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The Impact of Liquidity on Firms' Performance: Empirical Investigation from Indian Pharmaceutical Companies

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Abstract

The main aim of this paper is to investigate the impact of liquidity on the profitability of pharmaceutical companies listed on Bombay Stock Exchange (BSE). Data are extracted from ProwessIQ database. The analysis is done using a balanced panel data of 82 pharmaceutical companies for the period of 10 years from 2008 to 2017. Findings reveal that current liquidity ratio and quick ratio have a positive and significant impact on the profitability of pharmaceutical companies measured by return on assets, while control variables leverage, firms' size, and age have a negative impact on the profitability of pharmaceutical companies. The study used recent literature to explore the gap in the existing literature. This study will be useful for regulators, finance managers and other people concerned about liquidity in order to understand its importance. This study is considered one of the pioneering studies that examines the impact of liquidity in the financial performance of Indian pharmaceutical companies. It is considered a battery for further research in this area.

Keywords: Liquidity, Profitability, Firms performance, Pharmaceutical sector, India

1. Introduction

Liquidity points out to the ability of firms in paying back their short term liabilities. It plays an important role in smoothening all operations of a firm. Studying liquidity is very helpful for both external and internal analysts due to its impact on firms' day to day operations (Elangkumaran & Karthika, 2013). The importance of liquidity to the performance of a company might determine the level of profitability of a company (Zygmunt, 2013). Liquidity is a prerequisite for a firm as it shows its ability for meeting its short-term obligations. Quick ratio and current ratio are considered to be the common measures of liquidity position of a company. Current ratio sets the association between short term assets and short term liabilities. Generally, when current ratio is high it can be said that the firm's ability to pay back its short term obligations is good, whereas quick ratio sets the correlation between current liabilities and current assets. When assets are liquid it means that they can be converted into cash quickly without loss. Low current ratio means that a company cannot pay its obligations on time to creditors, services and goods suppliers (Owolabi, Obiakor, & Okwu, 2011).

Wang (2002) found that aggressive liquidity management boosts the operating performance of a firm and usually results in higher values for a firm. Managing liquidity efficiently results in

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eliminating the risk of inability of meeting short-term liabilities when it's due, on one hand. On the other hand, it helps in avoiding excessive investment in these assets (Priya & Nimalathasan, 2013).

Profitability's information is crucial for decision making and it is used by many people in the company such as managers, investors, and financial analysts as guide for dividends payment, management efficiency tool measurement and instrument for decision making evaluation (Nassirzadeh & Rostami, 2010). Profitability and liquidity are of substantial issue that all commercial units should keep studying and thinking about, as one of the most crucial duties. Some authors believe that there is a great importance for liquidity because companies that achieve low profitability or zero can serve the economy, whereas firms without liquidity cannot serve the economy well (as cited in (Nassirzadeh & Rostami, 2010). Therefore, management of profitability and liquidity are substantial issues for the growth and survival as well (Priya & Nimalathasan, 2013**)**.

The present study aims to evaluate liquidity position of pharmaceutical companies and examine its impact on the financial performance. To fulfill these objectives, data are gathered from various sources utilizing journals, books, and databases. Financial data are extracted for the period from 2008 to 2017. The study sample comprises of 82 companies after excluding companies that do not have data for the study period, companies that have more missing data and companies that contains outliers. There are three variables: the dependent variable is firms' performance which is measured by return on assets; the independent variable liquidity which is measured by current ratio and quick ratio and control variable that is represented by leverage, firms' size and age. In order to find out the impact of liquidity on firms' performance, the study uses a panel data approach in which fixed effect models are used. The rest of this article is divided into the following sections: section 2 reviews previous literature, section 3 illustrates research methodology, section 4 demonstrates the results and section 5 concludes the paper.

2. Literature Review

The importance of liquidity is not new in the literature of finance. Many researchers have been studying liquidity and its impact on firms' profitability using different types of measures. Number of scholars has analyzed the impact of liquidity on profitability using traditional measures for measuring firm's liquidity. Some studies were consisted with each other in their findings and some were contradicted. On one hand, (Elangkumaran & Karthika, 2013; Khidmat & Rehman, 2014; Mushtaq, Chishti, Kanwal, & Saeed, 2015; Owolabi et al., 2011; Saleem & Rehman, 2011) conducted their studies in different sectors with different sample size for the purpose of finding out the relationship between liquidity and profitability, all of them measured liquidity by liquidity ratios whereas profitability by different measures.

Owolabi et al. (2011) used operating profit-turnover ratio, whereas Khidmat (2014) used return on equity and return on assets, while Elangkumaran & Karthika, 2013 used earnings per share and return on assets. However, Saleem & Rehman (2011) used three measures; ROA, ROE and ROI; Mushtaq et al. (2015) used return on assets. All studies consisted and reveal positive correlation between liquidity and profitability.

On the other hand, (Bhunia, Khan, & MuKhuti, 2011; Krishnakumar, 2010; Panigrahi, 2013) applied their research in Indian software, cement and steel sectors respectively using traditional indices for measuring liquidity and different measures for profitability such as return on Investment, gross Profit ratio, return on assets and earning per share, findings of these three studies found a negative association between liquidity and profitability. (Morgheim, 2015; Owolabi et al., 2011; Rehman, Khan, & Khokhar, 2015) conducted their research in America, Nigeria and Saudi Arabia respectively, they argued that there is a negative association between liquidity measured by traditional indices and profitability of firms. Niresh (2012) aimed to understand the cause and effect of the relationship between profitability and liquidity, his study showed that there is mixed (positive and negative) relationship between the independent and dependent variables used in the study; current ratio has negative association with net profit and return on capital employed ratio and positive association with return on equity. Quick ratio has a positive correlation with net profit and return on equity and has a negative correlation with return on capital employed, whereas liquid ratio

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has negative relationship with all profitability measures. Hemalatha & Under (2005) aimed to assess the liquidity position and evaluate the profitability of the selected societies. Using trend analysis, ratio analysis, and variance analysis, average and co-efficient of correlation. The study concluded that SWCSs failed to maintain current ratio and liquid ratio in right proportions that is because none of the SWCSs which were taken for this study gave adequate security to the creditors.

Researchers in Kenya, Sweden, Nigeria, Turkey, Greece, Japan, Taiwan and China tried to find out the impact of liquidity on firms' profitability by using modern indices such as: cash conversion cycle, comprehensive liquidity and net liquid balance index for measuring liquidity. They arrived to different findings. Unlike those scholars who used traditional indices for measuring liquidity and its impact on profitability, (Nobanee, Abdullatif, & AlHajjar, 2014; Tripathi & Ahamed, 2016; Uyar, 2009; Wang, 2002; Ware, 2015; Yazdanfar & Öhman, 2014) decided to use one of the modern indices which is cash conversion cycle for measuring liquidity. All these studies applied descriptive statistics, correlation analysis and regression model for examining the association between the variables. Their investigation indicated that liquidity has a negative impact on profitability measured by; return on assets, return on equity and return on investment.

Lyroudi & Lazaridis (2000) aimed to examine the relationship between liquidity measured by cash conversion cycle and profitability of food industry in Greece measured by return on investment, return on equity and net profit margin. By applying regression and correlation analysis, as well as t-tests of two independent samples. This study identified that cash conversion cycle has positive correlation with return on assets, return on equity and net profit margin**.** Duncan, Njeru, Member, & Tirimba (2015) objectivity measured and assessed the impact of cash management on the financial performance of Deposit Taking SACCOs in Mount Kenya, they developed a self-administered structured questionnaire for 92 respondents, along with that, they extracted secondary data from audited financial statement of the SACCOs and the regulator (SASRA). The analysis of this study revealed that cash management and financial performance have strong positive relationship. Deposit taking SACCOs need to ensure that there is an adequate cash management policy to ensure optimal financial performance. Uyar, (2009) argued that liquidity management measured by company's cash flow, credit Policies, and cash conversion cycle has potential impact on profitability of firms.

In an attempt to empirically examine the relationship between liquidity and profitability using mixed of traditional and modern indices scholars from Saudi Arabia, Pakistan, Poland, India, Iran, Sri Lanka, Nigeria conducted their research and they came up with different findings. (Priya & Nimalathasan, 2013; Zygmunt, 2013) conducted their studies in Poland and Sri Lanka respectively, their sample size was 10 companies; they applied correlation and regression analysis. Their investigation indicated a positive association between liquidity measured by modern and traditional indices and firms' profitability**.** On the contrary, (Eljelly, 2004; Nassirzadeh & Rostami, 2010; Sandhar & Janglani, 2014) performed their studies in Saudi Arabia, Iran and India respectively, using correlation and regression analysis in order to evaluate liquidity profitability trade off, taking sample size of 29,108,30 respectively. Their evaluation concluded that liquidity measured by traditional and modern indices has a negative association with profitability. There are only slight differences between the findings of studies that used modern liquidity indices and the ones which used traditional liquidity indices, (Nassirzadeh & Rostami, 2010; Sandhar & Janglani, 2014) found that traditional liquidity indices have a significant impact on profitability, whereas modern liquidity indices have an insignificant impact on profitability. More surprisingly, Bibi & Amjad (2017) decided to explore the relationship between liquidity and companies' profitability and finding out the impact of all components of liquidity on profitability in Karachi Stock Exchange using cash gap in days and current ratio for measuring liquidity. In their research, they showed that traditional measures have a significant positive correlation with profitability measures whereas modern indices of liquidity have a significant negative correlation with profitability.

Based on the above discussion, the study has summarized the used variables that were taken by previous studies and the methods that were adopted for conducting the analysis, which enables the researcher to find the appropriate methods and variables to be used in the study.

3. Research Methodology

The review of previous literature has provided this study with the basic theory on the impact of liquidity on the firms' performance and how to be measured and analyzed. Data are gathered from various sources utilizing journals, books, and databases. Financial data are extracted from ProwessQ[1] database for the period from 2008 to 2017. The study population consists of 150 pharmaceutical companies listed on BSE, while the study sample comprises 82 companies after excluding companies that do not have data for the study period, companies that have more missing data and companies that contain outliers, as shown in figure (1).
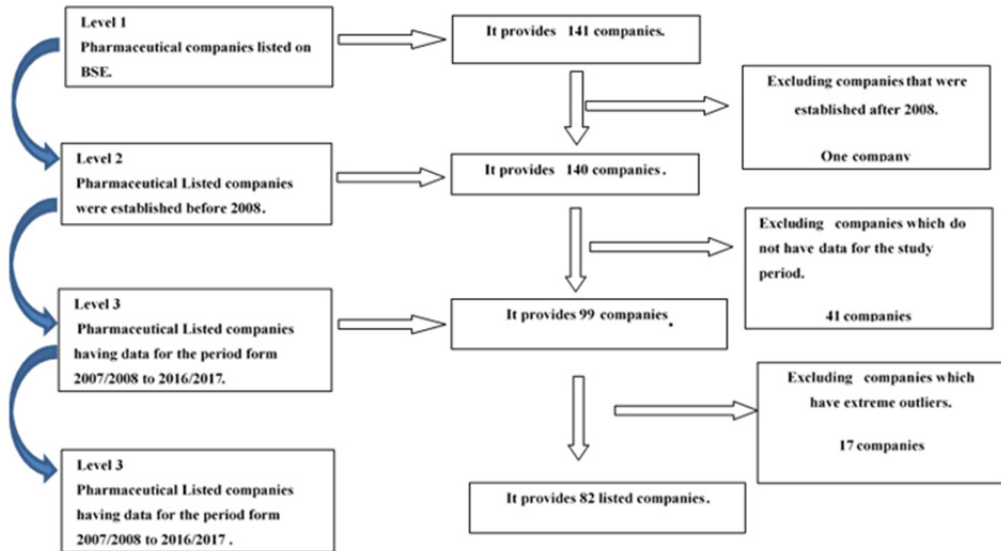

Figure 1: Summary of Study Selection Process

The research framework includes three main variables: the dependent variable is firms' performance which is measured by return on assets; the independent variable is liquidity which is measured by current ratio and quick ratio, and control variable that is represented by leverage, firms' size and age.

In order to find out the impact liquidity on firms' performance, the study uses a panel data approach in which fixed and random effect models are used. Following are the regression equations:

$(ROA)_{it} = \alpha + \beta_1 (CR)_{it} + \beta_2 (SIZ)_{it} + \beta_3 (LEV)_{it} + \beta_4 (Age)_{it} + \varepsilon_{it}$ (1)

$(ROA)_{it} = \alpha + \beta_1 (QR)_{it} + \beta_2 (SIZ)_{it} + \beta_3 (LEV)_{it} + \beta_4 (Age)_{it} + \varepsilon_{it}$ (2)

Where:

$(ROA)_{it} =$ Stands for the performance of company I, at time t, measured by return on assets

$(CR)_{it} =$ Stands for current ratio

$(QR)_{it} =$ Stands for quick ratio

$(SIZ)_{it} =$ Stands for size of company i at time t.

$(LEV)_{it} =$ Stands for leverage of company i at time t.

$(Age)_{it} =$ Stands for company i at time t.

$(\alpha) =$ Common y-intercept.

$(\beta1-\beta4) =$ coefficients of the explanatory variables

$(\varepsilon)_{it} =$ Stochastic error term of company i at time

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[1] *The largest database focusing exclusively on Indian companies' financial performance*

4. Data Analysis and Discussion

Table (1) shows descriptive statistics for all variables included in this study: Return on assets is the dependent variable, its mean value is 6.10 with a standard deviation of 9.15. The mean and median of current ratio are 1.70 and 1.38 percent respectively. The minimum current ratio in pharmaceutical companies is 0.24 percent while the maximum is 10.89 percent with a standard deviation of 1.22 percent. This gives an indication that pharmaceutical companies listed on BSE are highly liquid. Regarding quick ratio, table (1) demonstrates all statistics values, the average quick ratio is 1.15 and the minimum and maximum values range between 0.07 and 10.56 with a standard deviation of 1.09 percent. In case of control variables, the leverage mean value is 1.94 percent, while the minimum and maximum values ranges from 0.00 to 104.60, with a standard deviation of 9.36; size of firms was measured by log of total assets. Table (1) reveals that the minimum and maximum values range between 3.68 and 12.87 with a standard deviation of 1.86 and the average of log total assets is 8.26; firms' age ranges between 1 and 110 years with an average of 33.28 years. The average age of companies (33 years) could be the reason why firms within the sample are profitable. The standard deviation of firms in the sample is 18.82 which indicate the small variation in age of the companies.

Table 1: Descriptive statistics

Variable name	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	6.10	5.90	92.64	-50.90	9.15
CR	1.70	1.38	10.89	0.24	1.22
QR	1.15	0.83	10.56	0.07	1.09
SIZ	8.26	8.20	12.87	3.68	1.86
LEV	1.94	0.45	104.60	0.00	9.36
Age	33.28	28.00	110.00	1	18.82

Results in Table (2) show a positive and significant association between current ratio, quick ratio and profitability of pharmaceutical companies measured by return on assets at 1% level of significance. These results consist with prior literature (e.g. Bibi & Amjad, 2017: Rehman et al., 2015). On the other hand, the results contradict with (Nassirzadeh & Rostami, 2010). Regarding control variables, results in table 2 reveal that firms' size and firms' age have a positive and significant correlation with firm's performance, these results are supported by studies (e.g. Tahir & Anuar, 2015: Afrifa & Padachi, 2016) and contradict with (Pais & Gama, 2015:Yunos et al., 2015). Leverage is one of the control variables that are used in the current study, it is found that leverage has a negative and significant relationship this result is supported by (Garcia-Teruel & Martınez-Solano, 2007:Yunos et al., 2015). On the contrary, studies e.g. (Afrifa & Padachi, 2016: Pais & Gama, 2015) found a positive correlation between leverage and return on assets of pharmaceutical companies.

Table 2: Correlation matrix

Variable name	ROA	CR	QR	SIZ	LEV	Age
ROA	1					
CR	.289**	1				
QR	.264**	.963**	1			
SIZ	.116**	-.058	-.080*	1		
LEV	-.107**	-.014	-.042	-.139**	1	
AGE	.129**	.083*	.077*	.292**	-.065	1

For testing the assumptions of regression model, firstly, normality of the models was checked and it was found that the error terms are normally distributed figure (2) shows the normality histogram along with some statistics that indicate the normal distribution of the error terms. Similarly, figure (2) demonstrates the presence of linearity in the model between the dependent variable and the

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independent variables. Secondly, the autocorrelation of the models was also checked by running the Durbin-Watson test table (5) shows that error terms are not correlated with each other. Thirdly, for examining the absence of multicollinearity, correlation matrix which reflects the association between all independent variables is used. Table (2) shows that there is no high correlation coefficients between the independent variables. Moreover, Variance Inflation Factor (VIF) test is used; results of multicollinearity test in table (4) guarantees the absence of multicollinearity issue in both models as long as VIF values are far below the critical value 10. Fourthly, to check the absence of heteroscedasticity in the models, Heteroscedasticity White Test is performed. It is clear from table (4) that the p-value of white's test is greater than 0.05 for all models which confirms the absence of heteroscedasticity in the data.
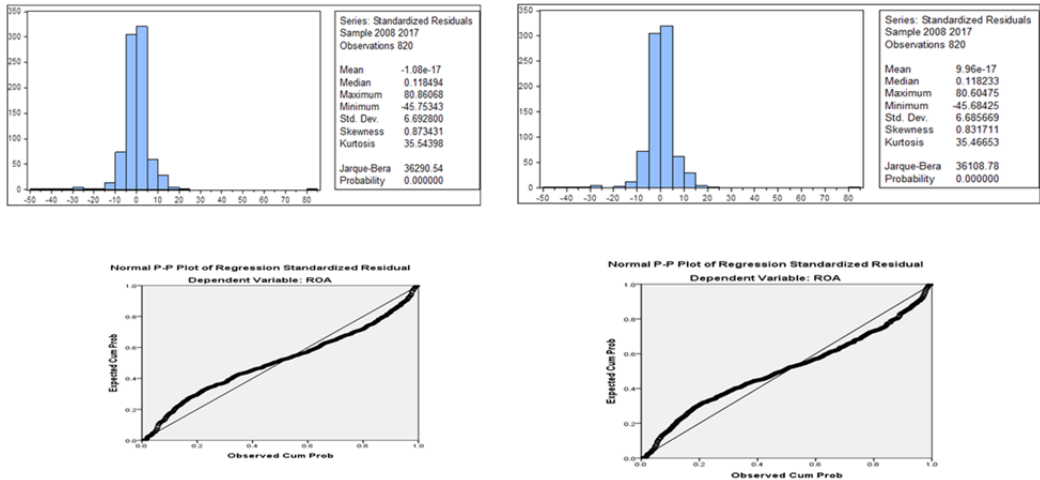

Figure 2: Normality and linearity plots

Table 3: Heteroscedasticity and multicollinearity tests

Heteroscedasticity test: White test								Variance inflation factors			
Model (1)				Model (2)				Model (1)		Model (2)	
								Variable	VIF	Variable	VIF
F-statistic	1.02	Prob	0.43	F-statistic	1.09	Prob	0.36	CR	1.015	QR	1.020
								Size	1.119	Size	1.125
Obs*R-squared	14.32	Prob	0.43	Obs*R-squared	15.24	Prob	0.36	LEV	1.021	LEVE	1.023
								Age	1.106	Age	1.106

In order to choose the appropriate model, the study performed Redundant fixed effects likelihood ratio test; findings in table (3) reveal that pooled models are invalid as there is a cross sectional effect. Results also show that cross section fixed effect for both models is significant ($p< 0.05$) whereas period fixed effect is insignificant ($p>0.05$) which mean the model has one-way variable intercept effect. Further, to decide which model to use (one way fixed or one-way random effect model), Hausman test is used. The null hypothesis of Hausman test states that random effect is appropriate. Results in table (3) suggest the rejection of the null hypothesis ($p<0.05$); therefore, the alternative hypothesis is accepted. Thus, the panel fixed effect model is appropriate.

Table 4: Panel diagnostic tests

Model	Redundant fixed effects tests						Hausman test	
	Test Cross-section fixed effects			Test period fixed effects				
	Effects test	Statistic	Prob.	Effects test	Statistic	Prob.	Prob	Model
1	Cross-section F	5.962	0	Period F	1.474	0.152	0.0049	Fixed effect model
	Cross-section Chi-square	414.590	0	Period Chi-square	13.394	0.145		
2	Cross-section F	6.220	0	Period F	1.298	0.233	0.009	Fixed effect model
	Cross-section Chi-square	428.552	0	Period Chi-square	11.807	0.224		

Findings of model 1 in table (5) show that R^2 is 0.46 and adjusted R^2 is 0.40. R^2 which indicate that 47% of the variation in return on assets of pharmaceutical companies is explained by the variables included in the model which are: current ratio, leverage, firms' size and age. It is also shown in table (5) that the coefficient of current ratio is 1.554 which means that current ratio has a positive impact on the performance of pharmaceutical companies. This indicates that when current ratio goes up by one percent return on assets increase by one percent. Regarding the outcomes of model 2, table (5) outlines the findings of fixed effect regression model that finds out the impact of quick ratio on the performance of pharmaceutical companies listed on BSE. R^2 and adjusted R^2 of the model which represent the explanatory power of model are 0.466 and 0.404 respectively which confirms the fitness of the model in predicting the outcomes. The coefficient of quick ratio is 1.718 which means that quick ratio has a positive and significant impact on the performance of pharmaceutical companies. This coefficient suggests that when quick ratio of pharmaceutical companies goes up by one percent, return on assets will also go up by one percent.

Table 5: Regression models

Fixed Effect regression models							
Model (5)				Model (6)			
	Coefficient	t-Statistic	p.v		Coefficient	t-Statistic	pv
CR	1.554	4.612	0.000	QR	1.718	4.784	0.000
Size	-0.251	-0.288	0.774	Size	-0.386	-0.443	0.658
LEV	-0.397	-2.531	0.012	LEV	-0.407	-2.601	0.010
Age	-0.160	-1.249	0.212	Age	-0.127	-0.998	0.319
C	11.709	2.329	0.020	C	12.394	2.478	0.013
R-squared	0.465			R-squared	0.466		
Adjusted R-squared	0.403			Adjusted R-squared	0.404		
F-statistic	7.504			F-statistic	7.538		
Prob(F-statistic)	0.000			Prob(F-statistic)	0.000		
Durbin-Watson	1.561				1.563		

5. Conclusion

This article aimed to investigate the impact of liquidity on the profitability of pharmaceutical companies listed on Bombay Stock Exchange (BSE) using a balance panel data of 82 pharmaceutical companies for the period of 10 years from 2008 to 2017. Current ratio and quick ratio are taken for measuring firms' liquidity while return on assets for measuring firms' performance. This paper found that current liquidity ratio and quick ratio have a positive and significant impact on the profitability of pharmaceutical sector measured by return on assets, while the control variables leverage, firms' size and age have a negative impact on the profitability of pharmaceutical companies. This topic has attracted many researchers to identify the association between liquidity and profitability, because of the special importance that liquidity has. The study used archival literature to explore the gap in the existing literature. This paper will be useful for scholars, finance managers and other people concerned about liquidity in order to understand its importance.

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