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Impact of working capital management on profitability: Evidence from various sectors in the nifty 100 index

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Abstract

This study examines the working capital management of various sectors and various companies from India during the 10 years study period from year 2010 to 2020. Many of the studies advocate a linear relationship between the working capital management and profitability, but in this study we investigate the existence of various possible relationships between various sectors and different companies in that particular sector. The distribution of working capital measure i.e. cash conversion cycle, debtors collection period, creditors payments period and inventory holding period were analyzed across sectors and companies and other factors affecting profitability like leverage, sales growth, firm size, current ratio, GDP growth rate have also been taken into consideration, as control variables.

Keywords: Working capital management, profitability, cash conversion cycle

1. Introduction

Working capital management is one of the most important elements in determining the financial performance of an organization. Working capital management is a concept which determines the ability of the firm to fund the difference between short-term assets and short-term liabilities. The important part in management of working capital lies in maintaining adequate liquidity in day-to-day operations to maintain smooth functioning of the business. Therefore, a firm is required to maintain proper current assets for adequate liquidity. However, the firm's decision about the level of investment in current assets involves a trade-off between risk and return. When the firm invests more in current assets it reduces the risk of illiquidity, but profitability is affected negatively since the opportunity of earning from the excess investment in current assets is lost. The firm therefore is required to have a right balance between investments in fixed assets and current assets.

Every organization whether, profit oriented or not, irrespective of size and nature of business requires proper management of working capital. Therefore, it is possible to say that working capital can be regarded as the wheels of business for the firm and its efficient management can ensure the success and the sustainability of the firm while its inefficient management may lead the firm into a pitfall.

The cash conversion cycle (CCC) is a metric that expresses the time (measured in days) it takes for a company to convert its investments in inventory and other resources into cash flows from sales. Also called the Net Operating Cycle or simply Cash Cycle, CCC attempts to measure how long each net input dollar is tied up in the production and sales process before it gets converted into cash received.

We have analysed the CCC and its characteristics for a period of 10 years from 2010 to 2020 for the different sectors of the Nifty 100 index which comprises the Nifty 50 and Nifty Next 50 Indices.

Research Gap addressed

1. Time period of 2010 to 2020 for working capital management and CCC practices has not been analysed qualitatively or quantitatively.
2. Research analysis on all fifteen sectors (with exception of banking and finance companies) of the Nifty 100 index is not present currently.

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3. Comparison between the Cash Conversion cycle and Working capital management practices between sectors has not been researched and conclusions for the same in Indian stock market are absent.

Materials and Methods

Literature Review

Many researchers have studied working capital management from several interesting viewpoints in different countries across the globe, which we found to be relevant and noteworthy for our research and current study. Herewith is the summary of those research papers. Working capital management is important for eventually creating shareholder value and wealth as it involves blocking funds and opportunity costs for the purpose of manufacturing.

(Deloof, 2003) ^[1] investigated the relationship between working capital and the impact it has on profitability of a company. He used the CCC (Cash conversion cycle) to predict the same. He found a negative relationship between operating income and receivables collection period, inventory turnover period and creditors payment period by using 1009 samples of non financial Belgian firms for a period of 1992 to 1996.

(Lazaridis, Tryfonidis, Dimitrios *et al.*, 2006) ^[2] studies Working Capital management and profitability of listed companies in the greek stock market. Using Pearson's correlation and regression as tools of data analysis this paper shows that there is a significant positive relationship between profitability vs gross operating profit, Cash conversion cycle. The paper emphasizes that the managers of the firm can create value for the shareholders by handling correctly the CCC and keeping AR, AP and Inventory to an optimum level.

(Charitou *et al.*, 2010) ^[3] years of studied was 1998 to 2007, using Pearson Regression (Multivariate analysis)-multivariate regression analysis results indicated that the cash conversion cycle and all its major components; namely, days in inventory, days sales outstanding and creditors payment period, are associated with firm's profitability.

(Mamoun & Al-Debi'e, 2011) ^[4] The results show that less profitable companies wait longer to sell their products, to collect credit sales, and to pay their supplies of goods. Moreover, the results show that regardless of the level of profitability industrial companies in Jordan pay their suppliers before collecting credit sales.

(Napompech, 2012) ^[5] studied effects of Working Capital Management on the Profitability of Thai Listed Firms using multiple regression analysis on 255 listed entities, and the findings of the research showed that only two actions can increase profitability: reducing the inventory conversion period by producing and selling goods faster and reducing the receivables collection period by accelerating collections. The results of this study showed a significant negative relationship between firm profitability and the inventory conversion period and receivables collection period.

(Ernst & Young., 2013; 2014; 2015) ^[6, 10, 15] has based their study on the performance of working capital management of 2600 top companies. A Lot of companies from Europe and the U.S, 600 companies were selected and also from the Asian region that includes China, Indonesia, Malaysia, Singapore, South Korea, Taiwan and Thailand. Their reports clearly indicated the downward sloping performance of

working capital management among Asian companies. The reason for this is the significant influence of the oil and gas industries as well as the metal and mining industries, as usually these types of companies deal with a major share of total sales. To top it up, they also indicated about the survey in the Malaysian context, the cash conversion cycle (CCC) increased from 51 to 59 days between 2012 and 2015.

(Pun Thapa, 2013) ^[8] studied the food and beverages industry for years 2000 to 2009, using regression as a tool, The working capital measure, the cash conversion cycle was positively related to the profitability and cash flow. On the other hand the cash conversion cycle was negatively associated with leverage, growth, size, age and fixed assets to total assets ratio. The study also examined the non-linear relationship between profitability and the cash conversion cycle.

(Makori & Jagongo, 2013) ^[9] The study found out the existence of negative correlation between Return on Assets and the firm's average collection period and cash conversion cycle. However, the study findings suggests that there is a positive correlation between Return on Inventory Holding Period and Accounts Payment Period

(Akoto *et al.*, 2013) ^[7] Accounts receivable days (ARD) portray a negative and statistically significant relationship with return on equity (ROE). This finding implies that listed manufacturing firms in Ghana will tremendously increase their profitability if they reduce their average collection period.

(Kamau & Ayuo, 2014) ^[11] in their study, they have found a positive relationship between Current Liabilities to Total Assets and ROE. They have used 13 manufacturing companies of Kenya as a sample in this study for the time period of ten years.

(T.A.N.R Jayarathne, 2014) ^[12] studied the impact of Working Capital Management on Profitability From Listed Companies in Sri Lanka, he performed OLS regression on 20 companies and the result shows that a liberal credit policy tends to decrease the profitability. Moreover, large companies get more benefits from the delay in payment to their creditors.

(Aggarwal & Chaudhary, 2015) ^[13] (IIT Delhi) studied the effect working capital management on the profitability of Indian firms belonging to Energy and resources, materials and construction, industrials, consumer products, technology sectors, the years of study were 2010 to 2014, using method of panel regression they concluded that Working capital is a significant segment of the capital of a firm that assists with doing the everyday exercises. The results suggest that quick cash conversion cycle, quick collection of accounts receivables and small inventory periods have a positive correlation with earning higher profits. Also it depends on the industry, different industries affect the gross operating profits differently.

(Pais & Gama, 2015) ^[14] In this study, a negative relationship with profitability was found for Accounts payable, Accounts receivable, Inventory and Cash conversion cycle variables

(Ganesan, 2017) ^[18] This study found evidence that even though "days working capital" is negatively related to profitability, it is not significantly impacting the profitability of firms in the telecommunication equipment industry.

(Ng *et al.*, 2017) ^[17] The outcome of this research explains

that GOI is negatively related to investment policies but positively related with the financing policies. Moreover, as they conducted the regression analysis of the efficiency of working capital management, the research paper finds cash conversion cycle is positively related to GOI. Hence it confirms that working capital management is positively related to firms' profitability. Likewise, the firms that wish to increase profitability can do it by reducing the period of collecting account receivables.

(Ahmed *et al.*, 2017) ^[16] The main aim of this research paper was to examine the impact of working capital management on profitability of the Bangladeshi textile companies. The analysis of the study proved that there is a significant positive relationship between working capital management and profitability in the textile companies. This study revealed the two most important ratios that had a significant impact on profitability of the textile companies were the Current ratio and Current liabilities to total assets.

(Nobanee, 2018) ^[19] The results show a negative and significant relationship between net trade cycles as a comprehensive measure of the efficiency in working capital management and profitability for the full sample. The result of the relationship between net trade cycle and profitability for small firms is positive and insignificant and for big firms

is negative and significant.

(Korent & Orsag, 2018) ^[20] Working capital management impacts profitability and risk of a company has gained a lot of importance in the last 10-15 years. In this research paper The results show that macroeconomic conditions working capital management significantly affects the profitability of Croatian software firms Confirming that there is a positive relation between the Working capital management and profitability.

Data and Research Methodology

2.1 Sampling and Design

The study consists of a sample of companies from 15 different sectors all part of the Nifty 100 Index which comprises Nifty 50 & Nifty Next 50 Index. The Financial Services sector was excluded since the ratios for this sector are different from other sectors and hence it won't be a like to like comparison. Top 5 firms as per market capitalisation are selected from each of these 15 sectors for the purpose of this study. The study comprises a period of 10 years, from 2010 to 2020. The sample data of selected firms was taken from the financial statements of the respective firms and from moneycontrol. Data thus obtained was a panel data set having 750 data points.

Fig. Table 1: Description of how sample sectors were selected

Number of sectors listed in NSE - NIFTY 50 and NIFTY next 50	17
(-) Financial services sectors	-2
Remaining non-financial sectors	15

The 15 sectors are as follows

Fig. Table 2: Classification of firms

List of sectors from NIFTY 50 and NIFTY next 50	
1. Automobile	9. Industrial Manufacturing
2. Cement	10. Metals
3. Chemicals	11. Fertilizers & Pesticides
4. Engineering Construction	12. Pharma
5. Consumer Goods	13. Media & Entertainment
6. Energy - Oil & Gas	14. Telecommunication
7. Energy - Power	15. Textile
8. IT	

2.2 Research Hypothesis:

1. Ho: There is no significant positive relationship between Profitability and Inventory Holding period
2. Ho: There is no significant positive relationship between Profitability and Receivables Holding period
3. Ho: There is no significant positive relationship between Profitability and Payable Holding period
4. Ho: There is no significant positive relationship between Profitability and Cash Conversion Cycle Period.

2.3 Explanatory and Control Variables:

To analyze the impact of working capital on profitability, the profitability ratio used is the Return on Equity and Return on Total Assets and the efficiency variables used are average inventory days, creditors payment period, debtor collection period and the cash conversion cycle. These ratios have been calculated from the financial statements of the given firms obtained from the database.

Fig. Table 3: Variables and Abbreviations

Abbreviation	Variable / Ratio	Formula
AD	Average Debtors	$\frac{((\text{Debtors } n * (1 - (\text{Profit } n + \text{Depreciation } n / \text{Gross Sales } n)) + (\text{Debtors } n-1 * (1 - (\text{Profit } n-1 + \text{Depreciation } n-1 / \text{Gross Sales } n-1))))}{2}$
AC	Average Creditors	$\frac{(\text{Creditors } n + \text{Creditors } n-1)}{2}$
AI	Average Inventory	$\frac{((\text{Inventory } n * (1 - (\text{DA } n / (\text{DA } n + \text{COGS } n))) + (\text{Inventory } n-1 * (1 - (\text{DA } n-1 / (\text{DA } n-1 + \text{COGS } n-1))))}{2}$
ARP	Accounts Receivable Period	$(\text{Average Debtors} / \text{Cash cost of sales} + \text{Excise duty}) * 365$
APP	Accounts Payable Period	$(\text{Average Creditors} / \text{Cash cost of sales} + \text{Excise duty}) * 365$
IHP	Inventory Holding Period	$(\text{Average Inventory} / \text{Cash cost of sales} + \text{Excise duty}) * 365$
CCC	Cash Conversion Cycle	$(\text{ARP} + \text{IHP}) - \text{APP}$
ROA	Return on Total Assets	$\text{PAT} / \text{Total Assets}$
ROE	Return on Shareholders Equity	$\text{PAT} / \text{Total Shareholders fund}$
CCOS	Cash Cost of Sales	$\text{Net sales} - \text{EBITDA}$
GOPR	Gross Operating Profit Ratio	$\text{Sales} - \text{COGS} / (\text{Total assets} - \text{financial assets})$

We studied the relationship between Return on Total Assets (ROA) with Working Capital Management of firms through four models as below:

$$\begin{aligned} \text{ROA} &= b_0 + b_1 * \text{IHP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROA} &= b_0 + b_1 * \text{ARP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROA} &= b_0 + b_1 * \text{APP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROA} &= b_0 + b_1 * \text{CCP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \end{aligned}$$

We also studied the relationship between Return on Shareholders Equity (ROE) with Working Capital Management of firms through four models as below:

$$\begin{aligned} \text{ROE} &= b_0 + b_1 * \text{IHP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROE} &= b_0 + b_1 * \text{ARP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROE} &= b_0 + b_1 * \text{APP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{ROE} &= b_0 + b_1 * \text{CCP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \end{aligned}$$

We studied the relationship between Gross Operating Profit Ratio (GOPR) with Working Capital Management of firms through four models as below:

$$\begin{aligned} \text{GOPR} &= b_0 + b_1 * \text{IHP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \\ \text{GOPR} &= b_0 + b_1 * \text{ARP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error} \end{aligned}$$

$$\text{GOPR} = b_0 + b_1 * \text{APP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error}$$

$$\text{GOPR} = b_0 + b_1 * \text{CCP} + b_2 * \text{SIZE} + b_3 * \text{GGRt} + b_4 * \text{LEVERAGE} + b_5 * \text{SGR} + b_6 * \text{CR} + \text{Error}$$

The distribution of working capital measure i.e. cash conversion cycle and factors affecting viz. Leverage ratio, GDP growth rate (GGR), Size, Sales growth rate (SGR) and Current Ratio (CR), etc. has also been studied.

The models above are created after considering the fact that profitability will not only be affected by working capital management. There will be several other things that will affect a company's profit. Some of these things are:

1. The size of the company which is Natural log of the annual sales (Size)
2. The YoY sales growth rate of the company (SGR)
3. The YoY GDP growth rate of the country (GGR)
4. The Leverage ratio of the Company which tells us how much assets are financed using debt (LEV)
5. The Current Ratio of the company which tells us how much units of Current Assets the company has for per unit Current liabilities (CR)

All these factors are included in the regression model as control variables. Hence these factors will be constant throughout all the models. The only difference in these models will be that each one of them will have a different working capital management ratio like IHP, ARP, APP and CCC. So since all the other things are kept constant the output of the regression will tell us the relationship between the individual Working Capital Management ratios and

profitability.

For analyzing the relationship between working capital management and profitability for companies within a single sector, one company with the highest market capitalization will be considered as the base company and other companies will be assigned dummy variables to run panel regression between different companies within the same sector and across a period of ten years. The results of the eight models mentioned above will be analyzed individually to determine how the working capital management is affecting profitability of these companies and to determine which company is earning better profits because of better working capital management. Similarly while analyzing the relationship between working capital management and profitability for all the fifteen sectors. One sector will be considered as the base sector, rest fourteen sectors will be assigned dummy variables to run Panel regression between sectors across a period of ten years. The results of all the Eight models will again be analyzed individually to determine whether working capital management is affecting profitability of all the sectors and which sector is getting a competitive advantage owing to better working capital management.

2.4 Problems encountered during data cleansing and their solutions

(i) **Heteroskedasticity:** One of the assumptions of regression is that the variance of the error term should be constant. If it is changing, then we call it heteroskedasticity. These are of two types: conditional and unconditional heteroskedasticity. There are two methods to detect and correct this issue. We can either draw a visual plot or perform Breusch-Pagan Test.

(ii) **Serial Correlation:** One of the assumptions of regression is that the error terms should be independent of each other. If error terms are correlated, then we have the issue of serial correlation. To detect and correct this we can use Durbin-Watson Test.

(iii) **Multicollinearity:** Multicollinearity refers to when two or more independent variables (or combinations of independent variables) are highly (but not perfectly) correlated with each other. With multicollinearity, the regression coefficients may not be individually statistically significant even when the overall regression is significant as shown by the *F*-statistic.

Data Interpretation & Analysis

The method of Ordinary Least Squares (OLS) regression was employed to study the relationship between profitability and working capital. The gross operating profit, return on assets and return on equity were taken as the dependent variable. For the independent variables, only one of average inventory holding period, debtors' collection period, creditors' payment period and the cash conversion cycle was taken at a time. The control variables – size of the company, sales growth, GDP growth rate, leverage ratio and current ratio were taken in all the regressions. To incorporate for the effect of industries, some industry dummy variables were also taken. The sample has been divided into fifteen categories –IT, Metals, Chemicals, Pesticides, Engineering construction, Industrial manufacturing, Consumer goods, Energy- Oil and gas, Power, Pharmaceutical, Telecom, Cement, Automobile, Textile and Media. The Information Technology (IT) industry was taken as the comparison industry and all other industries were assigned a dummy variable- IT, Metals, Chemicals, Pesticides, Engineering construction, Industrial manufacturing, Consumer goods, Energy- Oil and gas, Power, Pharma, Telecom, Cement, Automobile, Textile and Media for the order specified above. The regression analysis has been done to study the collective impact of all the industries as well as to analyze any differences between different types of industries identical in all other respects. The regression models including the dummy variable have been presented alongside. The test for the significance of the included dummy variable has also been presented in each case.

Regression results with Gross Operating Profit Ratio

(A) Effect of creditors payment period on gross operating profit ratio

The results, tabulated suggest that there is a significant positive relationship between the creditors payment period and gross operating profit ratio of the firm. There is a positive but insignificant relationship between the IT sector and other sectors like Chemicals, Pesticides, Consumer goods, Power, Telecom, Cement and Automobile sector, while the correlation with other industries is negative. This suggests that if everything else remains constant then for a given level of CPP the automobile industry has higher GOPR as compared other industries.

Fig. Table 4: Effect of creditors payment period on gross operating profit ratio

Regression Statistics				
Multiple R				0.932461014
R Square				0.869483542
Adjusted R Square				0.846177032
Standard Error				0.10806321
Observations				150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.21780498	0.653504179	-0.33329	0.039748
Size	0.0949563	0.046617451	2.036926	0.044806
CR	-0.105080647	0.032223894	-3.26095	0.001605
SGR	-0.242311152	0.12447918	-1.9466	0.044925
LEV	0.12067644	0.290864475	0.414889	0.037928
GGR	0.201378317	0.85407729	0.235785	0.014174

CPP	0.00188774	0.001077659	-1.7517	0.043474
Metals	-0.023338693	0.089594144	-0.26049	0.795121
Chemicals	0.264085104	0.14629302	1.805179	0.07463
Pesticides	0.02165362	0.144048114	0.150322	0.880871
Engineering Construction	-0.377471062	0.158878882	-2.37584	0.019784
Industrial Manufacturing	-0.33511225	0.137570101	-2.43594	0.016967
Consumer goods	0.345817518	0.073974229	4.674838	1.11E-05
Energy - Oil & Gas	-0.381323525	0.121587416	-3.13621	0.002359
Power	0.001239026	0.10234333	0.012107	0.990369
Pharma	-0.092147708	0.099261271	-0.92833	0.355894
Telecom	0.816404671	0.565390417	1.443966	0.155244
Cement	0.806984624	0.448337494	1.799949	0.078155
Automobile	1.811825888	0.424449973	4.268644	9.22E-05
Textile	-0.688500199	0.791846358	-0.86949	0.388908
Media	-2.485280119	0.929661546	-2.67332	0.010233

(B) Effect of debtors collection period on gross operating profit ratio

The results, tabulated in table 5 suggest that there is a negative correlation between the debtors collection period and gross operating profit ratio, the coefficient is statistically significant at the 5% level. The firm size, the leverage ratio, GDP growth rate are positively correlated while the sales growth rate and current ratios negatively correlated. The relationship between chemicals, consumer

goods, telecom, cement, automobile with respect to Information Technology is positive, while the correlation of other industries are negative. This suggests that for a given debtors collection period, keeping the control variables- firm size, the leverage ratio, GDP growth rate, sales growth rate and current ratios as constant the automobile industry earns the highest gross operating profit and media earns the lowest.

Fig. Table 5: Effect of debtors collection period on gross operating profit ratio

Regression Statistics	
Multiple R	0.930501522
R Square	0.865833083
Adjusted R Square	0.841874704
Standard Error	0.109564016
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.32018581	0.659110313	-0.48578	0.028384
Size	0.098502722	0.047589482	2.069842	0.041539
CR	-0.10034217	0.033069748	-3.03426	0.003209
SGR	-0.257991577	0.128855289	-2.00218	0.048492
LEV	0.22495696	0.28721629	0.783232	0.043569
GGR	0.484516734	0.863878661	0.560862	0.037638
DCP	-0.000807808	0.000965875	-0.83635	0.040533
Metals	-0.166378253	0.091391057	-1.82051	0.072243
Chemicals	0.236956494	0.147581039	1.605603	0.112114
Pesticides	-0.079131526	0.130978032	-0.60416	0.547366
Engineering Construction	-0.556745856	0.109720888	-5.0742	2.3E-06
Industrial Manufacturing	-0.406240517	0.153646495	-2.64399	0.009775
Consumer goods	0.256449512	0.089863602	2.853764	0.005439
Energy - Oil & Gas	-0.443544702	0.14170282	-3.1301	0.002404
Power	-0.069305778	0.102283016	-0.67759	0.499895
Pharma	-0.109346154	0.106675419	-1.02504	0.308289
Telecom	0.359035316	0.610047084	0.588537	0.558931
Cement	0.586485999	0.517916171	1.132396	0.263093
Automobile	1.491014307	0.567557277	2.627073	0.011527
Textile	-0.389052982	0.895613968	-0.4344	0.665946
Media	-2.690131497	0.947023174	-2.84062	0.006587

(C) Effect of inventory holding period on gross operating profit ratio

The table presents the regression results when the gross operating profit ratio is regressed on inventory holding period and the control variables. The results are tabulated in table 6. Here the inventory days includes the inventory period of the raw material, work-in-process and the finished

goods. The t-test shows that the results are significant at the 5% level. As seen in the results, when the number of days in the inventory increases by one, the profitability of the firm decreases. This is as expected in reality because longer periods of storage mean higher storage costs and lower inventory turnover ratio. The relationship between Chemicals, Consumer goods, Telecom, Automobile,

Cement are positive with respect to information technology while it is negative for the rest of the industries. The results suggest that for a given inventory and control variables, the

Automobile industry earns a higher gross operating profit ratio than all the given industries.

Fig. Table 6: Effect of inventory holding period on gross operating profit ratio

Regression Statistics				
Multiple R				0.930053753
R Square				0.864999984
Adjusted R Square				0.840892838
Standard Error				0.109903654
Observations				150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.43996074	0.693050803	-0.63482	0.005273
Size	0.099382693	0.049211899	2.019485	0.046625
CR	-0.091412615	0.032300435	-2.83007	0.00582
SGR	-0.225329577	0.129089216	-1.74553	0.008455
LEV	0.292528586	0.286115318	1.022415	0.030952
GGR	0.490618761	0.886527452	0.553416	0.005814
IPP	-0.001062075	0.002525959	0.420464	0.006752
Metals	-0.192680765	0.189034211	-1.01929	0.310992
Chemicals	0.195233927	0.180015612	1.084539	0.281229
Pesticides	-0.157444493	0.198728115	-0.79226	0.43044
Engineering Construction	-0.615038075	0.103717099	-5.92996	6.51E-08
Industrial Manufacturing	-0.60858985	0.267370037	-2.27621	0.025378
Consumer goods	0.25091957	0.142325146	1.763002	0.081537
Energy - Oil & Gas	-0.430293343	0.163865894	-2.62589	0.010268
Power	-0.081291509	0.125169145	-0.64945	0.517817
Pharma	-0.253619948	0.263903881	-0.96103	0.339295
Telecom	0.524346006	0.555762929	0.943471	0.350165
Cement	0.651446622	0.532364104	1.223686	0.227044
Automobile	1.72864075	0.442267877	3.908583	0.000291
Textile	-1.16966727	1.343333752	-0.87072	0.388241
Media	-2.659103283	0.951640434	-2.79423	0.007454

(D) Effect of cash conversion cycle on gross operating profit ratio

Table 7 represents the regression results when the gross operating profit ratio is regressed on cash conversion cycle and the control variables. As seen in the results, the profitability is negatively correlated with the cash conversion cycle and the coefficient is significant at the 5% level. This is as expected in reality because small cycles

lead to higher turnover ratio and hence higher profitability. There is a positive relationship between Chemicals, Consumer goods, Telecom, Cement, Automobile with respect to Information Technology, the rest of the industries have a negative relationship. It is inferred that for a given cash conversion cycle and control variables, the Automobile industry generates higher gross operating profit than all the given industries.

Fig. Table 7: Effect of cash conversion cycle on gross operating profit ratio

Regression Statistics				
Multiple R				0.930243806
R Square				0.865353538
Adjusted R Square				0.841309527
Standard Error				0.109759646
Observations				150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.374387694	0.66026774	-0.567024059	0.0057221
Size	0.093848298	0.047344783	1.982231035	0.005072264
CR	-0.091247684	0.032133929	-2.839605606	0.005664291
SGR	-0.220700504	0.12870245	-1.714811986	0.009006691
LEV	0.271671061	0.281936307	0.963590194	0.033801727
GGR	0.345030552	0.864338619	0.399184469	0.006907704
CCC	-0.000452226	0.000716988	0.630730635	0.00529929
Metals	-0.101124633	0.077544924	-1.304078043	0.19576921
Chemicals	0.226895429	0.148938158	1.523420411	0.131409622
Pesticides	-0.101890206	0.130507468	-0.780723189	0.437159973
Engineering Construction	-0.577139107	0.103503115	-5.576055436	2.92245E-07

Industrial Manufacturing	-0.563044269	0.136335427	-4.12984565	8.53001E-05
Consumer goods	0.316955967	0.074345352	4.263292285	5.24456E-05
Energy - Oil & Gas	-0.370698046	0.125563438	-2.952276967	0.00408875
Power	-0.039829847	0.10087463	-0.394845038	0.693958064
Pharma	-0.203132378	0.126875461	-1.601037556	0.113122968
Telecom	0.756055047	0.598629297	1.262977021	0.212698284
Cement	0.784653732	0.454743684	1.725485719	0.090873419
Automobile	1.928645663	0.474731784	4.062600671	0.000178731
Textile	-1.382669673	1.199715982	-1.152497502	0.25482423
Media	-2.558373334	0.941893238	-2.716203102	0.009153459

Regression results with Return on assets

(A) Effect of creditors payment period on return on assets

The table below suggests that there is a positive correlation between the creditor's payment period and return on assets of the firms and the coefficient is statistically significant. The relationship of Chemicals, Pesticides, Engineering

Construction, Industrial Manufacturing, Consumer goods, Pharma with respect to Information Technology are positive but insignificant, while the correlation with other industries are negative. Hence it can be inferred that the Industrial Manufacturing industry has higher return on assets than the rest of the industries.

Fig Table 8: Effect of creditors payment period on return on assets

Regression Statistics	
Multiple R	0.798578528
R Square	0.637727666
Adjusted R Square	0.573036177
Standard Error	0.067972334
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.937134063	0.411057607	-2.279811993	0.025153259
Size	0.085219216	0.029322625	2.906261506	0.004675653
CR	0.030449249	0.020269001	1.502257039	0.013678086
SGR	0.092398561	0.078298067	1.180087375	0.02412966
LEV	0.368334627	0.182955303	2.01324925	0.047290505
GGR	-0.165439283	0.537219162	-0.307954918	0.00758879
CPP	0.002364059	0.000677853	-3.487567405	0.000778166
Metals	-0.049241844	0.056355193	-0.873776506	0.384731188
Chemicals	0.164721338	0.092019088	1.790077915	0.077044718
Pesticides	0.150734818	0.09060703	1.663610623	0.099916937
Engineering Construction	0.093634953	0.099935662	0.936952343	0.351469148
Industrial Manufacturing	0.247308749	0.086532326	2.857992631	0.005373959
Consumer goods	0.105482806	0.046530184	2.266975926	0.025960515
Energy - Oil & Gas	-0.349901887	0.076479132	-4.575128895	1.62867E-05
Power	-0.174336258	0.064374499	-2.70815711	0.008196636
Pharma	0.073657714	0.062435868	1.179733964	0.241436404
Telecom	-0.255032875	0.054966736	-4.639767471	2.71671E-05
Cement	-0.181646587	0.043586959	-4.167452658	0.000127794
Automobile	-0.057395025	0.041264636	-1.390901047	0.170669983
Textile	-0.147522715	0.076982575	-1.916313081	0.061290331
Media	-0.526471191	0.09038084	-5.825030943	4.63413E-07

(B) Effect of debtors collection period on return on assets

The results, tabulated, suggest that there is a negative correlation between the debtors collection period and return on assets of the firm, the coefficient is statistically significant. The correlations between Chemicals, Pesticides, Industrial Manufacturing, Consumer goods, Pharma and Information Technology are positive but insignificant, while the correlation with other industries is negative. This

suggests that for a given size of the company, sales growth, GDP growth rate, leverage ratio and current ratio, the positively correlated industries have higher return on assets than the information technology industry. Also, it can be concluded that for a given debtors collection period, keeping the control variables constant the Industrial Manufacturing industry has the highest return on assets and media has the lowest.

Fig. Table 9: Effect of debtors collection period on return on assets

Regression Statistics	
Multiple R	0.770148494

R Square	0.593128703
Adjusted R Square	0.520473114
Standard Error	0.072034928
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.073130785	0.4333445	-2.476391843	0.015278442
Size	0.088487362	0.031288602	2.828102133	0.005853183
CR	0.038187424	0.021742329	1.756363059	0.008267101
SGR	0.078270649	0.084718339	0.923892633	0.035818862
LEV	0.510975388	0.188835764	2.705924857	0.008247403
GGR	0.168299062	0.567973311	0.29631509	0.007677208
DCP	-0.000808829	0.000635033	-1.273679964	0.020628995
Metals	-0.216532498	0.060086773	-3.603663257	0.000530716
Chemicals	0.131085869	0.097029936	1.350983773	0.18032847
Pesticides	0.020713991	0.086113976	0.24054157	0.81049654
Engineering Construction	-0.141686663	0.072138066	-1.964103968	0.052825077
Industrial Manufacturing	0.133621984	0.101017784	1.322757026	0.189506064
Consumer goods	0.005200087	0.059082519	0.088013974	0.930075059
Energy - Oil & Gas	-0.413143611	0.093165191	-4.434527626	2.77473E-05
Power	-0.257718732	0.067247897	-3.832368648	0.000244191
Pharma	0.041881795	0.070135765	0.597153177	0.552011377
Telecom	-0.179893498	0.07792132	-2.308655685	0.025313696
Cement	-0.195574108	0.066153437	-2.95637107	0.004815548
Automobile	-0.081762103	0.072494096	-1.127844992	0.264991539
Textile	-0.103913813	0.11439678	-0.908363092	0.368224717
Media	-0.488870087	0.120963279	-4.041475171	0.000191151

(C) Effect of inventory holding period on return on assets

The table presents the regression results when the return of assets is regressed on inventory holding period and the control variables. The results are tabulated in table 10. Here the inventory days includes the inventory period of the raw material, work-in-process and the finished goods. The t-test shows that the results are significant at the 5% level. As seen in the results, when the number of days in the

inventory increases by one, the profitability of the firm decreases. This is as expected in reality because longer periods of storage mean higher storage costs and lower inventory turnover ratio. The relationship between Information Technology and Chemicals is positive but insignificant while it is negative for the rest of the industries. The results suggest that for a given inventory and control variables, the Chemicals industry generates higher return on assets than all the given industries.

Fig. Table 10: Effect of inventory holding period on return on assets

Regression Statistics	
Multiple R	0.767736313
R Square	0.589419046
Adjusted R Square	0.516101018
Standard Error	0.072362573
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.232234029	0.456317303	-2.700388569	0.008374549
Size	0.091818874	0.032402013	2.833739813	0.005759899
CR	0.047897773	0.021267196	2.252190326	0.026918557
SGR	0.115704223	0.084994697	1.361311086	0.017705597
LEV	0.58727463	0.188383549	3.117441161	0.002497956
GGR	0.213737882	0.583705862	0.366173953	0.007151559
IHP	-0.00153212	0.001663137	0.921222809	0.035957236
Metals	-0.275289698	0.124463576	-2.211809321	0.02969506
Chemicals	0.070303412	0.118525566	0.593149769	0.554674617
Pesticides	-0.085569135	0.130846219	-0.653967197	0.514919332
Engineering Construction	-0.206772592	0.068289232	-3.027894543	0.003270093
Industrial Manufacturing	-0.115020167	0.176041315	-0.653370301	0.515302065
Consumer goods	-0.023228812	0.093709475	-0.247881146	0.804831309
Energy - Oil & Gas	-0.419830561	0.107892297	-3.891200519	0.000199063
Power	-0.283731789	0.082413651	-3.44277661	0.000900085
Pharma	-0.148247447	0.173759134	-0.853177868	0.395986984
Telecom	-0.206296169	0.050388796	-4.094088087	0.000161659

Cement	-0.340124766	0.048267318	-7.04668868	6.23615E-09
Automobile	-0.100762349	0.040098655	-2.51286108	0.015388188
Textile	-0.822459521	0.121794684	-6.75283594	1.76023E-08
Media	-0.552178797	0.086281422	-6.399741519	6.12807E-08

(D) Effect of cash conversion cycle on return on assets

Table 11 represents the regression results when the return on assets is regressed on cash conversion cycle and the control variables. As seen in the results, the profitability is negatively correlated with the cash conversion cycle and the coefficient is significant at the 5% level. This is as expected in reality because small cycles lead to higher turnover ratio

and hence higher profitability. The relationship between Information Technology and Chemicals, Consumer goods are positive but insignificant. It can also be inferred that for a given cash conversion cycle and control variables, Chemical industry generates higher return on assets than all the given industries.

Fig. Table 11: Effect of cash conversion on return on assets

Regression Statistics	
Multiple R	0.771885512
R Square	0.595807243
Adjusted R Square	0.523629965
Standard Error	0.071797424
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.139776738	0.431903024	-2.638964475	0.009909837
SIZE	0.08383679	0.030969792	2.70705044	0.008221769
CR	0.048311458	0.021019868	2.298371095	0.024025206
SGR	0.123795321	0.084188541	1.470453341	0.014517503
LEV	0.557068811	0.184423888	3.020589235	0.003341984
GGR	-0.00148358	0.565392553	-0.002623982	0.009979126
CCC	-0.000694013	0.000469006	1.479753314	0.014267988
Metals	-0.141547604	0.050724706	-2.790506144	0.006511555
Chemicals	0.114926838	0.097425388	1.179639527	0.241473773
Pesticides	-0.006128083	0.085369262	-0.071783253	0.942945039
Engineering Construction	-0.150012894	0.06770482	-2.215690029	0.029417753
Industrial Manufacturing	-0.054729672	0.089181524	-0.613688459	0.541079573
Consumer goods	0.073337697	0.04863176	1.508020624	0.135301264
Energy - Oil & Gas	-0.3325361	0.082135209	-4.048642536	0.000114185
Power	-0.223026185	0.06598544	-3.379930228	0.0011018
Pharma	-0.080296732	0.082993446	-0.967506896	0.336068124
Telecom	-0.177772439	0.076454249	-2.325213349	0.024334912
Cement	-0.169502136	0.058077823	-2.918534577	0.005338868
Automobile	-0.063617589	0.060630614	-1.049265136	0.299310573
Textile	-0.045784744	0.153222344	-0.298812451	0.766373036
Media	-0.483207295	0.120294379	-4.016873419	0.00020667

Regression results with Return on equity**(A) Effect of creditors payment period on return on equity**

The test results between creditors payment period and return on equity suggest that there is a positive correlation between creditors payment period and return on equity. The coefficient is statistically significant. The relationship between Chemicals, Pesticides, Engineering Construction,

Industrial Manufacturing, Consumer goods, Pharma and Information Technology are positive but insignificant, while the correlation with other industries are negative. Hence it can be inferred that the Industry Manufacturing industry has higher return on equity than the rest of the industries. The control variables size of the company, sales growth, GDP growth rate, leverage ratio and current ratio has been kept the same as in previous cases.

Fig. Table 12: Effect of creditors payment period on return on equity

Regression Statistics	
Multiple R	0.766277076
R Square	0.587180558
Adjusted R Square	0.5134628
Standard Error	0.167386548
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-2.810006306	1.012257627	-2.775979386	0.006783616

Size	0.221478233	0.07220898	3.067184051	0.002907439
CR	0.064994985	0.049913809	1.302144378	0.01964263
SGR	0.279972583	0.192814375	1.452031694	0.015021778
LEV	1.356375238	0.450540016	3.010554423	0.003443126
GGR	0.011482923	1.322939132	0.008679857	0.009930951
CPP	0.005659096	0.00166926	-3.390181927	0.001066222
Metals	-0.030379926	0.138778539	-0.218909394	0.827251647
Chemicals	0.494072806	0.226603333	2.180342184	0.032029375
Pesticides	0.478832909	0.223126043	2.146019811	0.034756538
Engineering Construction	0.296303737	0.246098441	1.204004931	0.2319695
Industrial Manufacturing	0.70884215	0.213091803	3.326463709	0.001306182
Consumer goods	0.260071157	0.114583777	2.26970313	0.025787119
Energy - Oil & Gas	-0.808892551	0.188335122	-4.294963898	4.66683E-05
Power	-0.362936735	0.158526632	-2.289436996	0.024562539
Pharma	0.32099231	0.153752619	2.087719297	0.039852619
Telecom	-0.341671633	0.239887212	-1.424301157	0.160828443
Cement	-0.294308312	0.190223301	-1.547172774	0.128390111
Automobile	-0.075292515	0.180088161	-0.418086979	0.67774809
Textile	-0.77751627	0.335969287	-2.314248058	0.024979249
Media	-0.306666926	0.394442335	-0.777469604	0.440696934

(B) Effect of debtors collection period on return on equity

The results suggest a negative correlation between the debtors collection period and return on equity of the firm also the coefficient is statistically significant. The relationship between Chemicals, Pesticides, Industrial Manufacturing, Pharma when compared to Information Technology are positive but insignificant, while the correlation with other industries is negative. This suggests

that for a given size of the company, sales growth, GDP growth rate, leverage ratio and current ratio, the positively correlated industries have higher return on equity than the information technology industry. Also, it can be concluded that for a given debtors collection period, keeping the control variables constant the Industrial Manufacturing industry has the highest return on equity and energy has the lowest.

Fig. Table 13: Effect of debtors collection period on return on equity

Regression Statistics				
Multiple R	0.740329645			
R Square	0.548087983			
Adjusted R Square	0.467389409			
Standard Error	0.175132774			
Observations	150			

	Coefficients	Standard Error	t Stat	P-value
Intercept	-3.103331117	1.053555911	-2.945578002	0.004169735
SIZE	0.234158776	0.076069482	3.078222311	0.00281249
CR	0.076048982	0.052860391	1.438676133	0.0153958
SGR	0.223343199	0.205968939	1.084353788	0.028131045
LEV	1.647945485	0.459101328	3.589502763	0.000556309
GGR	0.896683802	1.380868198	0.649362338	0.041787589
DCP	-0.002775896	0.001543905	-1.797970647	0.045774506
Metals	-0.479868229	0.146084179	-3.284874745	0.001489243
Chemicals	0.412155349	0.235901142	1.747152831	0.084265648
Pesticides	0.183344212	0.209362041	0.875728051	0.383675222
Engineering Construction	-0.222244647	0.175383526	-1.267192263	0.208588495
Industrial Manufacturing	0.538599968	0.24559648	2.193028042	0.031069703
Consumer goods	-0.028159641	0.143642616	-0.196039604	0.84505265
Energy - Oil & Gas	-1.021059688	0.226505095	-4.507888385	2.10363E-05
Power	-0.58308457	0.163494447	-3.566387608	0.000600617
Pharma	0.287316611	0.170515491	1.684988324	0.095702813
Telecom	-0.754989674	0.277903816	-2.716730146	0.009140872
Cement	-0.478117627	0.235934051	-2.026488436	0.048290387
Automobile	-0.341459191	0.258547802	-1.32068108	0.19287011
Textile	-0.535503322	0.407992343	-1.312532775	0.19558196
Media	-0.493004188	0.431411542	-1.142770047	0.258802157

(C) Effect of Inventory holding period on return on equity

The table presents the regression results when the return of equity is regressed on inventory holding period and the control variables. The results are tabulated in table 14. Here the inventory days includes the inventory period of the raw material, work-in-process and the finished goods. The t-test shows that the results are insignificant at the 5% level. As seen in the results, when the number of days in the inventory increases by one, the profitability of the firm

decreases. This is as expected in reality because longer periods of storage mean higher storage costs and lower inventory turnover ratio. The relationship between Chemicals, Consumer goods, Cement, Automobile with respect to Information Technology is positive but insignificant whereas the relationship with Textile is positive but the p value is significant. It is inferred that for a given inventory and control variables, the Textile industry generates higher return on equity than all the given industries.

Fig. Table 14: Effect of Inventory holding period on return on equity

Regression Statistics	
Multiple R	0.729963224
R Square	0.532846309
Adjusted R Square	0.449426007
Standard Error	0.178061642
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-3.422545127	1.122854053	-3.048076568	0.003078868
Size	0.231405003	0.079731212	2.902313896	0.004729458
CR	0.104919491	0.052331913	2.004885472	0.048195793
SGR	0.324427366	0.209145345	1.551205291	0.012461217
LEV	1.859766959	0.463552949	4.011983878	0.000130111
GGR	0.824921853	1.436317422	0.574331161	0.04672786
IHP	-0.002544527	0.00409246	0.621759616	0.043578384
Metals	-0.493808635	0.306265903	-1.612352629	0.1106363
Chemicals	0.313598251	0.291654318	1.07523953	0.285346273
Pesticides	-0.020049767	0.32197159	-0.062271852	0.950494279
Engineering Construction	-0.406711182	0.168038424	-2.420346326	0.0176615
Industrial Manufacturing	-0.048191752	0.433182573	-0.11125044	0.911683151
Consumer goods	0.006812584	0.230589686	0.029544182	0.976500664
Energy - Oil & Gas	-0.92847346	0.265489171	-3.497217819	0.000754025
Power	-0.591233401	0.202794199	-2.915435475	0.004552784
Pharma	-0.100766757	0.427566841	-0.235674865	0.814258624
Telecom	-0.398891111	0.193404592	-2.062469701	0.044597173
Cement	0.251130461	0.185261839	1.355543385	0.181588676
Automobile	0.087174787	0.153908499	0.566406583	0.573756357
Textile	1.486498003	0.467477953	3.179824834	0.002581275
Media	-0.16987201	0.331169317	-0.512946102	0.610341777

(D) Effect of cash conversion on return on equity

Table 15 represents the regression results when the return on equity is regressed on cash conversion cycle and the control variables. As seen in the results, the return on equity is negatively correlated with the cash conversion cycle and the coefficient is significant at the 5% level. This is as expected in reality because small cycles lead to higher turnover ratio

and hence higher profitability. The relationship between Chemicals, Pesticides, Industrial Manufacturing, Consumer goods, Pharma with respect to Information Technology is positive but insignificant. It can also be inferred that for a given cash conversion cycle and control variables, Chemical industry generates higher return on equity than all the given industries.

Fig. Table 15: Effect of cash conversion cycle on return on equity

Regression Statistics	
Multiple R	0.731954095
R Square	0.535756798
Adjusted R Square	0.452856226
Standard Error	0.17750609
Observations	150

	Coefficients	Standard Error	t Stat	P-value
Intercept	-3.266783536	1.067801778	-3.059353902	0.002976589
Size	0.218146718	0.076567187	2.849088846	0.005512798
CR	0.105424762	0.051967806	2.028655218	0.045661047
SGR	0.336403287	0.208140875	1.616228852	0.010979461

LEV	1.80972285	0.455954565	3.969085934	0.000151455
GGR	0.472862521	1.397830391	0.338283188	0.007359938
CCC	-0.00110954	0.001159531	0.956886326	0.034137056
Metals	-0.273414145	0.125407623	-2.180203557	0.032040003
Chemicals	0.388794809	0.240866575	1.614150109	0.110245351
Pesticides	0.112608926	0.211059995	0.533539887	0.595068903
Engineering Construction	-0.314604487	0.167387869	-1.879493947	0.063644358
Industrial Manufacturing	0.05753541	0.220485118	0.260949174	0.794770393
Consumer goods	0.165840208	0.120233194	1.379321322	0.171456973
Energy - Oil & Gas	-0.784865118	0.203064385	-3.865104748	0.000217997
Power	-0.491339025	0.163137016	-3.011818148	0.003430235
Pharma	0.017133193	0.205186221	0.083500701	0.933652092
Telecom	-0.753691924	0.271739349	-2.773584044	0.007872933
Cement	-0.335207703	0.206424499	-1.623875582	0.110952205
Automobile	-0.250129792	0.215497816	-1.160706854	0.251501395
Textile	-0.177952941	0.544594196	-0.326762463	0.745268198
Media	-0.464370033	0.427559187	-1.086095321	0.282861232

On the basis of study conducted on 15 industries the relationship between profitability and working capital can be summarized in the following table.

Fig. Table 16: Relationship between profitability and working capital

	GOPR	ROA	ROE
Creditors payment period	Positive	Positive	Positive
Debtors payment period	Negative	Negative	Negative
Inventory holding period	Negative	Negative	Negative
Cash conversion cycle	Negative	Negative	Negative

Regression results across companies

In order to gauge the impact of working capital on profitability across companies, three different sets of regression were performed with GOPR, ROA and ROE as the dependent variables, considering one independent variable out of - creditor's payment period, debtors payment period, inventory holding period and cash conversion cycle at a time with companies in that industry as dummy variable keeping one company as the base and by keeping the control variables constant throughout. Out of the three sets of regressions if a company is seen to have the highest beta in

at least 2 out of the 3 results then it was ranked 1 and based on the same logic other companies were also ranked. The results in the table demonstrate the extent of impact of each parameter on a company's gross operating profit. The table can be interpreted as follows:

The first 5 rows imply that for the textile industry if all the control variables are kept constant then for the same level of CPP swan energy would earn the highest profit whereas for the same level of DCP page industries would be most profitable.

Fig. Table 17: Effect of working capital management on profitability across companies

Sector	Company	Rank			
		CPP	DCP	IHP	CCC
Textile	Page Industries	3	1	1	1
Textile	Alok Industries	5	4	5	5
Textile	Welspun India	4	3	2	2
Textile	Garware Technic	2	2	3	3
Textile	Swan Energy	1	5	4	4
Cement	Grasim Ind	5	3	5	5
Cement	Shree Cements	2	1	1	2
Cement	UltraTech Cement	1	2	2	1
Cement	ACC	4	4	3	4
Cement	Ambuja Cements	3	5	4	3
Auto	Maruti Suzuki	3	3	3	3
Auto	Bajaj Auto	4	2	4	4
Auto	Mahindra & Mahindra	1	1	2	1
Auto	Eicher Motors	2	5	5	2
Auto	Hero MotoCorp	5	4	1	5
Pharma	Sun Pharma	5	5	5	5
Pharma	Dr. Reddy's Lab	2	1	4	3
Pharma	Divi's Lab	3	3	1	2
Pharma	Cipla	4	4	3	4

Pharma	Aurobindo	1	2	2	1
Communication	Vodafone-Idea	5	5	5	5
Communication	Tata Communications	2	3	3	3
Communication	Suyog Telematics	1	1	1	1
Communication	Bharti Airtel	3	2	2	2
Communication	MTNL	4	4	4	4
Media	Sun TV	5	5	5	5
Media	Zee Entertainment	1	1	1	1
Media	TV 18	2	2	2	2
Media	Network 18	4	4	4	4
Media	TV Today Network	3	3	3	3
Engineering and construction	L&T	5	5	5	5
Engineering and construction	GMR	4	4	4	4
Engineering and construction	IFRB	2	2	2	2
Engineering and construction	Ircon Developers	1	1	1	1
Engineering and construction	NCC	3	3	3	3
Industrial Manufacturing	Siemens	4	4	4	4
Industrial Manufacturing	ABB India	3	3	3	3
Industrial Manufacturing	BHEL	5	5	5	5
Industrial Manufacturing	Thermax	1	1	1	2
Industrial Manufacturing	BEML	2	2	2	1
IT	TCS	2	2	2	2
IT	Infy	4	4	4	4
IT	HCL Tech	1	1	1	1
IT	Wipro	5	5	5	5
IT	Tech M	3	3	3	3
Chemicals	Pidilite	1	3	2	2
Chemicals	Aarti	3	1	5	1
Chemicals	Atul	4	2	4	3
Chemicals	Vinati Organics	5	5	3	5
Chemicals	Navin Fluorine	2	4	1	4
Pesticides	UPL	5	5	5	3
Pesticides	PI Industries	2	1	2	4
Pesticides	Bayer Cropscience	1	3	1	1
Pesticides	Rallis India	3	4	4	5
Pesticides	BASF	4	2	3	2
Metals	Hindalco	5	5	5	5
Metals	JSW Steel	2	2	2	3
Metals	Tata Steel	1	1	1	1
Metals	Hindustan Zinc	4	4	4	4
Metals	NALCO	3	3	3	2
Energy Power	NTPC	5	5	5	5
Energy Power	Power Grid Corporation	1	1	1	1
Energy Power	NHPC	3	3	3	3
Energy Power	Torrent Power	2	2	2	2
Energy Power	Tata Power	4	4	4	4
Energy - Oil & Gas	Bharat Petroleum	3	3	3	3
Energy - Oil & Gas	GAIL	2	2	2	2
Energy - Oil & Gas	IOCL	5	5	5	5
Energy - Oil & Gas	ONGC	1	1	1	1
Energy - Oil & Gas	Hindustan Petroleum	4	4	4	4
Consumer Goods	Britannia	1	1	1	1
Consumer Goods	ITC	3	3	3	5
Consumer Goods	Asian Paints	4	5	4	4
Consumer Goods	HUL	5	4	5	3
Consumer Goods	Nestle India	2	2	2	2

Same as the rank table the below is a result of those three sets of regressions mentioned above. The table summarizes whether the relationship between the profitability and

working capital management is significant or insignificant within sectors. The logic applied here is the same as the rank table that if the relationship is significant for at least

two out of the three sets of regression then it is marked as 'Y' otherwise it is marked as 'N'. The table can be interpreted as for the metals industry the relationship between profitability & CPP, DCP, IHP and CCC is

significant at 5% LOS whereas for pesticides sector only the relationship between profitability and IHP is significant rest it is insignificant for CPP, DCP and CCC at 5% LOS.

Fig. Table 18: Relationship between profitability and working capital across sectors

Industry	CPP	DCP	IHP	CCC
Metals	Y	Y	Y	Y
Chemical	Y	Y	Y	Y
Pesticides	N	N	Y	N
Pharma	Y	Y	Y	Y
Communication	Y	N	N	N
Media	N	Y	N	N
Engineering Construction	Y	Y	Y	Y
Industrial Manufacturing	Y	Y	Y	Y
IT	N	Y	N	N
Energy - Oil & Gas	Y	Y	Y	Y
Energy - Power	N	Y	Y	Y
Consumer Goods	Y	Y	N	Y
Textile	Y	N	Y	Y
Automobile	Y	Y	Y	Y
Cement	Y	Y	Y	Y

Conclusion

Working capital management is an important aspect of financial decision making. The companies need to allocate an appropriate proportion of the total capital to the working capital. It can help them to enhance their profitability and reduce the risk of solvency. The analysis done on company level shows that for some companies and sectors the relationship between profitability and working capital management isn't significant but that doesn't imply that the profitability of these companies isn't affected by working capital management it may be just that the effect isn't that significant and hence it wasn't identified by the statistical measures. The same is justified by the analysis done on sector level which suggests that overall the working capital management affects the profitability of the companies in the Indian market.

The analyses presented above can help the companies identify the areas where there is a scope of improvement for better performance. From our analysis on the panel data of 75 companies listed on NIFTY 100 we conclude that the average inventory, creditor payment period and the debtor collection period are the main determinants of working capital. A smaller cash conversion cycle, smaller inventory period and a smaller debtors collection period help the firm to earn higher profits. A large creditors payment period on the other hand may not always help to increase the profits.

5.1 Study Limitations

None

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5.3 Funding Source

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5.4 Competing Interests

None

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