"Working Capital Management and its Impact on Firm's Performance"

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Abstract

Working Capital Management has its effect on liquidity as well as on profitability of a firm. In this paper we have analyzed the impact of working capital management on firm performance from Pakistani companies that are listed on Karachi stock exchange. Different variables such as ACP (Average Collection Period), Sales, CCC (Cash Conversion Cycle), ITID (Inventory Turnover in days), APP (Average Payment Period), and debts are used to analyze the effect of working capital management. Samples of 253 non financial firms were analyzed for a period of 6 years 2008-2013 for the analysis of different variables of working capital management. Net operating profitability is used as a dependent variable for the measurement of working capital management in this study. Sales, CCC, ITD, APP and Debts showed positive relationship to the dependent variable (NOP) while one component of WCM, ACP showed Negative relationship to NOP.

Keywords: Working Capital Management, Profitability, ACP, APP, DEBTS, Inventory Turnover in Days, Sales, CCC

Introduction

Working capital management engages the financing and management of the current assets of the firm. Current assets are Cash, AR (Accounts Receivable) and Inventory. Financial managers shall devote more time to working capital management than to any other activity. WCM has direct affects on the liquidity and profitability of a company (Rahman & Nasr, 2007). The most critical factor for maintaining liquidity and profitability, survival and solvency of a business is the management of working capital (Mukhopadhay, 2004). While conducting day to day operations, a firm is required to keep a sense of balance between profitability and liquidity. A derisory quantity of working capital blight a firm's liquidity while holding excess working capital may results in the diminution of profitability. Depending on the nature of the business, proper implication of working capital is essential (funds to be invested in various current assets).

A firm may be very profitable if it can transform cash from operations within the same cycle, otherwise the firm would have to borrow, to support its continued working capital needs. Thus the twin objectives of profitability must be synchronized (Brigham & Houston, 2004).

The main goal of WCM is to preserve the best possible set of scales of each of the working capital apparatus. Competency of a business set on the capacity to handle effectively the components of working capital management, i.e. inventories, receivables and AP. A great deal of effort is required from the firm's financial managers in bringing worst and non-optimal levels of currents assets and liabilities back towards the best possible and optimal levels. The best possible level and optimal level is the one in which a balance is achieved between risk and efficiency (Filbeck and Krueger). Bearing in mind the significance of WCM, the relationship between WCM and profitability have been analyzed by researchers such as; Smith et al., 1997 and Jose et al., 1996, Vishnani and Shah, 2007, Lazaridis & Tryfonidis, 2006, Teruel and Solano, 2007; Samiloglu and Demirgunes, 2008; Uyar, 2009 among others.

In context with Pakistan there are only few studies such as Rahman & Nasr (2007), Afza & Nazir (2007), Shah and Sana (2006). These studies were limited to measure of working capital management and profitability. Some of them only focused on policies of WCM, while a small sample of oil and gas sector was studied by Shah and Sana (2006), while Rahman and Nasr studied a sample of 94 firms and analyzed the profitability and working capital management.

The major objective of this study is to scrutinize the effect of Working Capital Management (WCM) on Profitability of Pakistani firms listed on Karachi Stock Exchange during the period of 2008-2013. We have studied and analyzed different variables and its affect on WCM. i.e ACP, Sales, APP, Debts and CCC of a large sample of 253 firms listed on KSE for the period 2008-2013. It is expected that independent variables should explain dependent variable, as the literature convince that well-functioning WCM can contribute to the growth and profitability of a company. However, due to political flux and other factors, WCM may have negative effect on profitability.

Literature Review

WCM have been studied by different researchers from different aspects in different scenario. The following studies are very useful and attention grabbing for our research.

Rahman and Nasr, 2007, found a negative relationship between profitability and Accounts Payable, ACP, ITID and CCC. Their studies suggest that firms that are less profitable wait longer to pay their bills, and that managers can create value for their shareholders by minimizing the number of day's inventories and receivable.

Lazaridis & Tryfonidis, 2006 analyzed 131 listed companies for four years (2001- 2004) of Athens stock exchange. Regression analysis and Pearson correlation were used to analyze the data and found negative relationship between profitability and Inventory Management, Accounts Receivable Turnover, and Accounts Payable Turnover.

H. Jamal, 2010, analyzed automobile sector of Pakistan to check the impact on profitability of capital structure and WCM. Earnings before interest and taxes were used to evaluate the profitability of the selected firms using regression analysis. Their study found a positive relationship between Size of the firms and profitability which is in accordance with the outcome of Rahman & Nasr (2007).

Shin & Soenen, 1998, studied a sample of United States firms. Net trading cycle was bringing into play as a measure of WCM to analyze the relationship between profitability and WCM. Their results suggest that net trading cycle is indirectly related to profitability while the results were not that significant in their previous research on the specific industry (Shin and Soenen, 1993). Profitability can be increase by decreasing the working capital investment (by declining the portion of current assets).

Afza and Nazir, 2007 found negative relationship between profitability and working capital financing and investment policies of different firms in 17 sectors listed on Karachi Stock Exchange. Shah and Sana, 2006, suggested that through effective management of WC, positive returns can be generated for shareholders in their studies.

There are very few studies conducted with reference to Pakistan on Working Capital Management and firm performance which is the major inspiring force to study WCM in more detail especially in context with Pakistan. In this study we made an effort to find out the relationship between firm performance and WCM for firms listed on Karachi Stock Exchange for a period of 6 years (2008-2013).

Research Methods

Sample Size

The motivation of this research is an attempt to evaluate the causality and to establish the relationship between dependent and independent variables. Secondary data were abstracted for the analysis of our research from the official websites and annual reports of firms and from the library of State Bank and Karachi Stock Exchange. Those firms are not included and eliminated whose data was not obtainable or observations were missing for few years. Total firm analyzed were 253 listed on Karachi Stock Exchange.

Variables

Table.1: Table 1 Presents Different Variables Used in the Study

Abbreviation	Variable	Status	Measurement
NOP	Net Operating Profitability	Dependent	"EBIT" +Depreciation/Total Assets
ACP	Average Collection Period	Independent	Days*AR/Credit Sales
APP	Average Payment Period	Independent	Accounts Payable / (Total Annual Purchases/365)
ITID	Inventory Turnover in Days	Independent	Inventories/Cost of goods sold*365
CCC	Cash Conversion Cycle	Independent	Inventory turnover in days + Average collection period –Average Payment Period
SG	Sales Growth	Independent	Current year sales – Last year sales/Last year sales.
Debt	Debt Ratio	Independent	Financial Debts/Total Assets

Research Model

The following model are developed to analyze our research and to find out the relationship between profitability and WCM

$$NOP = \beta_0 + \beta_1 ACP + \beta_2 Sales + \beta_3 CCC + \beta_4 ITD + \beta_5 APP + \beta_6 DEBTS - \beta_7 INF + e$$

Hypothesis

Hypothesis of the study are

H1: ACP (Average Collection Period) has a significant impact on NOP.
H2: Sales has a significant impact on NOP.
H3: CCC (Cash Conversion Cycle) has a significant impact on NOP.
H4: ITID (Inventory Turnover in Days) has a significant impact on NOP.
H5: APP (Average Payment Period) has a significant impact on NOP.
H6: Debts has a significant impact on NOP.

Limitations and Difficulties

The selected topic of the study is very broad and requires a comprehensive study in order to do full justice to it. However, due to the time and other constraints, the wide scope of the research needs to be narrowed down to a controllable field of research. The research is limited to the Non financial sector and does not explore other means of economic growth and a study of a country only. Furthermore, it only relies on the secondary data which is already available. The difficulties faced in this study relates to the availability of data in Pakistan. With difficulty in collecting data, limited time is another constraint to carry out a widespread research.

Data Analysis and Results

OLS Results with Absolute Values

Here we considered the effect of all explanatory variables of model and their effect on the NOP. The results of the regression give the change in dependant variable, which in our case is the NOP. Table 2 presents results of the regression model

Table.2. OLS results with absolute values

Variables	Model
Dependent Variable	NOP
Intercept	12.4962 (0.73105)
ACP	-0.28205 (-1.2236)
SG	0.10368 (0.49490)
CCC	0.061059 (0.38303)
ITD	0.28813 (1.6819)
APP	0.2424 0.57316
DEBTS	0.14290 0.32883
INF	-0.20466 (-0.70972)
R-Squared	0.31571
R-Bar-Squared	-0.026435
F-Test	0.92274
DW-Statistics	2.5199

Through the OLS results we established the following relationship:

$$NOP = \beta_0 + \beta_1 ACP + \beta_2 Sales + \beta_3 CCC + \beta_4 ITD + \beta_5 APP + \beta_6 DEBTS - \beta_7 INF + e$$

$$NOP = 12.4962 + 0.28205 \ ACP + 0.10368 \ SALES + 0.061059 \ CCC$$
$$+ 0.28813 \ ITD + 0.2424 \ APP + 0.14290 \ DEBTS - 0.20466 \ INF + e$$

From the coefficients we assume that NOP is negatively affected from the changes in ACP and INF, while positively affected from the change in Sales, CCC, ITD, APP and Debts. We can see that explanatory power of all variables is not significant.

T-test

Now we will conduct significance tests on the independent variables to check whether the variables are significant in the regression on the NOP.

Using a $\alpha = \dfrac{5\%}{2}$ and $\upsilon(= 13 - 5) = 8$, $t_{tab} = \pm 2.3060$.

So with a 5% confidence interval we obtain the following results:

Regressor	t_{calc}	t_{tab}	Hypothesis Accepted
ACP	-1.2236	2.3060	H_0 - insignificant
SALES	0.49490	2.3060	H_0 - insignificant
CCC	0.38303	2.3060	H_0 - insignificant
ITD	1.6819	2.3060	H_0 - insignificant
APP	0.57316	2.3060	H_0 - insignificant
DEBTS	0.32883	2.3060	H_0 - insignificant
INF	-0.70972	2.3060	H_0 - insignificant

The above results show that all variables in our model are insignificant at 5% level of confidence. The independent variables are insignificant in our model.

F-test

Using $\alpha = 5\%$ and $\upsilon(=13-5)=8, k(=5-1)=4$, $f_{tab} = \pm 3.838$.

So with 5% confidence level we get the following results:

$f_{calc} = 3.8604$ F cal= 0.92274

$f_{tab} = 4.884$ F tab= 3.838

As $f_{calc} < f_{tab}$, therefore, the model is overall insignificant at 5% level of confidence.

The actual value determined for R^2 is 0.31571 (0.31%) which is quite reasonable in our model to explain change in NOP in Pakistan.

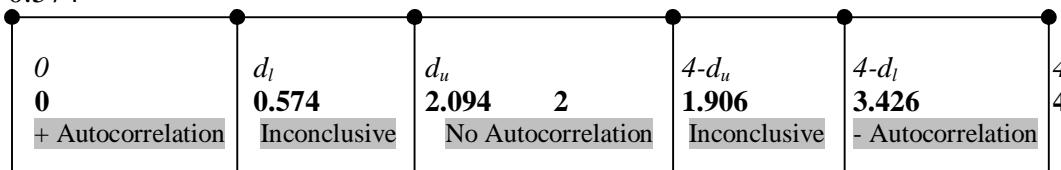**Autocorrelation or Serial Correlation**

To test for the presence of serial correlation we use Durban Watson test For the DW test we use the following table to determine where our DW calculated value lies:

$DW_{calc} = 2.5199$

From our d-statistic table it is determined that using 5% significance level, n, the number of observations and k, the number of independent variables, excluding the constant that:

$d_u = 2.094$

$d_l = 0.574$

0	d_l	d_u		$4\text{-}d_u$	$4\text{-}d_l$	4
0	**0.574**	**2.094**	**2**	**1.906**	**3.426**	**4**
+ Autocorrelation	Inconclusive	No Autocorrelation		Inconclusive	- Autocorrelation	

Since $DW_{calc} = 2.5199$, this falls in the region of inconclusive. Therefore, it is difficult to know if there is autocorrelation in our model.

Heteroscedasticity

The presence of heteroscedasticity can be measure through the Chi-Squared test, where the calculated Chi-Squared result χ_{calc}^{2} is compared with the table Chi-Squared value χ_{tab}^{2}.

$$\chi_{calc}^{2} = n \times R^2 = 13 \times 0.31571 = 4.10423$$

$$\chi_{tab}^{2} = 3.841, 9.488$$

As $\chi_{calc}^{2} < \chi_{tab}^{2}$, therefore, there is no heteroscedasticity exists in the model.

OLS Results with LOG Values

Table 3 describe the regression results of the model with Log values

Table.3: The OLS results with Log values

Variables	Model
Dependent Variable	NOP
Intercept	19.0461 (1.0885)
ACP	-5.6103 (-1.9654)
SG	1.0010 (0.31855)
CCC	0.48625 (0.87242)
ITD	0.46870 (0.78541)
APP	1.03177 (0.22147)
DEBTS	0.378210 (0.74108)
INF	-0.75651 (-1.3527)
R-Squared	0.37738
R-Bar-Squared	0.066071
F-Test	1.2122
DW-Statistics	2.7166

Through the OLS results we established the following relationship:

$$NOP = \beta_0 + \beta_1 ACP + \beta_2 Sales + \beta_3 CCC + \beta_4 ITD + \beta_5 APP + \beta_6 DEBTS - \beta_7 INF + e$$

$$NOP = 190461 + 5.6103 \; ACP + 1.0010 \; SALES + 0.48625 \; CCC + 0.46870 \; ITD$$

$$+ 1.03177 \; APP + 0.378210 \; DEBTS - 0.75651 \; LINF + e$$

From the coefficients we infer that NOP is positively affected from the changes in Sales, CCC, ITD, APP and Debts, where as negatively affected from the changes in ACP and INF. The same analysis as in the previous section applies here.

T-test

Now we attempts to conduct significance tests on the independent variables to check whether the variables are significant in the regression on the NOP.

Using a $\alpha = \dfrac{5\%}{2}$ and $\upsilon (= 13 - 5) = 8$, $t_{tab} = \pm 2.3060$.

So with a 5% confidence interval we obtain the following results:

Regressor	t_{calc}	t_{tab}	**Hypothesis Accepted**
ACP	**-1.9654**	2.3060	H_0 - insignificant
SALES	**0.31855**	2.3060	H_0 - insignificant
CCC	**0.87242**	2.3060	H_0 - insignificant
ITD	**0.78541**	2.3060	H_0 - insignificant
APP	**0.22147**	2.3060	H_0 - insignificant
DEBTS	**0.74108**	2.3060	H_0 - insignificant
INF	**-1.3527**	2.3060	H_0 - insignificant

The above tests show that all variables in our model are insignificant at 5% level of confidence.

F-test

Using $\alpha = 5\%$ and $\upsilon (= 13 - 5) = 8, k(= 5 - 1) = 4$, $f_{tab} = \pm 3.838$.

So with 5% confidence level we get the following results:

$f_{calc} = 3.8604$ F cal= 1.2122

$f_{tab} = 4.884$ F tab= 3.838

As $f_{calc} < f_{tab}$, therefore, the model is overall insignificant at 5% level of confidence.

The actual value determined for R^2 is 0.37738 (0.37%) which is good enough particularly in our model in explaining the NOP in Pakistan.
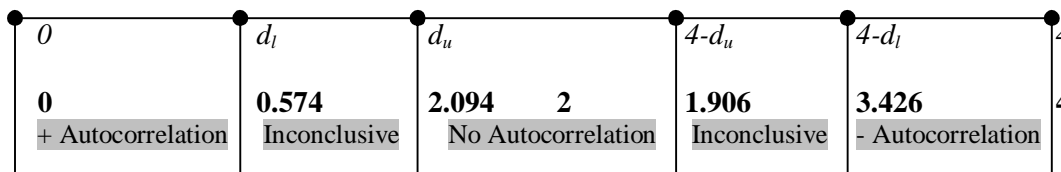
Autocorrelation or Serial Correlation

In OLS results DW calculated value is:

$DW_{calc} = 2.7166$

From our d-statistic table it is determined that using 5% significance level, n, the number of observations and k, the number of independent variables, excluding the constant that:

$d_u = 2.094$

$d_l = 0.574$

0	d_l	d_u		4-d_u	4-d_l	4
0	**0.574**	**2.094**	**2**	**1.906**	**3.426**	**4**
+ Autocorrelation	Inconclusive	No Autocorrelation		Inconclusive	- Autocorrelation	

Since $DW_{calc} = 2.7166$, this falls in the region of inconclusive. Therefore, it is again difficult to know the presence of autocorrelation in our model.

Heteroscedasticity

The presence of heteroscedasticity can be measure through the Chi-Squared test, where the calculated Chi-Squared result χ_{calc}^{2} is compared with the table Chi-Squared value χ_{tab}^{2}.

$$\chi_{calc}^{2} = n \times R^2 = 13 \times 0.37738 = 4.90594$$

$$\chi_{tab}^{2} = 3.841, 9.488$$

Since $\chi_{calc}^{2} < \chi_{tab}^{2}$, therefore, there is no heteroscedasticity exists in the model.

Conclusion

In this paper we investigated and measured the relationship between profitability and working capital management by different variables. The study predicts both negative and positive relationship of the working capital management and firm performance. We found negative relationship of working capital management with Average collection period, while positive relationship was found with Cash Conversion Cycle, Inventory Turnover in days, Debt, Sales and Average Payments Period. 253 firms listed on KSE were taken into consideration for 6 years from 2008-2013 for the analysis of different variables. The study came up with the findings that there is overall inefficiency in the WCM and profitability of Pakistani firms, because all variables and established models are statistically insignificant. The coefficients of APP, CCC, ITD, Sales and Debts are positive, while the coefficient of ACP is negative but statistically insignificant. In addition, the values of R^2 and $\overline{R}^2$ indicates that our models are very weak in explaining the change in NOP.

We ended with the outcome of this study is that Manager must give due consideration to working capital management to boost the firm performance and firm profitability while the negative relationship between ACP and NOP suggest that those firms are less profitable who collect their payments in maximum days.

We hope that this study would contribute to WCM and profitability as Regression analysis is rarely used for the analysis of Working Capital Management and Profitability. It is suggested that further study and research should be carry out on specific sectors to categorize the well-built determents of profitability, and other variables of working capital management shall be used to uncover the specific relationship between profitability and WCM.

Acknowledgements

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