Effective Working Capital Management Affects Profitability: Evidence from Asia

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Abstract

The purpose of this study is to investigate the dependence of profitability on working capital management. Efficiency of working capital management can be measured with cash conversion cycle. Panel data analysis has been used for 332 manufacturing firms listed on respective stock exchanges in Asia including China, Japan, India, Pakistan, Bangladesh, Iran and Korea. Data has been taken from financial statements of respective companies' websites from 2006-2010. Hypotheses were tested using multiple regression analysis and Pearson's correlation. It was found that there is a negative significant relationship between receivable period and firm's profitability, a negative relationship between Inventory period and profitability, negative significant relationship between payment period and profitability and a negative relationship between firm's cash conversion cycle and its profitability. The results show that working capital management directly impacts the firm's profitability, so managers can achieve their major objective of maximizing shareholders wealth by reducing cash conversion cycle, inventory and receivable period and by delaying the payments payable to different parties.

Key Words: Working Capital, Cash Conversion Cycle, Profitability, Asia.

1. Introduction

Working capital management also known as short term financial management determines the optimal level of current assets and current liabilities should be hold by a firm. It addresses two core issues of finance i.e. liquidity and profitability. Current assets are liquid so holding more current assets refer to high liquidity but on the other hand current assets include such items which diminish firm's profitability. Such items include cash, receivables and inventory. Having excessive cash means wasting investment opportunities, even though credit sales increases sales but more receivables means delay in cash inflows with a risk of bad debts same with inventory; excessive inventory can create a cost of storage, insurance etc. which diminishes firm's profitability.

By keeping importance of working capital management purpose of this study is to investigate the dependence of profitability on working capital management for a sample of 332 publically traded manufacturing companies of Asia for the period of five years from 2006-2010. Working capital management also known as short term financial management determines the optimal level of current assets and current liabilities should be hold by a firm. It addresses two core issues of

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finance i.e. liquidity and profitability. Current assets are liquid so holding more current assets refer to high liquidity but on the other hand current assets include such items which diminish firm's profitability. Such items include cash, receivables and inventory. Having excessive cash means wasting investment opportunities, even though credit sales increases sales but more receivables means delay in cash inflows with a risk of bad debts same with inventory; excessive inventory can create a cost of storage, insurance etc. which diminishes firm's profitability.

Cash conversion cycle, net operating working capital and liquidity ratios are three major tools to check efficiency of working capital management. Net operating working capital is the difference between current operating assets (current assets less marketable securities) and current operating liabilities (current liabilities less interest bearing short term accounts i.e. notes payables). Cash conversion cycle is the gap between a firm pays its payables and collects its receivables. It is found by subtracting payment period from sum of inventory period and receivable period.

Effective working management refers to maintaining a tradeoff between firm's liquidity and profitability. This suggests that a firm should speed up cash circulation by reducing the costs and maintaining profitability. Speeding up cash refers to collection of receivables as soon as possible and avoiding bad debts.

Literature identifies different variables concerning working capital management that affect profitability of manufacturing firms. In our study selection of independent variables has been made on basis of different theories of working capital management and firm's profitability.

Our study confirms the findings of previous studies made by different researchers testing dependence of profitability on working capital management.

2. Literature Review
Investopedia defines working capital management as "A managerial accounting strategy focusing on maintaining efficient levels of both components of working capital, current assets and current liabilities, in respect to each other. Working capital management ensures a company has sufficient cash flow in order to meet its short-term debt obligations and operating expenses."

There have been so many studies on "Relationship between working capital management and profitability". According to previous studies we can categorize working capital management researches into three groups.
- Relationship between Working capital management and firm's profitability
- Relationship between working capital management and value creation of firm.
- Determinants of working capital.

Deloof (2003) studied the relationship between profitability and management of working capital for 1009 Belgian firms for period of 1992-1996. It was found that most of companies had invested huge amount of cash in their working capital, so it can be expected that working capital has a strong correlation with profitability. So check this concept he used regression and correlation analysis. According to his results inventory period and collection period have negative relationship with profits and payment period has a positive relationship with profitability. This study provides a base for managers in creating value for shareholders by

implimenting the applications of this study. Managers can add value to wealth of shareholders by reducing receivable period and inventory period and cash conversion cycle.

Shin and Soenen (1998) investigated the relationship between working capital management and shareholders' wealth maximization. It was found that management of working capital had significant relationship with liquidity and profitability of companies. This study was done to find relationship between net trade cycle and profitability, net trade cycle was used by them as a measure of WCM. By using regression and correlation analysis it was found that there is a negative relationship between profitability net trade cycles.

Eljelly (2004) tested the tradeoff between profitability and liquidity by using correlation and regression analysis. By taking a sample of 929 companies of Saudi Arabia he found a significant negative relationship between the firm's profitability and liquidity. He explicated that firms' liquidity management dpends upon effective planning and controlling of current assets and current liabilities in a way that ends the risk of meeting short term obligations without investing much in current assets. He found that cash conversion cycle is a better measure of liquidity than current ratio and liquidity has a negative relation with profitability.

Ramachandran and Janakirama (2006) studied the firm's efficiency in wcm in the paper industry in India. They analysed the relationship between working capital management efficiency and earning before interest and taxes (EBIT). Using regression analysis it was found that there is an inverse relationship between EBIT and CCC, poitive relation between Payable Period and EBIT, which means profitable firms delay their payables. It was further found that there is a positive relationship between collection period and EBIT. This means credit facility increases sales of firm which ultimately increases profitability.

Raheman and Nasr (2007) studied the relationship between working capital and profitability of Pakistani firms. They analysed the data of 94 firms lisetd on stock exchange for period of six years (1999-2004). It was found that most of the firms invest huge amount of cash in their working capital. Results showed that profitability is inversly related to receivable collection period, average inventory period, cash conversion cycle and payment defferal period.

Garcia-Teruel and Martinez-Solano analyzed the panel data of 8872 small and medium enterprises from Spain for the period of 1996-2002. They investigated the impact of working capital on profitability of firms. It was found that profitability is inversely realted with inventory period and cash conversion cycle. Therefore managers can increase shareholders wealth by reducing inventory and receivable period.

Lazaridis and Tryfonidis (2005) studied 131 companies listed on Athens Stock Exchange for 2001 to 2004 to investigate the impact of profitability and managing working capital. By using regression and correlation analysis it was found that there is significant relation between profitability and components of working capital. They found a significant positive relationship between profit margins and inventory and a negative relationship between receivable days and profitability. Furthermore it was found that there is positive relationship between payment period

and profitability, this means profitable firms delay their payments. Therefore managers can increase shareholders wealth by reducing inventory and receivable period.

Mathuva tested 15 year data of 30 firms of Kenya to investigate the relationship between profitability and management of working capital. Data were analyzed using Pearson and Spearman's correlations. He found a significant positive relationship between profit margins and inventory and negative relationship between receivable days and profitability. Furthermore it was found that there is positive relationship between payment period and profitability, this means profitable firms delay their payments.

Banos-Caballero, Garcıa-Teruel and Martınez-Solano (2009) analyzed the factors influencing cash conversion cycle for small and medium enterprises (SMEs). They used panel data of 4076 Spanish SMEs from 2001-2005.From this study it was found that every SME has a target CCC period and they adjust themselves to that target very quickly. Results showed that older companies had longer CCC and growing companies used more aggressive working capital policy so ultimately had shorter CCC.

Afza and Nazir (2007) investigated the relationship between working capital policies and profitability for 208 companies listed on KSE for a period of 1998 to 2005. By using regression analysis it was found that there is an inverse relationship between companies' profitability and working capital policies which validates the study of Carpenter and Johnson (1983) and was found that there is not any significant relation between firms' risk and level of current assets and current liabilities.

Hill, Kelly and Highfield (2010) studied the components of working capital. They analysed panel data of 3343 companies over the period of 1996-2006. This study emphasized on working capital requirement. It was found that there is inverse relationship between working capital requirement and growth in sales and cost of externally raised capital and a positive relationship with operating cash flows and access to capital market.

Ghosh and Maji (2003) studied the firm's efficiency in wcm in the cement industry in India. They analysed the relationship between working capital management efficiency and earning before interest and taxes (EBIT). Using regression analysis it was found that there is an inverse relationship between EBIT and CCC, poitive relation between Payable Period and EBIT, which means profitable firms delay their payables. It was further found that there is a positive relationship between collection period and EBIT. This means credit facility increases sales of firm which ultimately increases profitability.

All above studies give us a strong background about working capital management. From different researches we get different results and conclusions which help us in conducting this study and developing reaserch methodology.

3. Research Methodology

This portion of article describes sample, variables, hypothesis development and statistical methods to investigate the dependence of profitability on working capital.

3.1 Data set and Sample
Data for this study was collected through web sources, firstly websites of stock exchanges were visited than available data were collected from stock exchange's website and for other firms data were collected from respective company's websites. Our study covers time period of 5 years from 2006 to 2010. We have taken data from financial statements of 332 firms listed on respective country's stock exchange. In our study we excluded finance companies such as banks and insurance because of their different nature of operations and companies with missing data were also excluded.

3.2 Variables
3.2.1 Dependent Variable
Profitability
Gross Profit from operation is taken as dependent variable, in other terms it is gross return on non-financial assets. It is calculated by dividing gross profit by total non-financial assets.

3.2.2 Independent Variables
Cash Conversion Cycle:
Firms purchase inventories from suppliers on credit and then sell inventory on credit as well. In both cases cash flows are delayed. CCC refers to time in days between a firms pays its payables and receives receivables. CCC is the difference between sum of inventory period and receivable period (operating cycle) and payment period

Inventory Period:
It is average number of days to convert raw materials into finished products and then selling them to customers. Inventory period is calculated by dividing average inventory by average sales per day.

Receivable Period:
It is average number of days to collect account receivables also known as days sales outstanding and collection period. It is calculated by dividing average receivables by average sales per day.

Payment Period:
It is average number of days a firm should delay cash outflows to suppliers for materials and to labor for their services. It is calculated by dividing average payables by average purchases per day.

3.2.3 Control Variables
Short Term Liquidity:
Liquidity affects profitability of firms, so to keep its effect neutral we have used current ratio as control variable. It is calculated by dividing current assets by current liabilities.

Size of firm:
It is obvious that firms' size affects profitability; to keep size as constant factor we have used natural logarithm of sales as control variable.

Short Term financial assets:
Financial assets are used to obtain short term profits, these assets vary company to company, so to keep its effect neutral we have taken it financial assets to company's total asset ratio as control variable and is calculated by dividing financial assets by total assets.

Leverage:
To keep the debt utilization effect constant debt to asset ratio is taken as control variable, it is calculated by dividing total debt by total assets.

Table 1: Variables

Variables	
Dependent	Gross Operating Profitability (G.O.P)
Explanatory	Receivable Period (RP)
	Inventory Period (IP)
	Payment Period (PP)
	Cash Conversion Cycle (CCC)
Control	Current Ratio (CR)
	Natural Log of Sales (LnSales)
	Finacial Assets to Total Assets (FTA)
	Debt to Asset Ratio (DAR)

3.3 Development of Hypothesis

H_{o1} *Receivable collection period (RP) has a positive relationship with profitability.*

H_{o2} *Inventory period has a positive relationship with profitability.*

H_{o3} *Payment period has a positive relationship with profitability.*

H_{o4} *Cash conversion cycle has a positive relationship with profitability.*

3.4 Model
Model 1
This model is used to test our first hypothesis; dependence of gross operating profit on average receivable period (RP).
$$\textbf{G.O.P}_{it} = \beta_o + \beta_1 (RP_{it}) + \beta_2 (CR_{it}) + \beta_3 (FTA_{it}) + \beta_4 (LnSales_{it}) + \beta_5 (DAR_{it}) + \mathrm{\epsilon}$$

Model 2
This model is used to test our second hypothesis; dependence of gross operating profit on average inventory period (IP).

$$\textbf{G.O.P}_{it} = \beta_o + \beta_1 (IP_{it}) + \beta_2 (CR_{it}) + \beta_3 (FTA_{it}) + \beta_4(LnSales_{it}) + \beta_5 (DAR_{it}) + \epsilon_{it}$$

Model 3
This model is used to test our second hypothesis; dependence of gross operating profit on average payment period (PP).

$$\textbf{G.O.P}_{it} = \beta_o + \beta_1 (PP_{it}) + \beta_2 (CR_{it}) + \beta_3 (FTA_{it}) + \beta_4(LnSales_{it}) + \beta_5 (DAR_{it}) + \epsilon_{it}$$

Model 4

This model is used to test our second hypothesis; dependence of gross operating profit on cash conversion cycle (CCC).

$$\textbf{G.O.P}_{it} = \beta_o + \beta_1 (CCC_{it}) + \beta_2 (CR_{it}) + \beta_3 (FTA_{it}) + \beta_4 (LnSales_{it}) + \beta_5 (DAR_{it}) + \epsilon_{it}$$

Table2: Proxy Variable, Definition and Predicted Realtionship

Proxy	Definition	Predicted Sign
G.O.P	Gross Operating Profit	
RP	Receivable Period	-/+
IP	Inventory Period	-/+
PP	Payment Period	-/+
CCC	Cash Conversion Cycle	-/+
CR	Current Ratio	-/+
FTA	Financial to Total Asset Ratio	-/+
LnSales	Natural Log of Sales	-/+
DAR	Debt to Asset Ratio	-/+

4. Data Analysis
Data is analyzed by using SPSS and EVIEWS. This portion consists of descriptive statistics, correlation and regression analysis.

4.1 Descriptive Statistics
Descriptive statistics is presented in table 3. It shows that on average firms earn a gross operating profit of 32%, where as firms take average 79.17 days to convert inventory into final goods. Firms delay their payables for 46.84 days and average collection period for firms is 56.8 days. On average firms' cash conversion cycle is 90 days. In terms of liquidity current ratio suggsts

that on average firms can pay their short term liabilities 1.08 times out of current assets. It further shows that on average firms hold 3.67% financial assets.

Table 3: Descriptive Statistics

Descriptive Statistics (N = 1660)				
	Minimum	**Maximum**	**Mean**	**S.D**
RP	13.4	148.56	56.8	21.33
PP	9.33	243.56	46.84	31.6
IP	13.9	302.33	79.17	49.5
CCC	14.68	273.43	90.34	53.34
LnSales	3.67	8.54	6.52	0.79
CR	0.15	2.65	1.08	0.36
FDR	0.03	0.67	0.33	0.19
FTA	0	0.23	0.0367	0.043
G.O.P	0.012	0.76	0.32	0.19

N = Number of Observations.

4.2 Pearson's Correlation

Table 4 presents Pearson's Correlation for all used variables.

Table 4: Pearson Correlation Analysis

Pearson Correlation Analysis								
	G.O.P	**RP**	**PP**	**IP**	**CCC**	**CR**	**LnSales**	**FDR**	**FTA**
G.O.P	1	-0.316**	-0.34**	-0.451**	-0.53**	-0.36**	0.19	-0.14	-0.073
RP		1	0.239**	0.319**	0.56**	0.01	0.008	-0.12	-0.346
PP			1	0.237**	-0.063	-0.068	-0.0058	-0.036	-0.143
IP				1	0.871**	0.05	0.003	-0.051	-0.095
CCC					1	0.064	0.054	-0.216	-0.221
CR						1	0.043	-0.105	-0.125
LnSales							1	-0.117	-0.151
FDR								1	-0.124
FTA									1

** Correlation is significant at the 0.05 level (2-tailed)

From table we can easily find the relationship between profitability and components of working capital. It shows that gross operating profit is negatively correlated with receivable period, inventory period and cash conversion period, which shows that any increase in any of these factors will reduce gross operating profitability of firms. It shows that payment period has a negative significant relationship with gross operating profitability, which means if firms delay their payments they will earn less profits; the reason behind this is that firms can take the advantage of discounts by paying soon. We can also see that correlation for explanatory variables is significant at 5%. Correlation between profit and current ratio is negative which shows the relationship between profitability and liquidity. It shows that companies with more liquidity are less profitable.

4.3 Regression Analysis
Model 1
Table 5 represents the regression results of first model. According to first regression model hypothesis 1 is rejected that receivable collection period (RP) has a positive relationship with profitability. Null hypothesis is rejected as coefficient of RP is significant at 5% level at which calculated t-statistic is more than critical value. So it shows that there is a negative significant relationship between receivable period and profitability. Firms late in collecting their receivables earn low profits as compared to firms recovering receivables early. To check the multicollinearity VIF is calculated as VIF is less than 5 so it shows that there is no multicollinearity among explanatory variables. Adjusted R square of 36.3% shows that after adjusting for degrees of freedom model is capable to explain 36.3% of profitability.

Table 5: Coefficients Model (A)

Mode	Coefficient	Std. Error	t	Collinearity Statistics	
				Tolerance	VIF
(Constant)	0.0476	0.0257	1.852		
RP	-0.005	0.0018	-2.77	0.7188	1.553
CR	0.0662	0.063	1.050	0.833	1.48
LnSales	0.018	0.026	0.692	0.6749	1.45
FDR	-0.542	0.165	-3.2814	0.63	1.74
FTA	0.554	0.41	1.3512	0.8953	1.42

Summary Model (A)

R Square	Adjusted R Square	Std. Error of the Estimate	F-Statistic	Durbin-Watson
0.383	0.363	0.089	4.674	1.74

Model 2
Table 6 represents the regression results of second model. Second regression model rejects null hypothesis at 5% significance level as calculated t-statistic is more than critical value. So it shows that there is a negative significant relationship between inventory period and profitability. Firms with high inventory turnover in days earn low profits as compared to firms with low inventory turnover in days. To check the multicollinearity VIF is calculated as VIF is less than 5 so it shows that there is no multicollinearity among explanatory variables. Adjusted R square of 26.2% shows that after adjusting for degrees of freedom model is capable to explain 26.2% of profitability.

Table 6: Coefficients Model (B)

Mode	Coefficient	Std. Error	t	Collinearity Statistics	
				Tolerance	VIF
(Constant)	0.018	0.234	0.076		
IP	-0.004	0.0014	-2.857	0.887	1.127
CR	0.0821	0.076	1.08	0.713	1.401
LnSales	0.053	0.0331	1.601	0.727	1.3755
FDR	-0.191	0.129	-1.48	0.81	1.234
FTA	0.423	0.38	1.113	0.753	1.328

Summary Model (B)

R Square	Adjusted R Square	Std. Error of the Estimate	F-Statistic	Durbin-Watson
0.276	0.2622	0.120	3.138	1.76

Model 3

Table 7 represents the regression results of third model. According to third regression model hypothesis 3 is rejected that payment period (PP) has a positive relationship with profitability. Null hypothesis is rejected as coefficient of PP is significant at 5% level at which calculated t-statistic is more than critical value. So it shows that there is a negative significant relationship between payment period and profitability. Firms late in paying their payables earn less profit as compared to firms paying early. To check the multicollinearity VIF is calculated as VIF is less than 5 so it shows that there is no multicollinearity among explanatory variables. Adjusted R square of 21.3% shows that after adjusting for degrees of freedom model is capable to explain 21.3% of profitability. Durbin Watson of 1.76 suggests that there is no autocorrelation.

Table 7: Coefficients Model (C)

Mode	Coefficient	Std. Error	t	Collinearity Statistics	
				Tolerance	VIF
(Constant)	0.038	0.249	0.132		
PP	-0.006	0.0023	2.808	0.923	1.083
CR	0.0921	0.08	1.1512	0.813	1.237
LnSales	0.046	0.033	1.3939	0.834	1.199
FDR	-0.252	0.147	-1.7142	0.824	1.213
FTA	0.432	0.34	1.27	0.845	1.834

Summary Model (C)

R Square	Adjusted R Square	Std. Error of the Estimate	F-Statistic	Durbin-Watson
0.232	0.213	0.121	2.43	1.67

Model 4

Table 8 represents the regression results of fourth model. Fourth regression model rejects null hypothesis at 5% significance level as calculated t-statistic is more than critical value. So it shows that there is a negative significant relationship between cash conversion cycle and profitability. Firms with high cash conversion cycle earn low profits as compared to firms with low cash conversion cycle. To check the multicollinearity VIF is calculated as VIF is less than 5 so it shows that there is no multicollinearity among explanatory variables. Adjusted R square of 28.2% shows that after adjusting for degrees of freedom model is capable to explain 28.2% of profitability.

Table 8: Coefficients Model (D)

Mode	Coefficient	Std. Error	t	Collinearity Statistics	
				Tolerance	VIF
(Constant)	0.0328	0.02659	0.84		
CCC	-0.003	0.0012	-2.51	0.77	1.298
CR	0.0887	0.063	1.407	0.871	1.147
LnSales	0.061	0.044	1.386	0.786	1.272
FDR	0.039	0.152	0.256	0.66	1.515
FTA	0.37	0.24	1.541	0.743	1.345

Summary Model (D)

R Square	Adjusted R Square	Std. Error of the Estimate	F-Statistic	Durbin-Watson
0.297	0.282	0.161	2.71	1.78

5. Conclusion and Suggestions

This study shows the effect of working capital management on profitability of Asian manufacturing firms. After analyzing the data for 332 firms for the period of 5 years from 2006-2010 by using regression and correlation analysis it is found that profitability of firms depends upon effective working capital management. Gross operating profitability is negatively related with account receivables collection period, whereas it also has a negative relation with inventory period and cash conversion cycle. On the other hand it is positively correlated with payment period, it's better to delay payables because it gives opportunity to invest that specific amount at some other place which gives more profitable opportunities.

Eventually we can say that effective working capital management has a great impact on profitability. Managers responsible for value creation and wealth maximization can achieve their objectives by managing firms' working capital. Managers should focus on reducing cash conversion cycles and should try to collect receivables as soon as possible because it is better to receive inflows sooner than later. Furthermore managers should reduce inventory periods and try to delay payables because it will provide them opportunities to invest in different profitable areas, which will eventually increase firms' profitability.

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Appendix
Formulas

CCC = Inventory Period + Receivable Period – Payment Period

Inventory Period =   */365*

Receivable Period =   */365*

Payment Period =   */365*

Gross Operating Profitability =   –

Current Ratio =

Financial to Total Assets Ratio =

Debt to Asset Ratio =   *h*   *+*