IMPACT OF LIQUIDITY AND MANAGEMENT EFFICIENCY ON PROFITABILITY: AN EMPIRICAL STUDY OF SELECTED POWER DISTRIBUTION UTILITIES IN INDIA

Syed Azhar[1],

[1]*Research Scholar, School of Management Studies,*
University of Hyderabad, Telangana, India
E-mail: azharsyed4617@gmail.com

Abstracts
This study investigated the relationship impact of liquidity and Management Efficiency on profitability of selected power distribution utilities in India. The study consist a sample of 23 power distribution utilities operating in India for the period of 2006 until 2013. Therefore the total panel (balanced) observations are 207. The work type structured is unbalanced data with annual frequency. The return on capital employed is used as a measure for profitability explaining dependent variable, whereas a current ratio, quick ratio, absolute cash ratio, debtor turnover ratio, creditor turnover ratio, collection efficiency, interest coverage ratio are representing independent variable. Statistical tools such as correlation and Generalized Least Squares (GLS) regression are applied. Debtor's turnover ratio, collection efficiency and interest coverage ratio show a significant impact while quick ratio, absolute liquid ratio and creditor's turnover ratio show an insignificant impact on profitability of selected sample utilities.

Research paper

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Introduction

Liquidity is very important for sustainability and growth of a firm. It is the amount of cash a company has on hand or can generate quickly reveals that how far the company is financially healthy. It is related to the ability of a firm to repay its short term debt or obligations. According to Bhunia (2010), liquidity is of major importance to both the internal and the external analysts because of its close relationship with day-to-day operations of a business. Many firms ignore its liquidity, to earn higher profits in the short run, which in turn worsens the business performance. This can lead to business failure or financial crisis in spite of earning high profits. Therefore the firms should maintain a tradeoff between liquidity and profitability to strengthen the business and increase the efficiency. If a firm maintain high levels of available liquid assets, it indicates that the business can pay off its debt easily when due dates occur. Therefore an efficient business is one which is able to repay its debts in the normal course and continue to do so within the next year. It is believed that the firms that lack liquidity can be forced to enter bankruptcy even if it is solvent or vice-versa. Hence liquidity plays an important role in sustaining business in short run and long run.

Power Distribution Utilities

Power distribution utilities are mainly controlled by state government as distribution of electricity is listed in concurrent list of the Indian constitution. After privatization few states have opted to unbundle power sector and privatize power distribution utilities. It is the most critical link in the electricity market, which interfaces with the end customers and provides

revenue for the entire value chain and catering to nearly 200 million con-sumers with a connected load of about 400 GW that places the country among the largest electricity consumer bases in the world.

Literature Review

Greg Filbeck (2005), in a research study has analyzed the working capital management results across industries for a period of 4 years i.e. 1996-2000. The study found that there is significant difference that exists between industries in working capital management across time and the measures for working capital change significantly within industries over a period of time. The changes in working capital management may be due to the macroeconomic factors such as change in interest charges, rate of inno-vation and competition.

Shukla (2002), have focused on the state of working capital man-agement in 8 cotton textile units for the period of 1977-78 to 1986-87. The correlation analysis shows that there exists a moderate positive correlation between cash holding and output and sales. The liquidity position is poor for most of the firms and profitability is low or negative in most of the firms.

Deloof (2003), in an empirical study has attempted to know the rela-tionship between Working Capital Management & portability for a sample of 1009 large non-financial Belgian firms for the period of 1922 to 1996. The author found that there is a significant negative relationship between gross operating income and the number of day's accounts receivable, num-ber of day's inventories and the number of days account payable.

Further Karaduman, Akbas, Ozsozgun, & Durer (2010), have found that a company can increase its return on assets by shortening the number

of days account receivable, account payable in days and the number of days of inventory. Further reducing cash conversion cycle will have a positive impact on return on assets. Charitou, Elfani, & Lois, (2010) indicated that the firm's financial health is inversely related to the components of the cash conversion cycle and leverage. In contrast to previous studies Danuletiu (2010), found that there is a weak negative correlation between working capital management indicators and Profitability ratios.

Raheman, Qayyum, Afza, & Bodla (2010), an empirical study estimated and compared sector wise impact of working capital management on performance of manufacturing firms in terms of collection policy, inventory policy, payment policy, cash conversion cycle and net trading cycle. The study used financial data of 204 sample firms listed on the Karachi stock exchange for the period of 1998 to 2007. The study found that there is a variation in sect-oral performance in terms of different measures of working capital management. Further Kequan & Lvliwei (2011), results of his study indicated a significant difference in performance of working capital between firms in different industries and different geographical areas, rather than differences in operational history.

Sharma & Kumar (2011), examined the effect of working capital management on profitability of Indian firms. The sample of 263 non-financial has been collected from firms listed on the BSE for the period of 2000 to 2008. The study found a positive correlation between working capital management and profitability.

Data and Methodology

The study attempts to understand and measure the impact of liquidity on profitability of power distribution utilities from selected sample Utilities.

Period of the study

The study selected power distribution utilities in India for a period of 2006 to 2013. The work type structured is balanced with the annual frequency. The data has been extracted from the annual report. Hence, the total panel (balanced) observations are 207.

Methodology

Panel data has space for both cross sections as well as time dimensions. According to Baltagi (2001), Panel data provide more information, reduce multi collinearity among variables, more degrees of freedom and more efficiency, and substantially reduce the problems that arise from omitted or ignored variables, lessen risk of obtaining biased results [13]. Therefore, it is suitable for the present study.

This study is using Generalized Least Squares (GLS) regression. This method is preferred over the Ordinary Least Squares (OLS) system because under certain assumptions, GLS will turn out to be asymptotically more efficient than OLS system and hence GLS is preferred for this specific study.

Data Interpretation and Analysis

This part of the paper deals with data analysis and interpretation using multiple correlation and regression.

Correlation Coefficient Analysis

Pearson's Correlation coefficient explains if there is any relationship between two variables. It illustrates change in one variable due to change in other variable. The below "Fig.1" shows the Pearsons correlation matrix. This analysis helps to locate the relationship that exists among the independent or explanatory variables. It signifies the presence of multicollinearity among the independent variables. The study also attempts to explain the relationship between the liquidity variables and profitability. SPSS software is used to test multiple correlations between independent variables and dependent variables. The "Fig.1" shows the relationship between the variables under study

Ideally there should be a negative relationship between the current assets ratio and profitability. Since the coefficient of correlation shows a positive relationship of 0.484 with a p-value of 0.019. It indicates that there is a significant relationship at 5% level of significance. The study found a positive relationship between current assets ratio and profitability. It means that an increase in current ratio will lead to increase in profitability of utility and vice versa.

Quick ratio and ROCE should have a negative relationship in general. The study found that coefficient of correlation between quick ratio and ROCE is 0.389 at 10% level of significance. There is positively correlation indicating a positive relationship between the two. Therefore an increase in quick ratio will lead to increase in profitability of the firm and vice-versa.

Table 1. *Correlation Analysis*

	R	R	LR	TR	TR	E	ER	CR	OCE
R									
R	966*								
LR	218	275							
TR	140	.052	159						
TR	289	289	136	450*					
E	121	024	377**	748*	547*				
ER	.014	.005	336	100	004	235			
CR	297	200	185	495*	073	532*	174		
OCE	484*	389**	028	371**	115	355**	107	860*	

Source: SPSS
. Correlation is significant at the 0.05 level (2-tailed).
**.Correlation is significant at the 0.10 level (2-tailed).*

The correlation analysis found a positive coefficient (0.28) between ALR and ROCE, with a p-value of 0.900. It shows that the results are highly insignificant at α =10%. It indicates that an increase in cash levels of sample firms will increase the profits and vice versa.

Ideally most of the firms have a positive relationship between DTR and ROCE. The study found that the coefficient of correlation is 0.371 with a p-value of 0.82. Therefore there is significant positive relationship between the debtors' turnover ratio and ROCE, at 10% level of Significance. Hence the firms which fasten collection will earn good profits.

The correlation matrix shows that the creditors' turnover ratio and profitability are having very low positive relationship with a p-value of 0.629. Therefore there is insignificant relationship between the two variables. It indicates that an increase in creditors' turnover ratio will lead to

increase in profits. It implies that the firms have to fasten payment to creditors to improve profits. These results are inconsistent with the generally accepted norms.

Ideally there is a positive relationship between collection efficiency and profitability. The coefficient of correlation is 0.355 with a p-value of 0.097, indicating a significant positive relationship at 10% level of Significance. Since the study results complement with the generally accepted principles, the firm should maximize its collections in respect to the expected revenue in demand to increase the profitability of the firm.

The coefficient of correlation between debt equity ratio and ROCE is positive with a p-value of 0.626. It indicates that there is an insignificant relationship between the two variables.

Higher interest coverage ratio means the firms is comfortable in paying of its interest on debt. It justifies that the firms is more likely to pay interest on time and most likely to default. The coefficient of correlation is 0.86 with a p-value of 0.000. It indicates that there is a highly significant positive relationship between Interest coverage ratio and ROCE at 5% level of significance.

Panel Unit Roots Test

Non-stationary data are volatile and cannot be modeled or forecasted. The results obtained by using raw data testing stationary may be spurious. It is a well known fact that time series data are non-stationary. The presence of non-stationary variables might produce spurious regression results [15]. Standard unit root test is performed to check for the stationary of the data before the panel data regression analysis. Therefore each varia-

ble of the study is subjected to panel unit root tests of ADF-Fisher unit root test. It assumes individual unit root process and uses chi square test statistics. Stationary test is performed for the selected sample distribution utilities in India. Eviews software by default uses the Schwartz info criterion using maximum lags length selected by the method proposed by ADF Method. It is found that variables were having unit root in level, meaning that the data is not stationary.

In order to obtain consistent, reliable results, the non-stationary data needs to be converted into stationary form. Hence the variables are differenced at first level to check for stationary at difference. It is found that the variables are stationary at first difference. The process can be shown through running a hypothesis. The "Fig.2" table shows summary of stationary test of all the variables used in the study. The research hypothesis tests the stationary of variables individually. The results are indicted that all the variables are found to be stationary at 5% level of significance at first difference. The research hypothesis is as following for testing Stationarity of variables.

Hypothesis:

H1: *Variables has no unit root (Stationary)*

Table 2. *ADF stationary test*

	Level		1st Difference		
Series	**Statistic**	**Prob.****	**Statistic**	**Prob.****	**Result**
CR	55.9092	0.1075	92.2584	0.00	Accepted
QR	39.1846	0.6778	91.4197	0.00	Accepted
ALR	67.2219	0.0136	80.8638	0.00	Accepted
DTR	92.6280	0.0001	72.7643	0.00	Accepted
CTR	50.0888	0.0906	84.6577	0.00	Accepted
CE	104.975	0.0000	179.719	0.00	Accepted
DER	111.165	0.0000	100.959	0.00	Accepted
ICR	38.0464	0.7916	83.7744	0.00	Accepted
ROCE	96.1027	0.0000	.2811	0.0001	Accepted

Source: Eviews

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Hausman Test

Panel data allows you to control for variables. It is observed that many factors which we cannot observe in our study are omitted, and those variables change over time but not across utilities. The variables such as government policy and regulations, business practices, business agreements are not observed but   change over time. These variables accounts for individual heterogeneity.

The Hausman test is used to test to identify appropriate model to be carried out for estimation. It helps in identifying whether fixed effect model is appropriate or random effect model is appropriate. The following hypothesis is tested to verify which model is efficient.

Table 3. *Hausman Test Cross-section random effects*

Test Summary	*Chi-Sq. Statistic*	*Chi-Sq. d.f.*	*C rob.*
Cross-section random	*2.63*	*6*	*.8527*

The "Fig.3" shows the results of the Hausman test. The null hypothesis both estimators are consistent. Since the p-value is more than .05, we cannot reject null hypothesis. In this specific case, it can be concluded that the random effects estimator is the more efficient model against fixed effect model.

Regression

Regression analysis is a statistical tool for studying the relationships between variables. In the regression model summary table, the capital "R-Squared" in this table explains how close the data are to the fitted to the regression line. If there is a strong positive linear relationship between the variables, the value of "R-squared" will be close to +1. If there is a strong negative linear relationship between the variables, the value of "R-squared" will be close to-1. In case there is no linear relationship between the variables or only a weak relationship, the value of "R-squared" will be close to 0.

Variables for the study

The variables in the study can be classified into dependent and the independent variables, and will be discussed in the nest paragraph. The dependent variable is explained by profitability. Liquidity can be explained with the independent variable such as current ratio, liquid ratio, absolute cash ratio, debtor's turnover ratio and creditor turnover ratio, collection efficiency, debt equity ratio and interest coverage ratio. Liquidity is independent variable in this study.

Models estimated

Multiple regression models are estimated for each of the dependent variable. The models are as follows:

$$ROCE_{it} = C_{it} + \beta_1 QR_{it} + \beta_2 ACR_{it} + \beta_3 DTR_{it} + \beta_4 CTR_{it} + \beta_5 CE_{it} + \beta_6 ICR_{it}$$

Where

ROCE= Return on capital employed; CR= Current Ratio; QR=Quick Ratio; ACR=absolute cash ratio; DTR= Debtors Turnover ratio; CTR= Creditors Turnover ratio; CE=collection efficiency; ICR=Interest coverage ratio; i = cross sectional, here i=1, 2, 3, 4....Uit; t = time, here, t=1, 2, 3........9

The "Fig.4" shows the results of the coefficient of regression estimates. Each variable can be interpreted using research hypothesis to understand whether there is significant impact of each independent variable on dependent variable.

H2: There is a significant impact of Quick ratio on profitability of selected power distribution utilities in India.

The t-statistic is 1.01 with a p- value of 0.31 at 5% level of significance. The coefficient is showing a negative sign with a value of 20.12 with a standard error of 1.01. The increase in quick ratio by one unit will lead to increase in profitability by 20.12 units, holding all the other independent variables constant and vice-versa. It indicates that there is an insignificant impact of quick ratio on profitability of the sample utilities and hence research hypothesis is rejected.

H3: There is a significant impact of absolute cash ratio on profitability of power distribution utilities in India.

The "Fig.4" shows that the t-statistics is 0.44 with a p-value of 0.65. The coefficient indicate that one unit increase in absolute liquid ratio, increase in profitability by 11.40 units. The research hypothesis is rejected at 5% level of significance. Therefore there is no significant impact of quick ratio on profitability.

H4: There is a significant impact of debtor turnover ratio on profitability of selected power distribution utilities in India.

The "Fig.4" indicates that the t-statistic is 1.69 with a p-value of 0.09. The coefficient of regression indicates that one unit increase in debtor turnover ratio will lead to increase in profitability by 5.07 units. The research hypothesis is accepted at 10% level of significance. Therefore the study found a significant impact of debtor turnover ratio on profitability of selected utilities.

H5: There is a significant impact of creditors' turnover ratio on profitability of selected distribution utilities in India.

The t-statistic is -0.04 with a p-value is 0.96. The coefficient of regression is showing a negative sign, indicating that delaying payments to

creditors will lead to increase in profits, keeping all other independent variables constant. The finding shows an insignificant impact at 5% level of significance. Therefore the research hypothesis is rejected; infer that there is insignificant impact of creditors on profitability of the sample utilities.

H6: *There is a significant impact of collection efficiency ratio on profitability of selected distribution utilities in India.*

The t-statistic is 2.47 with a p-value is 0.0147. The coefficient indicates that one unit increase in collection efficiency ratio will improve the profitability by 2.06 units and vice-versa. The study found that there is a significant impact of collection efficiency on profitability at 5% level of significance. Therefore the research hypothesis is accepted.

H8*: There is a significant impact of interest coverage ratio on profitability of selected distribution utilities in India*

The "Fig.4" shows the model summary of the study. The t-statistic value is 11.12, with a p-value of 0.00. It shows a positive coefficient, indicating a decrease of one unit in interest coverage ratio will decrease profitability by 11.12 units. The findings suggest a significant impact of interest coverage ratio on profitability of the sample utilities at 5% level of significance. Therefore the research hypothesis is accepted.

Table 4. *Regression Estimates of ROCE (Random Effect Model)*

Variable	Coefficient	Std Error	t-statistic	Prob .
C	1.137	5.38	0.211	0.83
DQR	20.122	19.92	1.010	0.31
DALR	11.401	25.381	0.449	0.65
DDTR	5.0712	2.999	1.690	0.09
DCTR	-0.0972	2.294	-0.042	0.96
DCE	2.0680	0.834	2.479	0.01
DICR	11.127	2.233	4.983	0.00

Source: Eviews

a.   *ROCE dependent variable*

Table 5. *Model summary (Panel EGLS (Cross-section random effects)*

R-	Adjusted R-squared	S.E. of regres-	F-	Prob (F-	Durbin-Watson stat
0.32	0.284	53.140	8.6	0.000	1.967

Source: Eviews

b.   *Dependent Variable: DROCE*

c.   *Predictors : constant variable: net current assets, quick ratio, absolute liquid ratio, debtors turnover ratio, creditors turnover ratio, collection efficiency, debt equity ratio and interest coverage ratio*

H1: *There is a significant impact of liquidity and management efficiency on profitability of sample utilities in India.*

The R-squared is 0.32 and adjusted R-Squared is 0.28, indicating that 28.40% of variables have been explained by independent variables in this specific model. The F-statistic is used to test the overall significance of model. The Durbin–Watson test statistic is use to detect the presence of autocorrelation in this model. If the value of the test statistic is closer to 2, it means that there model has no auto correlation. The statistic test value of 1.96 indicating that he specific model is free from auto correlation. The

joint effect of all coefficient is significant (F=8.66 at P=0.00) which means that overall liquidity and management efficiency impact the profitability of these utilities. Therefore the research hypothesis is significant at 5% level and therefore it is accepted.

Table No. 6. *Summary of Hypothesis*

Hypothesis	*Significance Level*	*Alternate Hypothesis (H1)*
QR	5%	Rejected
ALR	5%	Rejected
DTR	10%	Accepted
CTR	5%	Rejected
CE	5%	Accepted
ICR	5%	Accepted

The "Fig.6" explains the summary of hypothesis. The research hypothesis is accepted for collection efficiently and interest coverage ratio a 5% level of significance, while debtor's turnover ratio is found to be significant at 10% level of significance. Further the other variables such as quick ratio, absolute cash ratio and creditor's turnover ratio are found to insignificant at 5% and 10% level of significance.

Conclusion

The study has showed both positive and negative coefficient between the selected independent variables and return on capital employed. It shows quick ratio and absolute liquid ratio are not having a significant impact but showing a positive sign, indicating increase in liquidity will increase profitability. Moreover there is a significant impact of liquidity and management efficiency on profitability of power distribution utilities in India. Among all the variables in the study, managing debtors and collection efficiency

should be the prime objective of power distribution utilities. The managers should also improve collection efficiency to avoid bad debts.   . The study suggests that management should reduce collection period and improve collection efficiency to increase profits. It should focus on strategies to fasten the collection period and reduce late payments.

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