 Descriptive Statistics

From table 2, it can be observed that for the selected companies, liquidity indicators i.e. current ratio, quick ratio and working capital ratio have average of 1.43, 0.83 and 7,453,938 respectively and profitability indicators i.e. return on assets, return on equity and return on capital employed have average of 7.89, 12.94 and 11.11 respectively.

**Table 2:** Descriptive Statistics

Variable	Min	Max	Mean	SD
CR	1.23	1.52	1.43	0.09
QR	0.62	0.97	0.83	0.11
WCR	3276505	12977087	7453938	3445944
ROA	6.84	9.30	7.89	0.80
ROE	11.38	14.34	12.94	1.06
ROCE	9.66	12.76	11.11	1.14

### 5.2 Correlation Analysis

The correlations among the variables are shown in table 3. It is observed that the correlation values are to be both positive and negative between the variables. The correlation coefficients are found to be negative between ROA, ROE and ROCE with liquidity as measured by current ratio with R values of -0.15, -0.26 and -0.38, respectively. Other two liquidity indicators i.e. quick ratio and working capital ratio are positively correlated with ROA, ROE and ROCE.

**Table 3:** Correlation Matrix

	CR	QR	WCR	ROA	ROE	ROCE
CR	1.00					
QR	0.78	1.00				
WCR	0.50	0.91	1.00			
ROA	-0.15	0.34	0.55	1.00		
ROE	-0.26	0.10	0.23	0.81	1.00	
ROCE	-0.38	0.10	0.33	0.96	0.86	1.00

### 5.3 Regression Analysis

The summary result of multiple regressions between the independent variables (CR, QR, and WCR) and dependent variables (ROA, ROE, and ROCE) shows that independent variables have a correlation coefficient of 0.74 with ROA, 0.55 with ROE and 0.73 with ROCE indicating that they have a positive correlation. The R Square value indicates that about 55% changes in ROA, about 31% changes in ROE and about 54% changes in ROCE can be expressed by independent variables and remaining variance in profitability cannot be explained by this model, rather by the variables not depicted in the model. But, at 5% significance level, Significance F value found for ROA is 0.16, ROE is 0.50 and for ROCE is 0.17 those are more than .05. Therefore, there is no evidence of overall relationship in these models.

**Table 4:** Results of Regression Analysis

Particulars		Dependent Variables			
		ROA	ROE	ROCE	
Multiple R		0.74	0.55	0.73	
R <sup>2</sup>		0.55	0.31	0.54	
Significance F		0.16	0.50	0.17	
Intercept	Coefficients	13.91	21.06	23.33	
	P-value	0.01	0.02	0.01	
Independent Variables	CR	Coefficients	(7.19)	(13.14)	(14.59)
		P-value	0.31	0.72	0.71
	QR	Coefficients	4.27	14.44	10.47
		P-value	0.26	0.47	0.71
	WCR	Coefficients	0.00	(0.00)	0.00
		P-value	0.17	0.55	1.00

By looking at the independent variables individually, it can be seen that CR is negatively related with ROA, ROE and ROCE; QR is positively related with all measures of profitability where WCR is positively related with ROA and ROCE and negatively with ROE. The table also shows that P value for each independent variable is more than the significance level 0.05. Therefore, it can be said that there is no significant relationship between liquidity and profitability.

### 5.4 Spearman's Rank Correlation Coefficient

**Table 5:** Spearman's Rank Correlation Coefficient

Year	CR	Rank	ROCE	Rank	D	D <sup>2</sup>
2005	1.48	4.00	11.41	5	-1	1
2006	1.45	7.00	9.94	8	-1	1
2007	1.37	8.00	9.86	9	-1	1
2008	1.23	10.00	12.35	3	7	49
2009	1.49	3.00	10.35	7	-4	16
2010	1.49	2.00	9.66	10	-8	64
2011	1.48	6.00	11.44	4	2	4
2012	1.52	1.00	10.93	6	-5	25
2013	1.34	9.00	12.37	2	7	49
2014	1.48	5.00	12.76	1	4	16
					ΣD <sup>2</sup>	= 226
					n	= 10
					n <sup>3</sup>	= 1000
					n <sup>3</sup> - n	= 990

Now, Spearman's rank correlation coefficient,

$$r_s = 1 - \left\{ \frac{6 \times \Sigma D^2}{n^3 - n} \right\}$$

$$= 1 - \left\{ \frac{6 \times 226}{990} \right\} = 1 - 1.3697 = -0.3697$$

T-test Analysis

$$t = r_s \sqrt{(n-2) / \sqrt{1-r_s^2}}$$

$$= -0.3697 * \sqrt{(10-2) / \sqrt{1-(-0.3697)^2}}$$

$$= -0.3697 * \sqrt{8 / \sqrt{1-0.1367}}$$

$$= -1.1254$$

Value of t at 5% level of significance and degree of freedom of 8 (n-2 = 10-2) is 2.3060. The computed t value of -1.1254 is less than table value of 2.3060 which means that null hypothesis would be accepted. Therefore, there is no significant association between profitability and liquidity for the selected firms in pharmaceuticals and chemical sector of Bangladesh.

## 6. Conclusions

This research tried to explore the trade-off between liquidity and profitability for pharmaceuticals and chemical sector of Bangladesh based on financial data of 10 listed firms of this sector for 10 years (2005-14). Correlation, Regression, and Spearsman's Rank Correlation Coefficient were used for this purpose. The correlation analysis has identified that except current ratio, other two ratios i.e. quick ratio and working capital ratio, were positively related with ROA and ROE. In the regression analysis, it was found that both F value and P value were more than the significance level 0.05, thus, it has suggested no significant relationship. Spearsman's rank correlation coefficient also showed no significant association between liquidity and profitability for this sector.

Although this study found no significant association between liquidity and profitability, the financial managers of these firms should not ignore the importance of maintaining adequate liquidity and profitability for the sustainability of their firms. It is worthwhile to mention that, this study has incorporated only ten listed pharmaceuticals and chemical companies of Bangladesh. Therefore, the room for error exists when generalizing the finding for the entire sector. So, further researches on this area by meeting this limitation are highly encouraged. In addition, similar study can be conducted for every sector which will help the financial manager of the concerned sector to adopt the appropriate liquidity management and profitability management policies for their firms.

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