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RELATIONSHIP BETWEEN WORKING CAPITAL AND PROFITABILITY: AN EMPIRICAL ANALYSIS

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ABSTRACT

In this paper an attempt is made to investigate the relationship between working capital and profitability. To achieve this objective the secondary data for analysis is retrieved from annual reports of Dr. REDDY'S LABORATORIES for the period from 2001 to 2010. The study aims to explore impact of working capital components i.e., current ratio (CR), acid test ratio (ATR), current ratio to total assets ratio (CTTR), current assets to sales ratio (CTSR), working capital turnover ratio (WTR), inventory turnover ratio (ITR), debtor turnover ratio (DTR), cash turnover ratio (CTR), Misc. current assets turnover ratio to the firms performance by looking at firm's profitability i.e. return on investment (ROI). Applying correlations and multiple regression analysis, the result shows that there are significant negative associations between working capital and firm's profitability. Thus it highlights the working capital components are having low and moderate influence on firm's profitability i.e. ROI.

KEYWORDS

Correlation, Multiple regressions, Profitability, Working capital.

INTRODUCTION

Working capital is essential for the day-to-day operations of a business, and hence it is the life-blood of any business. The basic theme of working capital management is to provide adequate support for smooth and efficient functioning of normal day-to-day business operations by striking a tradeoff between the three dimensions of working capital, i.e., liquidity, profitability and risk. In the present environment of cut-throat competition, business does not have any other option than cutting the cost of its operation in order to be competitive as well as financially healthy. It is in this connection that effective management of working capital plays a vital role. But a great deal of controversy exists over the issue as to whether the working capital of a firm, as determined by its financing and investment decisions, affects its profitability or not.

In this paper an attempt has been made to make an empirical study of Dr. REDDY'S LABORATORIES. A pharmaceutical multinational company in Andhra Pradesh for assessing the relationship between working capital and its profitability during the period 2001 to 2010.

Profitability has been defined as ability to earn profit. It is measured in relative terms of either size, past years. The most commonly used measure of profitability is in terms of size that is profit or loss divided by total assets. Profitability is the power of the firm to earn profits. Return on investment (ROI) is a basic measure of profitability of a firm. It is a common benchmark to measure the effectiveness of the resource generating capacity within the firm by sales and investment, it is well known that turnover of assets and earnings as a percentage of sales are two variables of the two tier structure of the Du Pont system used for finding out ROI. ROI is the product of these two variables, i.e.,

$$ROI = \frac{EARNINGS}{INVESTMENT} = \frac{EARNINGS}{SALES} \times \frac{SALES}{CAPITAL EMPLOYED}$$

Working capital represents that portion of the total capital of an enterprise which is invested to keep moving, without any stoppage, its operating cycle starting right from purchase of raw materials to the realization of cash through the sales of productions.

LITERATURE REVIEW

Many previous researches have indicated the relationship between working capital management and Profitability of firm in different environments. Shin and Soenen used a sample of 58,985 firm's years covering the period 1975-1994 in order to investigate the relationship between net-trade cycle that was used to measure efficiency of working capital management and corporate profitability. In all cases, they found a strong negative relationship between the length of the firm's net-trade cycle and its profitability (soenen, 1998).

The management of working capital is defined as the "management of current assets and current liabilities, and financing these current assets." Working capital management is important for creating value for shareholders. Management of working capital management was found to have a significant impact on both profitability and liquidity in studies in different countries.

The relationship between working capital management and corporate profitability was studied by Deloof on a sample of 1,009 large Belgian non-financial firms for a period of 1992-1996. By using correlation and regression tests, he found significant negative relationship between gross operating income and the number of days accounts receivable, inventories, and accounts payable of Belgian firms. Based on the study results, he suggests that managers can increase corporate profitability by reducing the number of day's accounts receivable and inventories (Deloof, 2003). Eljelly empirically examined the relationship between profitability and liquidity, as measured by current ratio and cash gap (cash conversion cycle) on a sample of 929 joint stock companies in Saudi Arabia. Using correlation and regression analysis, he found significant negative relationship between the firm's profitability and its liquidity level, as measured by current ratio. This relationship is more pronounced for firms with high current ratios and long cash conversion cycles. At the industry level, however, he found that the cash conversion cycle or the cash gap is of more importance as a measure of liquidity than current ratio that affects profitability. The firm size variable was also found to have significant effect on profitability at the industry level (Eljelly, 2004). Lazaridis and Tryfonidis [1, p. 26] conducted a cross sectional study by using a sample of 131 firms listed on the Athens Stock Exchange for the period of 2001 - 2004 and found statistically significant relationship between profitability,

measured through gross operating profit, and the cash conversion cycle and its components (accounts receivables, accounts payables, and inventory). Based on the results analysis of annual data by using correlation and regression tests, they suggest that managers can create profits for their companies by correctly handling the cash conversion cycle and by keeping each component of the conversion cycle (accounts receivables, accounts payables, and inventory) at an optimal level. (Lazaridis, 2006).

(Chakraboty, 2008) Evaluated the relationship between working capital and profitability of Indian pharmaceutical companies. He pointed out that there were two distinct schools of thought on this issue: according to one school of thought, working capital is not a factor of improving profitability and there may be a negative relationship between them, while according to the other school of thought, investment in working capital plays a vital role to improve corporate profitability, and unless there is a minimum level of investment of working capital, output and sales cannot be maintained - in fact, the inadequacy of working capital would keep fixed asset inoperative.

Finally (nazir, 2009) made an attempt in order to investigate the traditional relationship between working capital management policies and a firm's profitability for a sample of 204 non-financial firms listed on Karachi Stock Exchange (KSE) for the period 1998-2005. The study found significant difference among their working capital requirements and financing policies across different industries. Moreover, regression result found a negative relationship between the profitability of firms and degree of aggressiveness of working capital investment and financing policies. They suggested that managers could create value if they adopt a conservative approach towards working capital investment and working capital financing policies.

METHODOLOGY

The study is based on secondary data collected from the annual reports of Dr.Reddy's laboratories. Survey reports, government publications etc. have been used for the purpose of the study. Journals, conference proceedings and other relevant documents have also been consulted to supplement data. The study covers period of 10 years (i.e. from 2001 to 2010). The available data have been analyzed by using various financial ratios as managerial tool as well as some statistical tools like co-efficient of correlation and regression etc. have been applied in this study.

OBJECTIVES

- To examine the impact of working capital on profitability by computing simple correlation coefficients between ROI and each of some selected important ratios relating to working capital management.
- To assess the joint effect of the above ratios upon the profitability with the help of multiple correlation coefficient and multiple regression equation and to test the regression coefficients.
- To ascertain the working capital leverage for examining the sensitivity of ROI to changes in the level of working capital of the company.

For these objectives we formulate the following hypotheses and will attempt to find statistical evidences to support the hypotheses.

Hypothesis H1: There is negative impact of working capital management on profitability.

Hypothesis H2: There is no sensitivity between working capital management and profitability.

ANALYSIS AND IMPLICATION

SECTION 1: SIMPLE CORRELATION ANALYSIS BETWEEN SELECTED RATIOS RELATING TO WORKING CAPITAL MANAGEMENT AND RETURN ON INVESTMENT

It is evident from the table I Correlation Coefficient between ROI and CR is 0.923. It indicated that there is a high positive relation between profitability and current ratio of the company. The value of the correlation coefficient is found to be significant at 5 per cent level.

Secondly correlation between ROI and ATR is 0.922. It shows that there is positive relationship between the two variables. The result from these two ratios that the greater the company's margin of safety to the short-term creditors, and company is able to meet short term obligations, the higher is the profitability of the concern. Thirdly the coefficient of correlation between ROI and CTTR is 0.274. It reveals that there is a negligible positive association between the profitability of the company and the ratio of the current assets to total assets. At five percent level, the value of the correlation coefficient is found to be significant. This sound inconsistent with the earlier results. Fourthly the correlation between CTSR and ROI is 0.315 which is found to be significant at five per cent level. It reveals a positive association between the two variables. Generally speaking, the lower the current assets to sales ratio, the greater the efficiency of the employment of the working capital and the larger the scope of profitability. The calculated value of correlation coefficient between CTSR and ROI conforms to the principle.

Fifthly, the correlation coefficient between WCTR and ROI is (-) 0.116, which indicate a negative correlation between these two variables. This value is found to be significant at five percent level. It is an accepted principle that the faster the working capital turnover, the lower is the relative investment and greater is the profitability. The calculated value of the correlation coefficient between ROI and WCTR don't conform to the accepted principle.

Sixthly, the coefficient of correlation between ROI and ITR is found to be 0.433 it shows a low moderate degree of positive correlation between the variables. Seventhly, the coefficient correlation between ROI and DTR shows negative association of (-)0.37 it is found to be significant at 0.5 level.

Lastly, the coefficient of correlation between ROI and CTR and between ROI and MCTR viewing significant positive association. Hence, the study of the impact of working capital ratios on profitability viewed both negative and positive impacts.

SECTION 2: RELATIONSHIP BETWEEN WORKING CAPITAL RATIOS ON PROFITABILITY –MULTIPLE REGRESSION ANALYSIS

In table III, Multiple correlation and multiple regression techniques have been applied in order to study the joint influence of selected ratios relating to working capital management of the profitability of the company and the regression coefficients have been tested with the help of the most popular T test. In this study, CTTR, ITR, DTR, CTR, and MCTR have been taken as the independent variables and ROI has been taken as the dependent variable.

For the purpose of selection of variables in this analysis, the correlation matrix representing the correlation between independent variables has been constructed in table. This table shows that there is high degree of correlation between CR and ATR is 0.988, between ATR and WTR (-0.408) and between CTTR and WCTR (-0.677). For this reason, CR, ATR, CTSR and WCTR have been taken into account while fitting the regression line. The regression model used in the analysis is:

$$ROI = b_0 + b_1 CTSR + b_2 ITR + b_3 DTR + b_4 CTR + b_5 MCTR$$

Where $b_0, b_1, b_2, b_3, b_4,$ and b_5 are the parameters of the ROI line.

Table III depicts the multiple correlation coefficients and regression coefficient of ROI on CTSR, ITR, DTR, CTR, and MCTR showing the strength of relationship between the dependent variable ROI and all the dependent variables taken together and the impact of independent variables on the profitability of the company. When CTSR increased by one unit the ROI increased by 53.7 units that was statistically significant at 10 percent level. However, for one unit increase in ITR, the profitability of the company decreased by 23.1 units which were statistically insignificant both at 0.5 percent level and 10 percent level. When DTR increased by one unit the ROI of the company increased by 22.9 units that were statistically insignificant both at 0.5 percent and 10 percent level. For one unit increase in CTR, the company's profitability decreased by 60.8 which was significant at 0.01 percent level. When MCTR increased by one unit, the ROI of the company increased 1.2 times which was statistically significant at both levels. The multiple correlations between ROI and CTSR, CTR and MCTR is 0.902. It signifies that the profitability of the company was highly influenced by CTSR, ITR, DTR, CTR, MCTR contributed 0.81 percent of variations in the profitability of the company.

In table IV it has been attempted to measure the sensitivity of ROI due to variability in the level of working capital (gross) with the help of computing the working capital leverage of the company during the study period from 2001 to 2010. The formula used for calculating the working capital leverage is: $WCL = WC/TA + DWC$ where WCL = working capital leverage, WC = working capital investment, total asset investment and DWC = change in working capital investment. In computing

the WCL it has been assumed that the change in working capital investment in the previous years is also maintained in this year also . The higher the degree of WCL, the greater is the risk and vice versa. But at the same time, it increases the possibility of the higher ROI.

Table IV reveals that in 2002 the WCL of the company was the highest during the study period. Which was 0.35 representing the maximum sensitivity of ROI due to changes in the level of working capital investment. In the year 2009 and 2010 WCL concern is the lowest, which was the 0.032 showing the least sensitivity of ROI due to the variability in the level of working capital investment. Therefore variability in working capital investment was maximum helpful in the year 2002 and minimum helpful in 2010 in increasing the profitability of the company. In the remaining years of the study working capital investment made direct impact on profitability of the company. From the table it is understood that the values of WCL are less than one. It signifies that all the years of the study period increase in rate of return on investment was less than proportionate to decline working capital investment.

CONCLUSION

The study on relationship between working capital and profitability revealed that both negative and positive association. Nine ratios selected for the study , two ratios namely WCTR and DTR registered negative association with ROI was found to be insignificant at both 5 percent and 10 percent levels. But there was significant association between remaining working capital ratios and profitability .MCTR was found to have significant association with the profitability.

The slopes of the ROI equation associated with CTSR, ITR, DTR, CTR and MCTR witnessed both positive and negative influence of variations in the independent variables on the profitability of the company of the five regression coefficients of the ROI line, there associated with ITR and CTR showed negative influence on the profitability. For a unit increase in the value of CTSR, DTR AND MCTR there was significant increment in the profitability of the company. The multiple coefficient determination r square makes it clear that 0.81 percent of the total variation in the profitability of the company was explained by five independent variables ,CTSR,ITR,DTR,CTR,MCTR.

The WCL of the company recorded a fluctuating trend during the study period. it is in between 0.032 in the year 2010 and 0.35 in the 2002.the WCL was always less than one .hence, the increase in the profitability of the company was less than the proportion to decrease in working capital.

The analysis was done to find statistical evidence to support the hypotheses. It is found that significant statistical evidence exists to reject the hypotheses (H1 and H2) that the working capital management is negatively associated to the profitability.

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APPENDIX

Table –I SIMPLE CORRELATION ANALYSIS BETWEEN SELECTED RATIOS RELATING TO WORKING CAPITAL MANAGEMENT AND RETURN ON INVESTMENT

Year	CR	ATR	CTTR	CTSR	WCTR	ITR	DTR	CTR	MCTR	ROI
2001	4.19	2.75	0.45	2.16	2.92	5.83	3.22	48.36	11.64	28.31
2002	2.94	2.07	0.68	1.47	1.88	8.59	4.09	131.13	23.36	19.54
2003	2.19	1.31	0.62	1.33	1.73	7.13	3.89	75.03	9.79	12.64
2004	2.14	1.41	0.44	1.78	2.89	6.66	4.22	26.71	2.71	8.35
2005	1.68	1.01	0.58	1.13	1.69	5.51	3.59	35.44	4.32	3.69
2006	1.68	0.97	0.502	1.25	2.05	5.36	4.01	74.19	2.19	5.81
2007	2.31	1.64	0.58	1.36	1.85	8.13	4.62	24.56	3.91	14.62
2008	2.04	1.22	0.37	1.7	2.84	5.92	3.42	47.35	1.6	5.77
2009	1.92	1.29	0.4	1.65	3.2	5.81	3.45	45.14	2.14	6.79
2010	1.29	0.71	0.27	2.49	19.95	5.32	3.54	87.12	0.65	8.78
R-value	.923***	.922***	0.274	0.315	-0.116	0.433	-0.037	0.252	0.699	

Source: Annual reports of the company

Table –II CORRELATION MATRIX

	CR	ATR	CTTR	CTSR	WCTR	ITR	DTR	CTR	MCTR	ROI
CR	1									
ATR	.988**	1								
CTTR	0.285	0.334	1							
CTSR	0.179	0.141	-.765**	1						
WCTR	-0.384	-0.408	-.677*	.763*	1					
ITR	0.334	0.436	.699*	-0.32	-0.37	1				
DTR	-0.151	-0.052	0.526	-0.463	-0.264	.698*	1			
CTR	0.06	0.06	0.247	0.092	0.26	0.278	-0.025	1		
MCTR	.639*	.668*	.656*	-0.102	-0.268	.652*	0.1	.681*	1	
ROI	.923**	.922**	0.274	0.315	-0.116	0.433	-0.037	0.252	.699*	1

Source: Annual reports of the company

TABLE –III MULTIPLE CORRELATIONS AND REGRESSION ANALYSIS

Variable in the equation $ROI=b_0+b_1 CTR+b_2 ITR+b_3 DTR+b_4 CTR+b_5 MCTR$

Model	Unstandardized Coefficients	Standardized Coefficients		T	Sig.
	B	Std. Error	Beta		
1(Constant)	-10.455	21.108		-.495	.646
CTSR	9.619	4.546	.537	2.116	.102
ITR	-1.512	3.710	-.231	-.408	.704
DTR	4.018	7.851	.229	.512	.636
CTR	-.141	.075	-.608	-1.873	.134
MCTR	1.426	.567	1.295	2.513	.066
R=0.902		R ² =0.813		Adjust R ² =0.580	

Source: Annual reports of the company

TABLE –IV WORKING CAPITAL LEVERAGE ANALYSIS

YEAR	WORKING CAPITAL INVESTMENT (Rs in lakhs)	TOTAL ASSETS INVESTMENT (Rs in lakhs)	WORKING CAPITAL LEVERAGE (WL=WC/WC+TA)
2001	314.19	928.69	0.252
2002	792.62	1471.79	0.35
2003	876.57	1835.69	0.323
2004	574.12	2105.24	0.214
2005	914.7	2347.33	0.28
2006	975.64	3186.02	0.234
2007	2041.66	4703.26	0.302
2008	1173.9	5274.09	0.182
2009	1249	5899.4	0.174
2010	220.3	6477.8	0.032

Source: Annual reports of the company

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