

Impact of Liquidity on Profitability of the Firm: An Empirical Study on Select Pharmaceutical Companies in India

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Abstract

Liquidity and profitability both run simultaneously and are very important from the viewpoint of any firm and it is important to maintain a balance between these two for the proper conduct of business. The present study is conducted to evaluate the trade-off between profitability and liquidity of select pharmaceutical companies in India. In the present study top ten pharmaceutical companies have been taken as a sample and the secondary data for 10 financial years have been collected. The researchers selected ROCE as the proxy of profitability, on the other hand, DV, CV, IV, CR, log of Total asset (LTA), and log of total sales (LTS) have been taken as the proxy of liquidity. To conduct the study firstly the researchers run the Hausman test to choose which regression model is suitable for the present study. They found that the fixed effect regression model is appropriate as the calculated value of the Hausman test is lower than 0.05. The study revealed that LTA and LTS have huge impact on the profitability of the firm while the other variables do not have much impact on profitability. Besides this, the researcher found that the probability value of all the variables was significant even at a 1% level of significance except in the case of DV.

Keywords: *Liquidity, Profitability, Pharmaceutical Companies.*

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Introduction:

The present economic world is full of the financial crisis that affects almost all the countries of the world and India is not an exception to that. Due to the higher inflation rate and difference in foreign exchange rates the value of the money is declining fast (**Owolabi and Obida, 2012**). This creates immense pressure on the managers to maintain the liquidity to fight the crisis.

Liquidity is the efficiency of the firm in converting the assets into the most liquid form of cash. Managers are the ones who are the ultimate decision-makers for financial obligations. They need to manage the funds for short-term as well as long-term activities for smooth conduct of business activities (**Madushanka and Jathurika, 2018**). They ensure the continuity of operation and production cycle efficiency with a proper supply of liquid cash hence it becomes necessary to maintain a balance of liquidity in order to manage the activities of the firm. Excess and lack of liquidity, both are not favourable for the present and future of business.

Liquidity can be described as the ability of any firm to pay its short time obligations (**Eljelly, 2004**). The profitability of a firm can be described as the difference between the expenses and income of the firm (**Malik, Awais, and Khuesheed, 2016**). There are many theories even about the relationship between liquidity and profitability among them one is, the greater liquidity is always expensive for the firm (**Osborne, Fuertes, and Milne, 2009**). The other theory suggests that a firm should always maintain high liquidity in form of cash to manage the production time cycle without any deal (**Agbada and Osuji, 2013**).

Shareholders are real owners of the company and the ultimate goal of the company is to increase the wealth of shareholders. To do so, liquidity and profitability both are important and play a crucial role. The management of

liquidity has a direct impact on the growth and profitability of the firms. Due to this, the management of liquidity becomes most important.

Review of Literature:

The liquidity of the firm impacted profitability. It is important to maintain the liquidity of the firm to meet all the financial obligations at the time. To maintain a good relationship with the stakeholders it is important to pay for their dues on time and this can only be done once the liquidity of the firm is in a good position.

Kirkham (2012) in the research paper titled “liquidity analysis using cash flow ratios and traditional ratios: The telecommunication sector in Australia” analyzed the liquidity on the basis of cash flow ratios and the traditional ratios. The researcher tried to make a comparison between the liquidity measured through traditional ratios and liquidity measured by modern cash flow ratios. He selected 25 telecommunication companies and collected data from the fin analysis database. He took three traditional ratios, namely, the quick ratio, the current ratio, the interest coverage ratio, and three modern cash flows ratios namely, as critical needs cash coverage ratio, cash interest coverage ratio, and cash flow ratio. His study revealed that a significant difference was found between the performance of these two kinds of liquidity measures. He found that the traditional ratios sometimes give an incorrect decision about the liquidity position of the company which put the company in a situation where they have faced many problems while the modern cash flow ratios give accurate predictions regarding the liquidity.

Shaw (2021) conducted an empirical study to analyse the impact of Management of working capital on the profitability of selected firms. She selected 5 top automobile companies of India belonging to the 2- 3-Wheeler sector and collected data for 15 years. She used debtors’ velocity, creditors velocity, inventory velocity, current ratio, firm size, and growth prospectus as independent variables and the return on asset [ROA] as the dependent variable of the study. By implying the panel data regression model, she

found that the working capital of the firm has a significant effect on the profitability of the selected firm. Besides this, she also found that there exists a strong positive relation between creditors velocity, current ratio, and size of the firm with the profitability while a negative relationship was found with the rest of the variables.

Shaw (2021) analyzed the profitability of selected automobile companies in India. She made a comparison between the top automobile companies of India that are Mahindra and Mahindra Ltd and Tata Motors Ltd. She collected the secondary data of both companies for 10 financial years. The variables taken in the study were net profit ratio, return on assets, operating profit ratio, return on equity, and earnings per share. The statistical tool applied by the researcher was ANOVA. Her study revealed that Mahindra Ltd performed better than Tata Motors in terms of operating profit ratio, return on equity, earning per share add profit ratio and return on acid.

Madushanka and Jathurika (2018) in their research article titled “The impact of liquidity ratio on profitability” tried to analyse the impact of liquidity on profitability of the firm. The researchers tried to understand how liquidity management is so important from the viewpoint of any firm and how it affects the shareholders also. To conduct the research, the researchers selected 15 manufacturing firms that were listed on the Stock Exchange of Colombo from 2012 to 2016. They performed Pearson correlation, regression, and descriptive statistics to understand the impact of liquidity on profitability. Their results revealed that among all the selected liquidity ratios quick ratio has a significant and positive relationship with the profitability of the firm. The researchers of this study also recommended the manufacturing companies of Sri Lanka should give more attention to the management of liquidity as it has a significant effect on profitability. They should devise a new and good strategy for liquidity management.

Dhanalakshmi and Rajeswari (2017) in the research paper titled “An empirical study of liquidity analysis of select pharmaceutical companies in India” conducted a study to analyze the liquidity position of the firms that

recently entered into a merger and acquisition. They selected pharmaceutical companies that are listed on the Bombay Stock Exchange and were recently indulged in acquisition and merger activities. The data of companies were collected for 12 years Out of which 6 years of data were before the merger period and the rest 6 years of data were related to after the merger. They calculated the current ratio and quick ratio of the selected companies. They used a t-test to compare the data set belonging to two different sets. They found that a significant difference was found in the current ratio as well as the liquidity ratio of both the groups which implies that after the acquisition and merger the position of liquidity of the selected firms got better than earlier.

Malik, Khursheed, and Awais (2016) tried to investigate the relationship between profitability and the liquidity of private sector banks in Pakistan. They have selected 22 private banks that were registered under the Pakistani State Bank from 2009 to 2013. They used the ordinary least square method to estimate the impact of liquidity on profitability. Their result revealed that there is a significant relationship between the liquidity position of a bank with the profitability that is measured by return on asset. It also revealed an insignificant relationship between the return on equity and return on investment with the liquidity position of the firm's banks.

Yadav (2014) conducted a comparative analysis of liquidity among the top three pharmaceutical companies in India. He collected secondary data related to all three companies for five financial years. He took the current ratio, absolute liquidity ratio, and quick ratio as a measure of liquidity. He argued that the short-term craters are mainly interested in knowing the liquidity of the firm and this motivates the researcher to conduct the study in this respect. From the comparative analysis, he found that among all the three companies the liquidity position of Cipla ltd was best in terms of quick ratio and current ratio while he got a mixed result in terms of absolute liquidity ratio.

Malik (2011) tried to find out the factors of profitability and also compared the life insurance and non-life insurance companies of Pakistan in terms of

profitability. He selected 35 listed and 35 non-listed life insurance companies that were listed during the time period 2005 to 2009 on the Pakistan stock exchange. He used return on assets as a measure of profitability and used size, age, leverage ratio, volume of capital, and loss ratio to measure its impact on profitability. From the study, he found that the age of the company has no relation with the profitability while a significant and a positive relation was discovered between the profitability and size of the company. He also concluded that the leverage ratio and loss ratio have a significant negative relationship with the profitability of selected firms.

Research Gap:

Based on the extensive reviews that have been done in this research area, the researchers found that a lot of researches have been done but very few researchers took top pharmaceutical companies and ran a panel data regression model to find out the real effect of profitability on the liquidity of firms. This gap encouraged the researcher to study in-depth in this area as this has a social implication.

Objectives of Study:

Based on the above research gap found by the researcher following research objectives have been formulated:

- (i) To analyze the relationship between liquidity and profitability.
- (ii) To investigate the effect of liquidity on profitability.

The Hypotheses of Study:

Based on the above-mentioned objectives, the researcher formulated the following hypothesis:

H₀₁: No statistically significant relationship is there between the profitability and debtor's velocity.

H₀₂: No statistically significant relationship is there between the profitability and creditor's velocity.

H₀₃: No statistically significant relationship is there between profitability and inventory velocity.

H₀₄: No statistically significant relationship is there between the profitability and the current ratio.

H₀₅: No statistically significant relationship is there between profitability and total assets.

H₀₆: No statistically significant relationship is there between profitability and total sales.

Research Methodology:

Sample selected: Top 10 pharmaceutical companies of India have been taken into the study as the sample.

Study period: In the present study 10 years of secondary data related to the selected firms has been collected. The time period for the study is from 2012-2013 to 2020-2021. This gives a data set of 100 firm-year observations for the present study.

Dependent variables: In the present study Return on Capital Employed [ROCE] is taken as the dependent variable and will be treated as the proxy for profitability.

Independent variables: In the present study Debtor's Velocity [DV], Creditors velocity [CV], Inventory Velocity [IV], and Current Ratio [CR] are taken as independent variables.

Control variables: Besides the above-selected variables the log of the total assets and log value of the total sales is also taken in the study as a control variable to correctly measure the impact of liquidity on profitability of the select firms.

Table 1: Calculations of variables

variables	Measurement	Type of variable
Return on capital employed (ROCE)	Earnings before interest and tax/ Capital employed	Dependent
Debtors' velocity (DV)	(Account receivable/credit sale) *365	Independent
Creditor's velocity (CV)	(Account payable/credit purchase) *365	Independent
Inventory velocity (INV)	(Inventory/cost of goods sold) *365	Independent
Current ratio (CR)	Current asset/current liability	Independent
Log of total asset	Total asset	Control
Log of total sales	Total sales	Control

Source: authors computation

Statistical Tools: In the study, to find out the relation between the variables Pearson correlation test has been conducted. In order to check the multi-collinearity, VIF and tolerance factors have been calculated. To check whether there is any autocorrelation between the variables, the Durbin Watson test has been used. There are two methods in the panel regression model, one is the Fixed-effect model and the other is the Random-effect model. To choose between these two methods the Hausman test is done. Finally, the result suggested that the fixed effect model is the most suitable model for the present study.

To Check	Statistical tool used
Correlation	Pearson correlation
Auto-correlation	Durbin-Watson test
Multicollinearity	VIF and Tolerance factor
Choose between Fixed and Random effect models	Hausman test
To test the Hypothesis	Fixed effect model

Model Specification:

Taking the variables of the study, ROCE which is determinant of profitability, and DV, CV, INV, CR, LTA, and LTS as determinants of liquidity the following regression model can be constructed:

$$\text{ROCE}_{it} = \alpha + \text{B1} \cdot \text{DV}_{it} + \text{B2} \cdot \text{CV}_{it} + \text{B3} \cdot \text{INV}_{it} + \text{B4} \cdot \text{CR}_{it} + \text{B5} \cdot \text{LTA}_{it} + \text{B6} \cdot \text{LTS}_{it} + e_{it} (\mu_{it} + \delta_{it})$$

In the above model,

ROA_{it} = Return on capital employed of i^{th} company at time t .

DV_{it} = Debtor's velocity in terms of days of i^{th} company at time t .

CV = Creditor's velocity in terms of days of i^{th} company at time t .

INV_{it} = Inventory velocity in terms of days of i^{th} company at time t .

CR_{it} = Current ratio of i^{th} company at time t .

LTA_{it} = Log of total asset of i^{th} company at time t .

LTS_{it} = Log of total sales of i^{th} company at time t .

e_{it} = Error term

$i = 1, 2, \dots, 5$

$t = 1, 2, 3, \dots, 15$

Data Presentation and Interpretation:

Table 2 shows the mean value, standard deviation, skewness, kurtosis, and the minimum and maximum value of the selected variables. ROCE, which is the dependent variable, scores the mean value of 15.34 with a standard deviation of 9.49% and the maximum ROCE is 44.31. DV and CV also have a good average score of 85.31 and 75.88 respectively with a standard deviation of 37.57%, and 74.83% respectively.

Kurtosis is the statistical measure for peakedness or flatness of distribution. In our study ROCE, DV, CR, LTA, and LTS are platykurtic (kurtosis < 3) that implies the distribution has a thinner tail than the normal tail while CV and IV are the variables showing a leptokurtic (kurtosis > 3) implies the distribution is more peaked than the normal distribution.

Skewness which is used to found the asymmetry of the distribution of the mean shows that except LTS all the other variables have a long right tail and have positive skewness.

Table 2: Descriptive statistic

	Minimu m	Maximu m	Mean	Std. Deviation	Skewn ess	Kurto sis
ROCE	-4.54	44.31	15.3434	9.49313	.591	.283
DV	35.00	182.00	85.3100	37.57489	.763	-.019
CV	25.00	740.00	75.8800	74.83359	7.381	64.019
IV	2.62	19.95	6.2699	3.71000	2.004	3.377
CR	.19	3.74	1.6099	.75142	.434	-.168
LTA	3.35	4.58	3.9858	.30609	.006	-.672
LTS	3.06	4.14	3.6745	.27497	-.102	-1.085

Source: Author's computation with excel

Table 3 correlation represents the degree of association between a dependent variable and an independent variable and between pairs of independent variables. The below matrix shows a positive and a weak relationship between CR and ROCE, DV. Besides this, a positive relationship is found between IV, CR, and LTA with LTS. The rest of the variables taken in the study show a negative but weak relationship with the other variables. The pairs of independent variables not having many strong positive relations also shows that there is no issue of multicollinearity in our study. Although the more sophisticated test of multicollinearity is already done in the study.

Table 3: Correlation Matrix

	ROCE	DV	CV	INV	CR	LTA	LTS
ROCE	1.00						
DV	-0.076	1.00					
CV	-0.235	0.218	1.00				
INV	-0.164	-0.533	-0.168	1.00			
CR	0.449	0.210	-0.242	-0.395	1.00		
LTA	-0.573	0.285	0.343	-0.094	-0.355	1.00	

LTS	0.017	0.234	-0.248	0.036	0.043	0.50 9	1.00
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Source: Authors computation with Excel

Table 4 represents the VIF factor and tolerance statistics to measure multicollinearity. The VIF value of all the selected variables is less than 2.5 indicating no multicollinearity in the variables. On the other hand, the tolerance factor of all the variables is high than 0.10 indicating no multicollinearity in the variables.

Table 4: Multicollinearity matrix

Model	Collinearity Statistics	
	Tolerance	VIF
DV	0.607	1.646
CV	0.606	1.650
IV	0.569	1.756
CR	0.590	1.694
LTA	0.402	2.488
LTS	0.466	2.145

Source: Authors computation with Excel

Table 5 represents the result of the Hausman test. This test has been performed to test the hypothesis whether Random effect or Fixed effects regression models should be appropriate for the present study. The null hypothesis states that there is no covariance between regressors and firm-specific effects. Rejection of the null hypothesis denotes that the fixed effect model is appropriate in comparison to the random effect and vice versa. From the result, it can be concluded that we reject the null hypothesis, as the value, it is less than 0.05 which implies that there is a covariance between the regressor and error term. Thus fixed effect model is appropriate

Table 5: The summary result of the Hausman test

Test Summary	Chi-Sq. Statistic	Ch-Sq. d.f	Probability
Period random	16.9079	6	0.0096

Source: Calculated by Author with EViews 11

Testing Hypothesis:

To test the hypothesis of the study Fixed-effect model has been applied, the result of which is presented below:

Table 6 represents the summary model of the fixed-effect model highlighting the impact of different determinants of liquidity on the determinants of profitability i.e., ROCE. From the above table of the Hausman test, it is clear that the fixed effect is best-suited for the present study.

Based on the result of the fixed-effect model it is observed that the value of R-squared is 0.8679 indicating that more than 86% of the variations in return on capital employed is described by the selected explanatory and controlled variable of the study. Here the value of intercept is 32.76 indicating that the value of ROCE will increase if the entire independent and control variables are kept constant.

In the below table the relation of different explanatory variables and control variables with the explained variable is well depicted. By observing the individual coefficient with their probability, the result shows that except for DV all the other variables are statistically significant at the 5% level of significance.

H₀₁: No statistically significant relationship is there between the profitability and debtor's velocity.

Debtors' velocity [DV] which indicates the number of times that a debtor is turned over in one year has a direct relationship with ROCE. The coefficient

of DV is 0.02995 indicating that only 1% increase in the debtors will lead to a 0.03% increase in the ROCE. Although the result is not significant at a 5% significance level.

H₀₂: No statistically significant relationship is there between the profitability and creditor's velocity.

Creditors velocity [CV] indicates the number of times the creditor can be converted in a year. The coefficient of CV is 0.0285 indicating that only 1% increase in the creditor's velocity will lead to 0.03% increase in the return on capital employed. This value is significant even at a 1% significance level as the null hypothesis of the study is rejected.

H₀₃: No statistically significant relationship is there between profitability and inventory velocity.

The value of the coefficient of IV is 1.545, showing that only a 1% increase in the inventory velocity will lead to an increase of 1.5 per cent in the return on capital employed. Besides this, the result is significant even at a 1% level of significance.

H₀₄: No statistically significant relationship is there between the profitability and the current ratio.

The value of the coefficient of CR is 3.51, showing that only a 1% increase in the current ratio will lead to an increase of 3.51 in the return on capital employed. The P-value of CR is 0.0002 indicating that the null hypothesis is rejected which means CR impacts profitability.

H₀₅: No statistically significant relationship is there between the profitability and log of total assets.

The coefficient value of the total asset is -39.44 indicating that an increase in the total asset can lead to a huge decrease in the return of capital employed. This can be theoretically justified by the fact that if the company will invest more in total assets, it won't be able to invest more in the

workings which can affect the profitability of the firm negatively. Here the null hypothesis of the study is rejected.

H₀₆: No statistically significant relationship is there between the profitability and log of total sales.

The value of LTS is 32.58 indicating that an increase in sales can lead to a huge increase in the profitability of firms. This can be theoretically justified as there is a direct relationship between sales and profitability. With the increase in the number of sales, the company can earn a huge profit. The null hypothesis of this value is also rejected as the P-value is 0.000.

The F statistic and probability of F statistic measure the overall predictability of the model. It indicates whether the model used in the study is predicting the result well or not. Here the probability of the F statistic is highly significant as the Probability value is much lower than 0.05. Even at a 1% significance level, it is showing a significant result as the P-value is 0.000. As a result, we reject the null hypothesis and accept the alternate hypothesis which depicts that there exists some relationship between the profitability and the liquidity of firms.

The Durbin Watson test is done by the researchers to test the first-order autocorrelation. As we know that D-W stat can vary from 2-to 4. A value close to 2 indicates no autocorrelation while the value below it indicates positive autocorrelation, and above 2 it indicates a negative autocorrelation between the variables. Since the value of the D-W stat is almost two, indicating no autocorrelation between the liquidity and the variable of profitability in the study.

Table 6: The summary result of the Fixed-effect model

Dependent variable		ROA
Method		Panel Least Square
Variable	Coefficient	Probability
C	32.7659	0.0008
DV	0.02995	0.1384
CV	0.02856	0.0001
IV	1.5456	0.0010
CR	3.5113	0.0002
LTA	-39.4482	0.0000
LTS	32.5862	0.0000
R-squared		0.867892
F-statistic		36.78950
Probability of F-stat		0.00000
Durbin-Watson stat		1.999210

Sources: Author computation with excel

Conclusion:

Liquidity of any company is very important to pay the dues on time and also for smooth conduct of all the activities of the firm. The management of liquidity is necessary as it directly or indirectly impacts the profitability of the firm also. The present study is undertaken to establish a relationship between the variables of profitability and the liquidity position of the firm. The test result of VIF and tolerance factors denoted that no problem of multicollinearity exists in the present study, on the other hand, the Durbin Watson test also shows a value of 2 indicating no autocorrelation in the study.

In the study, a Fixed effect model is used which according to the Hausman test was the best-suited model for the present study. The study revealed that the value of R-square is more than 0.86 indicating that 86% of variations are explained by the model used in the study. The two important variables creating much effect on the profitability are LTA and LTS except

that all the other variables have a light impact on the profitability of the selected firms.

The findings of the study are very useful for the Indian Pharmaceutical industry to understand the relationship between the profitability and liquidity of the selected form, based on this they can make important financial decisions.

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