Relationship of Working Capital Management with Firm’s Profitability during the Period of Global Slowdown: An Empirical Study of Manufacturing Firms in India

Barnali Chaklader, Associate professor (Finance and Accounting)
International Management Institute, New Delhi

Neharika Shrivastava, Research Scholar
Birla Institute of Technology Mesra- Noida Campus

Abstract

It was intended to know the importance of components of working capital and the effect of working capital management on manufacturing firm’s profitability during the period of global slowdown and also to find out about the working capital management policy of these firms. The purpose of this study is to find out the effect of working capital management policies on the profitability of manufacturing firms listed in Bombay Stock Exchange (BSE) 500. There are several studies that are conducted to find out the level of profitability and the components of working capital management but there is no study manufacturing firms during the period starting of global slowdown. Sharma and Kumar (2011) had conducted a similar kind of study taking the sample of non financial firms. It was therefore intended by us to make an attempt to conduct this study taking manufacturing firms as our sample. The period of study was from 2008 till 2011. This is the period when manufacturing sector was hit by global recession. The dataset was taken from CMIE prowess data base. For the purpose of our study, out of 11208 manufacturing firms from CMIE Prowess database, those firms were selected that are listed in BSE 500 as financial information of the listed firms were available. There are 254 firms that were of manufacturing nature listed in BSE 500. 169 firms were finally selected as complete information from 2008 onward was available for these firms. Return on capital was taken as a measure of profitability and average inventory turnover days, average collection period, average payable period, cash conversion cycle and the ratio of current assets to total assets were taken as various exogenous variables. Multicolinearity check was done and Hausman test was conducted, Results of Hausman test indicated that random effect model is true. Panel data regression was run through random effect method.

Key words

Working capital policies, manufacturing sector, profitability of manufacturing firms, panel data regression, multicollinearity problem, BSE 500.

I Introduction

In the era of extreme global competition, a firm has to not only manage cost but also has to manage its short term and long term sources of finance. In September 2011, a 13th time raise in repo rate by Reserve Bank of India as a measure to curb inflation was an indication that loans were to be costlier. For the companies wanting to take loan, an efficient working capital management is therefore extremely necessary for smooth running of the business. It is the capital required for day to day running of the business. Working capital decisions are important to the organization as they affect the firm’s liquidity position. Liquidity crisis can put the business in problems as the business has a chance of losing reputation due to non payment or delayed payment to creditors. Liquidity crisis can also occur in case the debtors do not pay on time or if the finished goods do not convert themselves to sale. Accountants view working capital as the difference between the current assets and the current liabilities, which is the net working capital. Working capital is alternatively referred to the investment of the firm in the current assets. Working capital decisions affect the firm’s profits through their
impact on sales, operating costs, and interest expense. They affect the firm’s risk through their impact on the volatility of cash flows, the probability of not receiving the cash flow and the ability of generating cash during crisis. (Srivastava and Mishra, 2010). The working capital policy touches upon almost every functional area of the business’s operation. A firm is required to maintain a balance between liquidity and profitability while conducting its day to day operations. Working capital management is important because it consumes a large portion of the financial manager’s time. Most of the financial managers’ time and efforts are consumed in identifying the non-optimal levels of current assets and liabilities and bringing them to optimal levels (Lamberson, 1993). The management of working capital is one of the most important and challenging aspect of the overall performance of the organization. Merely more effective and efficient management of working capital can ensure survival of a business enterprise. Working capital management is concerned with the problems that arise in attempting to manage the current assets, current liabilities and the interrelation that exists between them. (Chandrabhai and Rao, 2011). The working capital policy touches upon almost every functional area of the business’s operation. Net working capital forms an average of over 15 per cent of the total asset base of Indian companies. While for some companies in the pharmaceutical sector, net working capital is 50 per cent of the total asset base; some companies function consistently on negative working capital (Suryanarayana Akella, 2005). Working capital plays an important role in the firm’s profitability, risk and value (Smith, 1980). A firm may choose an aggressive working capital management policy with a low level of current assets as percentage of total assets, or it may also be used for the financing decisions of the firm in the form of high level of current liabilities as percentage of total liabilities (Afza and Nazir, 2009). Keeping an optimal balance among each of the working capital components is the main objective of working capital management. Kim et.al say that there is a close relationship between sales growth and level of current assets. Liquidity is a precondition to ensure that firms are able to meet its short-term obligations. The liquidity and profitability goals conflict in most decisions which the finance manager makes. For example, if higher inventories are kept in anticipation of increase in prices of raw materials, profitability goal is approached, but the liquidity of the firm is endangered. Similarly, the firm by following a liberal credit policy may be in a position to push up its sales, but its liquidity decreases. It is a well accepted fact that a company has to borrow less if it manages its working capital well. Even cash has to be invested in such a way that it generates proper return to the investors. Firms are able to reduce financing costs and/or increase the funds available for expansion by minimizing the amount of funds tied up in current assets.

The paper proceeds as follows. In the next section a review of literature has been done. In section 3, objective of the study, sample and the variables used in the empirical analysis has been discussed, Section 4 discusses the possibility for future research and finally section 5 concludes.

II Research on Working Capital

Gupta and Huefer, in the year 1972 examined the differences in financial ratio between industries and found that differences exist between ratio means among industries. Frecka and Lee (1983), focused an area of research on the issue of using regression analysis verses financial ratios for analysis and prediction,

Lamberson (1995) in his paper studied how the working capital position of small firms responds to changes in the level of economic activity. For his research, he took fifty small firms for the time period 1980-1991. The findings from this study showed that liquidity increased slightly for these firms during economic expansion with no noticeable change in liquidity during economic slowdowns. Their investment in working capital, as measured by the inventory to total assets and current assets to total assets ratios, were relatively stable over the time period of this study. Findings suggest that working capital management practices of small firms in response to changes in economic activity do not follow commonly held expectations. Rafuse (1996) proposed that improvement of working capital by delaying payment to creditors is an inefficient and ultimately damaging practice, both to its
practitioners and to the economy as a whole. Stock reduction strategies, drawing on some of the techniques of “lean production” are far more effective, and the article proposes that those seeking concentrated working capital reduction strategies should focus on stock reduction. Filbeck et.al (2005) study revealed that firms are able to reduce financing costs and/or increase the funds available for expansion by minimizing the amount of funds tied up in current assets. They provided insights into the performance of surveyed firms across key components of working capital management by using the CFO magazine’s annual working capital Management Survey and discovered that significant differences exist between industries in working capital measures across time. They also discovered that these measures for working capital change significantly within industries across time. Working capital starvation is generally credited as a major cause if not the major cause of small business failure in the UK. Gracia and Solano (2007) study provided the empirical evidence on the effect of working capital management on the profitability of a sample of SME Spanish firms. The author had collected a panel of 8872 small to medium sized enterprises for the period of 1996-2002. Their results should that managers can create value by reducing their inventories and the number of days for which the accounts are outstanding. Shortening the cash conversion cycle also improves firm’s profitability. They took the dependent variable as return on asset. Raheman and Nasr (2007) in their paper had selected a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004. They had studied the effect of different variables of working capital management including the Average collection period, inventory turnover in days, average payment period, cash conversion cycle and current ratio on the net operating profitability of Pakistani firms. Debt ratio, size of the firm (measured in terms of natural logarithm of sales) and financial assets to total assets ratio were used as control variables. The results show that there is a strong negative relationship between variables of the working capital management and profitability of the firm. They found that there is a significant negative relationship between liquidity and profitability. They also found that there is a positive relationship between size of the firm and its profitability. Anand and Malhotra’s (2007) paper found very little evidence on the positive relationship between working capital management and firm profitability. The findings of the paper captured the dynamics of risk-return trade-off to help the performance evaluation of working capital management of Corporate India. Appuhami (2008) investigated the factors which affect the working capital management in manufacturing industry and found that capital expenditure, operating expenditure, financial expenditure, leverage and operating cash flow were the some other factors that affect the working capital level. Yadavet.al. (2009) analyzed the working capital management of bulk drugs companies that were listed on the Bombay Stock Exchange. The research findings revealed that the listed companies adopted a conservative approach in the management of their working capital. The findings also suggested that working capital policy was not static overtime, but varied with the changes in the state of the economy. Jasmine Kaur (2010) conducted a study on Indian tyre industry which reflected that the proper management does affect positively on the profitability levels of the sample companies. The results reveal that there is a standoff between liquidity and profitability and the profitability and that the selected corporate has been achieving a tradeoff between risk and return. Talha et.al. (2010) conducted a study on the impact of working capital management on profitability of selected Indian corporate hospitals. The time span was ten years from 1996 to 2006. The results of regression analysis pointed out that the current ratio, cash turnover ratio, proportion of current assets to operating income and leverage have a negative influence on profitability.

Dong and Su (2010) study based on secondary data collected from listed firms in Vietnam stock market for the period of 2006-2008 with an attempt to investigate the relationship existing between profitability, the cash conversion cycle and its components for listed firms in Vietnam stock market. Finding shows that there is a strong negative relationship between profitability, measured through gross operating profit, and the cash conversion cycle. This means that as the cash conversion cycle increases, it will lead to declining of profitability of firm. They therefore interpreted the result that the managers can create a positive value for the shareholders by handling the adequate cash conversion cycle and keeping each different component to an optimum level. Sharma and Kumar (2011) collected
data of a sample of 263 non-financial BSE 500 firms listed at the Bombay Stock (BSE) from 2000 to 2008 and evaluated the data using OLS multiple regression. The findings of their study significantly depart from the various international studies conducted in different markets. The results revealed that working capital management and profitability is positively correlated in Indian companies. The study further revealed that inventory of number of days and numbers of days accounts payable are negatively correlated with a firm’s profitability denoted by return on assets whereas number of days accounts receivables and cash conversion period exhibited a positive relationship with corporate profitability.

Mustafa Afeef (2011) in his paper on Analyzing the Impact of Working Capital Management on the Profitability of SME’s in Pakistan investigated the effect of working capital management on profitability based on a sample of 40 Pakistani small and medium enterprises (SME’s) listed in Karachi Stock Exchange for a period of six years from 2003 to 2008 leading to a total of 240 firm-year observations. Findings from the analyses suggested that indicators of working capital management had a perceptible impact on profitability of firms under study. The Correlation matrix of the pooled data of sample firms exhibited strong negative relationships of the Inventory Conversion Period and the Receivable Collection Period with the Operating Profit to Sales of small firms. However, no significant associations were found between the profitability measures and the Payable Deferral Period, Cash Conversion Cycle & Current Ratio.

Mamoun M. Al-Debi’e (2011) conducted a study on the industrial firms listed in Amman stock exchange. The period of study started from 2001 till 2010. The results showed 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. The control variables (Size, Leverage, and GDP growth) included in all regression models were significant and have the expected signs. Profitability increases with Size and GDP growth and decreases with leverage. Bana Abuzayed, (2012) examined the effect of working capital management on firms’ performance for a sample of firms listed on a small emerging market, namely Amman Stock Exchange. The author analysed the data from sample of listed firms for the period from 2000 to 2008 to examine if more efficient working capital management improves firms’ accounting profitability and firms’ value and found that that profitability is affected positively with the cash conversion cycle. This indicates that more profitable firms are less motivated to manage their working capital. In addition, financial markets failed to penalize managers for inefficient working capital management in emerging markets. Quayyum (2012) in her study investigated if there is any relationship between working capital management and profitability of manufacturing corporations. She selected Corporations enlisted with the Dhaka Stock Exchange covering a time period from year 2005 to 2009. The result of this study showed that except for food industry all other selected industries have a significant level of relationship between the Profitability Indices and various Working Capital Components. Her research findings also showed that the significance level of relationship varies from industry to industry. The regression analysis considered Profitability ratios as dependent variable and various working capital ratios and liquidity ratios as independent variables. Ahmadi et.al. (2012) investigated the relationship between working capital management and profitability at companies of food industry group member at Tehran Stock Exchange. 33 companies were selected for a period of five years from 2006-2011 and the effect of various variables of working capital management including average accounts collection cycle, inventory turnover, medium-term debt payment and the cash conversion cycle on operational net profit of companies. The results of the study showed that there is a reverse relationship between the variables of working capital management and profitability. It was found out that increasing collection cycle, debt payment period, inventory turnover and cash conversion cycle leads to decreasing profitability in the companies. According to them, managers can create a positive value for stockholders by decreasing collection cycle, debt payment period, inventory turnover and cash conversion cycle to the lowest possible level.
II Objective, Sample and Variables

As per the revised estimates of Central Statistical office (CSO), Ministry of Statistics and programme Implementation, manufacturing sector’s contribution in Indian GDP was 14.53% in 2010-2011 and 13.89% in the year 2011-12. Thus there is a change of 9.9% over the previous year. The average share of manufacturing sector in real GDP increased from about 13 per cent during 1970-75 to about 15.1 per cent during 2002-07, that is, by just about 2 percentage points over a period of more than three decades. For the entire 2008-09, manufacturing grew by just 2.4 per cent against 8.2 per cent in 2007-08 (RBI publication, 2011). As per CRISIL research report 2012, manufacturing growth has been constrained by two main factors - lack of sufficient and quality physical infrastructure and strict labour laws which discourage job creation. The National Manufacturing Policy (NMP) aims at increasing contribution of manufacturing to the national GDP to 25 per cent by 2025, and also creating 100 million jobs in the next decade.

There is a pressure on profitability on the company as a result of increase in raw material cost, and hike in finance cost. This makes working capital management in this sector extremely important. It is expected that the results of this study will help the managers in this sector frame policies for efficiently managing the working capital of their company. Manufacturing sector contributes about 15 to 16% to Indian GDP and policy makers are optimistic about its increased contribution by 2025. Revised estimates of GDP at factor cost at constant (2004-05) prices in the year 2011-12 is Rs. 52,02,514 crore (as against Rs. 52,22,027 crore estimated earlier on 7th February, 2012, showing a growth rate of 6.5 per cent (as against 6.9 per cent in the Advance Estimates) over the Quick Estimates of GDP for the year 2010-11 of Rs. 48,85,954 crore, released on 31th January 2012. The downward revision in the GDP growth rate is mainly on account of lower performance in ‘manufacturing’ and ‘trade, hotels, transport and communication’ than anticipated. (CSO report, 2012). Since there is a slowdown in the economy and statistics also show that manufacturing sector along with other sector is also responsible for downward revision of GDP, it was decided to conduct a study during the period of global slowdown to find out, whether working capital components have an impact on profitability of manufacturing firms. This would help in improving the profitability of manufacturing firms by properly managing the different components of working capital. There are several studies that are conducted to find out the level of profitability and the components of working capital management but there is no study manufacturing firms during the period starting of global slowdown. Sharma and Kumar (2011) had conducted a similar kind of study taking the sample of non financial firms. It was therefore intended by us to make an attempt to conduct this study taking manufacturing firms as our sample.

Objective of the Study:

To analyse the impact of management of working capital on the profitability of manufacturing firms in India.

Research Methodology

Research methodology has been adopted through the literature review. The dataset was taken from CMIE prowess data base. For the purpose of our study, out of 11208 manufacturing firms from CMIE Prowess database, those firms were selected that are listed in BSE 500 as financial information of the listed firms were available. There are 254 firms that were of manufacturing nature listed in BSE 500. Finally 169 companies were selected for study as all relevant financial data of these companies were available. Period of study was from April 2008 till March 2011. This is the period when manufacturing sector is hit by global slowdown. A panel data regression analysis has been done. The advantage of panel data analysis over either time series or cross section modeling is that is that it captures the differences across individual cross sections much better. The panel data analysis is done to find out the
impact of aggressive and/or conservative working capital policies on the profitability of the firm where profitability has been measured by Return on Assets (ROA) as the dependent variable as per the study conducted by Gracia and Solano (2007) and Sharma and Kumar (2011). The various independent variables taken were average collection days (ACP), inventory turnover period in days (ITP), Cash conversion cycle (CCC) and average payment days (APP) as per Raheman and Nasr (2007), Mustafa Afeef (2011), Ahmadi et.al. (2012), and current assets to total assets (CATA) as per lamberson (1995). Average collection days (ACP) are the average number of days of credit period extended to the debtors. Average payment days (APP) are the average number of days extended by the creditors to the firm. Inventory turnover days (ITP) are the average number of days required to convert inventories into sales. Cash conversion cycle (CCC) is another measure of managerial effectiveness. CCC is the time lag between expenditure for the purchase of raw materials and the collection of sales of finished goods. It does this by following the cash as it is first converted into inventory and accounts payable, through sales and accounts receivable and then back into cash. A longer cycle would mean a larger fund blocked in the working capital. E Views 6 software has been used for analysis of data. The following formulae are used for the dependent and different independent variables.

\[ \text{ROA} = \frac{\text{Profit after tax}}{\text{Total assets}} \]
\[ \text{ACC} = \frac{365}{\left(\frac{\text{Sales}}{\text{average debtors}}\right)} \]
\[ \text{APP} = \frac{365}{\left(\frac{\text{Cost of productions}}{\text{average creditors}}\right)} \]
\[ \text{ITP} = \frac{365}{\left(\frac{\text{Cost of sales}}{\text{average inventory}}\right)} \]
\[ \text{CCC} = \text{ACC} + \text{ITP} - \text{APP} \]
\[ \text{CATA} = \frac{\text{Current Assets}}{\text{Total Assets}} \]

### III Data Presentation and Analysis

169 companies were taken from the financial year 2008 till 2011. There were 169 cross sections of 4 years resulting into 676 firm year observations for manufacturing sector. Table I shows the descriptive statistics.

As per Table I, the cash conversion cycle (CCC) has an average of 43 days with a standard deviation of 128 days. There is a wide disparity between the minimum and maximum CCC. Minimum CCC is negative 448 days and the maximum is 1769 days. Negative CCC is because of high payment period of some of the firms. Their cash conversion cycle is very small as their process of collection is much quicker that payment. They therefore are efficient enough to shorten their operating cycle and thus increase profitability. The average payment period to creditors is 98 days with a standard deviation of 66 days where as the average collection period is 86 days with a standard deviation of 100 days. It is indicated that firms enjoy an average payment period of 12 more days that the average collection period and this helps in increasing the profitability of the manufacturing firms. It seems that manufacturing sector in India has a high negotiating power with the suppliers but collects its debts much faster. Firms with very high payment period should remember that they have a risk of loss of reputation due to non payment or delayed payment. Also, obtaining credit will be a problem for them. Mean conversion period of inventory is 55 days.

Data in Table II reflects that return on capital is positively correlated and highly significant at 1 percent level with average payment period and the ratio of current assets to total assets. It means that longer payment period increases profitability of the firm as the firm is able to shorten its operating cycle partly with the creditor’s money. Also, higher current assets as compared to total assets indicates that the manufacturing firms increase their profitability by following an aggressive working capital policy. ROA is negatively correlated and highly significant with inventory conversion period and cash conversion cycle. Negative correlation between ROA and ICP indicates shorter inventory conversion period which results in less blockage of fund in inventory and a quick conversion of inventory to sales, thus resulting in higher profitability. Negative relation for CCC means that as the cash conversion...
cycle increases, it will lead to declining of profitability of firm. The findings of correlation of this study are consistent with Dong and Su’s (2010) study who interpreted the result that the managers can create a positive value for the shareholders by handling the adequate cash conversion cycle and keeping each different component to an optimum level. ROA is positively correlated but is not significant with average collection period. Since the period of study is from 2008 till 2011 when the economy was hit by a slowdown, positive correlation between average collection period and return on assets justifies that manufacturing firms increase sales and thus profitability by increasing the collection period of debtors. This is consistent with Sharma and Kumar’s (2011) study who conducted a study on 263 non financial firms listed in BSE 500. The results revealed that inventory number of days and numbers of days of accounts payable are negatively correlated with firm’s profitability denoted by return on assets whereas number of days accounts receivables exhibited a positive relationship with corporate profitability. The only difference of this study with their study is that the cash conversion cycle had a positive relation with the return on assets.

REGRESSION ANALYSIS

There was no multicolinearity problem among the variables (Table II). To investigate the impact of the various variables of working capital management on profitability, the following model for regression analysis has been taken

\[ ROC = \beta_0 + \beta_1 (ACP) + \beta_2 (APP) + \beta_3 (ICP) + \beta_4 (CCC) + \beta_5 (CATA) + \varepsilon \]  

Where \( \beta_0 \) is the intercept of the equation
\( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \) are the coefficients of independent variables. i.e. ACP, APP, ICP, CCC AND CATA respectively.
\( \varepsilon \) is the Error Term

Unit root test was conducted for the dependent series to check for stationarity of the data. ROA, APP, CCC and CATA were found to be stationary at level. ACP and ICP were converted to stationarity at first difference.

Thus the new equation after conversion of the variables to stationarity is shown in equation II

\[ ROC = \beta_0 + \beta_1 d (ACP) + \beta_2 (APP) + \beta_3 d (ICP) + \beta_4 (CCC) + \beta_5 (CATA) + \varepsilon \]

Panel data regression for equation II was run. The estimation procedure started with the Hausman Specification Test, which essentially tests the hypothesis that Random Effect Model is true for panel data analysis. Through Hausman Specification Test it was found out that Random Effect Model (REM) was suitable for this equation. Since p value of Hausman test is 0.06 or is insignificant at 5% level of significance, it shows that REM is appropriate. The results of Hausman Test and REM are shown in Table III and IV. Durbin- Watson result of 1.70 shows that there is no autocorrelation in the series.

\( R^2 \) is coming out to be 0.23 which means that 23% variance in ROA can be explained with the help of this regression. All variables except CCC were found to be significant at 1%.

IV Future Research Prospect

Researchers can extend the study by doing a comparison of pre slow down period with slow down period. Also they can study taking one particular industry in the manufacturing sector.
V Conclusion

The period of study is a period of 3 years starting from 2008 till 2011. During this period manufacturing sector and growth was affected by the global slowdown. Results of the study show that average collection period, average payment period, inventory conversion period and current assets to total assets are significant. During this period of slowdown, manufacturing firms were following an aggressive working capital policy with high level of creditors and low level inventory. Manufacturing firms under study were also having a shorter cash conversion cycle. Firms were playing safe during the period of slowdown and were avoiding risk. Firms also had a higher proportion of current assets to total assets indicating that they follow an aggressive working capital policy and increased their short term profitability by investing more on current assets than fixed assets. Aggressive working capital policy increases profitability by also increases risk.

REFERENCES

Journals


Chapter in Book


Reports
Downloaded from Website


**TABLE I: DESCRIPTIVE STATISTICS**
169 firms, 2008-2011, 676 firm year observation

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>MINIMUM</th>
<th>MAXIMUM</th>
<th>MEAN</th>
<th>STD. DEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>676</td>
<td>-2.400</td>
<td>7.560</td>
<td>0.910</td>
<td>0.753</td>
</tr>
<tr>
<td>ACP</td>
<td>676</td>
<td>3.510</td>
<td>1866.19</td>
<td>86.380</td>
<td>100.795</td>
</tr>
<tr>
<td>APP</td>
<td>676</td>
<td>6.720</td>
<td>586.100</td>
<td>98.123</td>
<td>66.000</td>
</tr>
<tr>
<td>ICP</td>
<td>676</td>
<td>4.800</td>
<td>333.800</td>
<td>55.443</td>
<td>35.840</td>
</tr>
<tr>
<td>CCC</td>
<td>676</td>
<td>-448.200</td>
<td>1769.000</td>
<td>42.896</td>
<td>128.418</td>
</tr>
<tr>
<td>CATA</td>
<td>676</td>
<td>0.970</td>
<td>38.270</td>
<td>8.625</td>
<td>5.011</td>
</tr>
</tbody>
</table>

**TABLE II: CORRELATION ANALYSIS**
Pearson’s Correlation Coefficient
Correlations (MANUFACTURING SECTOR)

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>ACP</th>
<th>APP</th>
<th>ICP</th>
<th>CCC</th>
<th>CATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROC</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACP</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>.026</td>
<td>.497</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APP</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>.095</td>
<td>.013</td>
<td>.086</td>
<td>.024</td>
<td>1.00</td>
</tr>
<tr>
<td>ICP</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>-.258</td>
<td>.236</td>
<td>.1089</td>
<td>.777</td>
<td>1.00</td>
</tr>
<tr>
<td>CCC</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>-.148</td>
<td>.1144</td>
<td>-.1752</td>
<td>0.00</td>
<td>.19311</td>
</tr>
<tr>
<td>CATA</td>
<td>Pearson’s Correlation Sig (2-tailed)</td>
<td>.116</td>
<td>.002</td>
<td>-.108</td>
<td>.0049</td>
<td>-.373</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**
TABLE III

Correlated Random Effects - Hausman Test
Test cross-section random effects

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq.d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>10.863666</td>
<td>5</td>
<td>0.0642</td>
</tr>
</tbody>
</table>

TABLE IV: DETERMINATION OF RETURN ON CAPITAL ON WORKING CAPITAL VARIABLES IN MANUFACTURING SECTOR (2008-2011) RANDOM EFFECTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>.33677</td>
<td>2.58**</td>
</tr>
<tr>
<td>D(ACP)</td>
<td>.00259</td>
<td>10.76**</td>
</tr>
<tr>
<td>APP</td>
<td>.00222</td>
<td>3.14**</td>
</tr>
<tr>
<td>D(ICP)</td>
<td>-0.00629</td>
<td>-4.45**</td>
</tr>
<tr>
<td>CCC</td>
<td>0.00018</td>
<td>0.99</td>
</tr>
<tr>
<td>CATA</td>
<td>0.03008</td>
<td>3.208**</td>
</tr>
</tbody>
</table>

** significant at 1% level

R-squared 0.23
Adjusted R-squared 0.22
F-statistic 30.80
Durbin-Watson stat 1.70