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Working Capital Management and Corporate Profitability: Evidence from Iran

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Abstract: The main objective of this research is studying the relationship between working capital management and profitability. Cash conversion cycle is one of the important measuring tools to calculate the efficiency of working capital management. The time realm of the research was 2001-2006 and the studied companies have been the ones accepted in Tehran stock exchange. In general, out of 2628 companies; the company has been selected as a top company for 1063. Then multiple regression and Pearson's correlation was used to test the hypothesis. The results of the statistical test of the hypothesis indicate that there is a negative significant relation between number of days accounts receivable and profitability, a negative significant relation between Inventory turnover in days and profitability, a direct significant relation between number of day's accounts payables and profitability and there is a negative significant relation between cash conversion cycle and profitability. The results of the research show that in the studied companies, there is a significant relation between working capital management and profitability and working capital management has a great effect on the profitability of the companies and the managers can create value for shareholders by means of decreasing receivable accounts and inventory.

Key words: Working Capital Management · Profitability · Cash Conversion Cycle · Iran

INTRODUCTION

Net operational working capital is defined as operational current assets minus operating current liabilities. It usually equals to cash, receivable accounts and inventory minus payable accounts and delayed accounts [1]. Effective working capital management consists of applying the methods which remove the risk and lack of ability in paying short term commitments in one side and prevent over investment in these assets in the other side by planning and controlling current assets and liabilities [2].

Beside the definitions about the effective working capital management, lean working capital management term is used nowadays which is defined like this:

Lean working capital management is selecting the best methods:

First, the profit of the company does not decrease. Second, the speed of cash circulation in creases and finally the costs decrease. The main consideration of the lean working capital management is increasing cash flow speed, decreasing irrecoverable receivables and decreasing the costs to create opportunities to maximize the wealth. Financial operations inefficient management can lead to several main deficiencies existence [3]. The main criterion of effective working capital management has been introduced by researchers such as shin and Soenen [4], Lazaridis and Tryfonidis [2], Teruel and Solano [5], Amir Shah and sana [6] as cash conversion cycle. The different parts of working capital are payable accounts receivable account and inventory that con manage these parts in different ways to maximize the profit or to increase company's value [7]. In Iranian companies, the ratio of payable accounts was 8% as compared with total assets and the ratio of receivable accounts and Inventory as compared with total assets was 17% and 20% respectively, in 2006. For an example, in the same year, current assets percent was 62 on the average to total assets and current debts percent is 83.so working capital management is very important in Iranian companies and the subject is propounded that how the companies take action to manage working capital items to affect the profit and value of the company positively?

If the working capital management is not correct, the sale and consequently the profit of the company might decrease and the company may be unable to pay its debts

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and commitments on time [8]. Also *CFO Magazine* identifies working capital management as one of the key issues facing financial executives in the 21st century. The most salient example of working capital management importance and its effect on the companies relates to Amazon Company which is one of the biggest active companies in electronic business and different kinds of goods. In about the middle of 2000, it was specified that the working capital management in this company has caused share holding Price decrease according to the accomplished survey [9].

Literature Review: Analyzing the previous studies in different countries showed the necessity of a similar study in Iran. For the future orientation, we need the knowledge that how much working capital management methods and models have effects of the aspects of financial situation of the company which are the aims. In general, the researches around working capital management can be divided into 3 groups.

- Researches about the relationship of working capital management and company profitability.
- Researches about the relationship of working capital management and the value creation of the companies.
- Other researches about working capital management.

Lazaridis and Tryfonidis [2], Teruel and Solano [5], Amir shah and Sana [6], Padachi [10], Jose *et al*, [11], Shin and Soenen [4], Eljelly [12], Lyroudi and lazaridis [13], Beaumont and Begemann [14] Ren Chiou *et al*, [15] and Wang [16] Studied the effect of working capital management on the profitability of the companies. They used cash conversion cycle to evaluate working capital management and they used different profitability ratios such as net operating profit ratio, gross operating profit ratio, return on assets ratio, return on equity ratio, marginal net profit ratio and return on investment. The results of the researches show that there is a negative relationship between cash conversion cycle and profitability criterion and working capital management has a great effect on the profitability of the companies and the managers of the companies create valuation for stockholders by effective working capital management and cash conversion cycle decrease. Researchers such as Poirters [17], Moussawi *et al*, [18], Filbeck *et al*, [9] did some researches about the relationship between working capital management, Cash sufficiency and the value of the companies. Cash conversion cycle has also been used in the researches to evaluate working capital management. The results of the researches show that there is a significant relationship between cash conversion cycle and cash sufficiency with company market value. And the results of the researches show that cash conversion cycle decrease is one of the key and important factors for profitability increase and consequently company value increase.

Jadid bonab [19] also studied working capital management of Iranian companies. The results of his research showed that there is working capital management in Iranian companies, but in some of Iranian companies the abolished methods of working capital management are used (for example economic order quantity method is used but the just in time system is not applied) and the managers of the companies do not use the other managers help in working capital items control.

The Objectives and Hypothesis of the Research: This research objectives and hypothesis is:

- Studying the relationship between effective working capital management (cash conversion cycle) and profitability during 2001-2006.
- Studying the effect of different components of cash conversion cycle on the profitability of the companies.
- And concluding about the relationship between working capital management and profitability of the companies.

To Get These Objectives, the Following Hypothesis Propounded

The First Hypothesis: There is a significant relation between Average collection period and profitability.

The Second Hypothesis: There is a significant relation between Inventory turnover in days and profitability.

The Third Hypothesis: There is a significant relation between Average Payment Period and profitability.

The Fourth Hypothesis: There is a significant relation between effective working capital management that cash conversion cycle is its evaluating criterion and profitability.

Research Methodology: The research tries to study the effect of working capital management on profitability of the accepted companies in Tehran stock exchange. Multiple regression and correlation analysis has been

used to study the relationship between independent variables (cash conversion cycle and its components) and dependent variable (GOP). The required data were collected from financial statements of the accepted companies in Tehran stock exchange therefore they got ready to be analyzed by adding up and by accounts related to variables. SPSS and E-VIEWS software has been used for analysis of the different variables in this study. I started with the 2628 firms for which a financial statement was available for each year of the (2001-2006) period. Because of the specific nature of their activities, firms in (banking and finance, insurance, investment) and were excluded from the sample. 2628 companies have been selected during 6 years of study and considering the above limitation, 1063 companies have been chosen as a sample. To test the hypothesis of the research, 4 models have been used to analyze the relationship between the variables, which are explained below:

The First Model: the first hypothesis test model; the relation of Average collection period and profitability.

$$GOP\ it = \beta 0 + \beta 1(ACP\ it) + \beta 2(LOS\ it) + \beta 3(CR\ it) + \beta 4(DR\ it) + \beta 5(FATA\ it) + \varepsilon$$

The Second Model: the second hypothesis test model; the relation of Inventory turnover in days and profitability.

$$GOP\ it = \beta 0 + \beta 1(ITID\ it) + \beta 2(LOS\ it) + \beta 3(CR\ it) + \beta 4(DR\ it) + \beta 5(FATA\ it) + \varepsilon$$

The Third Model: the third hypothesis test model; the relation of Average Payment Period and profitability.

$$GOP\ it = \beta 0 + \beta 1(APP\ it) + \beta 2(LOS\ it) + \beta 3(CR\ it) + \beta 4(DR\ it) + \beta 5(FATA\ it) + \varepsilon$$

The Fourth Model: the fourth test model; the relation of cash conversion cycle and profitability.

$$GOP\ it = \beta 0 + \beta 1(CCC\ it) + \beta 2(LOS\ it) + \beta 3(CR\ it) + \beta 4(DR\ it) + \beta 5(FATA\ it) + \varepsilon$$

Where:
GOP = gross Operating Profit
ACP = Average Collection Period
LOS = the size of the company
CR = Current Ratio
DR =Debt Ratio
FATA= Financial Assets to Total Assets
ITID =Inventory Turnover in Days
APP = Average Payment Period
CCC = Cash Conversion Cycle
ε = The error term.
β 0, …, β5= Regression model coefficient

Variables

Independent Variables

Cash Conversion Cycle (CCC): The term, cash conversion cycle, first was propounded by Hager (1976) and it was used by many researchers [13]. Usually the companies first have credit transactions buying and selling the goods in credit and then they recover receivable account which is called cash conversion cycle. The correct policy of working capital management is minimizing the time between expenses for getting Inventory and cash reception resulted of selling it [20]. Cash conversion cycle is calculated in this way; (Inventory Turnover in Days+ Average Collection Period-Average Payment Period).

Inventory Turnover in Days (ITID): is the average required time to change the materials into the product and then sell the goods. It is calculated in this way:

$$ITID = \frac{Inventory \times 365}{cost\ of\ goods\ sold}$$

Average Collection Period (ACP): is the average required time for changing the company's receivables into cash. It is calculated in this way:

$$ACP = \frac{Receivable\ accounts \times 365}{sale}$$

Average Payment Period (APP): is the average time between buying materials and using lab our force and cash payment relates to them. Average Payment Period is calculated in this way:

$$APP = \frac{payable\ accounts \times 365}{cost\ of\ goods\ sold}$$

Dependent Variable

Profitability (GOP): Gross Operation Profit ratio has been used in this research to measure the company profitability that is calculated in this way:

$$GOP = \frac{sale - cost\ of\ goods\ sold}{total\ assets - financial\ assets}$$

Control Variables

Liquidity (CR): The companies with more Liquidity have more profitability, so Liquidity variable has been used as control variable in order to make its effect on profitability neuter. Current ratio has been used as Liquidity criterion.

$$CR = \frac{Current\ assets}{Current\ liabilities}$$

The Company Size (LOS): The companies which have more sales naturally have more profitability too. So the company size variable is used to control the effect of this issue. The company size is: *natural logarithm (sale)*

Financial Assets (FATA): on the average, 4% out of total assets in Iranian companies are financial assets and since they are bought for profitability purposes, so these assets affect profitability. Therefore this variable is used as control variable in order to make its effect neutral on the company profitability. Long term and short term investments in stock and bills of exchange of the other companies are considered as financial assets.

$$FATA = \frac{Financial\ assets}{Total\ assets}$$

Debt Ratio (DR): used as proxy for Leverage and is calculated by dividing Total Debt by Total Assets.

$$DR = \frac{Total\ debts}{Total\ Assets}$$

Data Analysis and Hypothesis Testing

Descriptive Statistics: After presenting descriptive statistics in Table (1), regression analysis and correlation is presented. To do this, first deviated observations of the study are distinguished from the total statistical sample and after this distinction, we delete them. So to test the hypothesis, regression method has been used. To estimate the research models, first pooled ordinary least squares method is used. After that due to dispersion non-homogeneity existence to create changes in short time. Weighted least square method has been used to reach to more correct and better results about hypothesis test. All regression models were tested for multicollinearity. The variance inflation factor (VIF) is used to detect whether one predictor has a strong linear association with the remaining predictors (the presence of multicollinearity among the predictors).VIF measures how much the variance of an estimated regression coefficient increases if your predictors are correlated.The largest VIF among all predictors is often used as an indicator of severe multicollinearity. Montgomery and Peck [21] suggest that when VIF is greater than 5-10, then the regression coefficients are poorly estimated.

Research Findings

The First Regression Model: With testing the first hypothesis, result indicates that there is a significant relation between the average collection period and profitability. As it was already mentioned regression model relates to the first hypothesis test of the first model. Table (3) offers that, H0 hypothesis is rejected in the confidence level of 0.95 and H1 hypothesis is accepted.

Table 1: Descriptive statistics of the collected variable

	N	Minimum	Maximum	Mean	Std. Deviation
ACP	1063	.00	346.44	100.7606	67.05076
ITID	1063	-463.73	1026.61	191.3368	127.75408
APP	1063	-126.61	891.34	56.7895	71.12926
CCC	1063	-720.49	1005.05	235.3082	151.40260
LOS	1063	7.8517	16.4793	12.096737	1.2424204
CR	1063	.1217	2.3682	1.069692	.3441503
DR	1063	.2715	1.4367	.741029	.1837048
FATA	1063	.000000	.215976	.03834075	.047506079
GOP	1063	-.069	.442	.17959	.086650

Source: Calculations Based on Annual reports of firms from 2001-2006

Table 2: Correlation for the Collected Variable

	ACP	ITID	APP	CCC	GOP	
ACP	Pearson Correlation	1				
	Sig. (2-tailed)					
ITID	Pearson Correlation	.146**	1			
	Sig. (2-tailed)	.000				
APP	Pearson Correlation	.193**	.199**	1		
	Sig. (2-tailed)	.000	.000			
CCC	Pearson Correlation	.475**	.815**	-.216**	1	
	Sig. (2-tailed)	.000	.000	.000		
GOP	Pearson Correlation	-.173**	-.190**	-.214**	-.136**	1
	Sig. (2-tailed)	.000	.000	.000	.000	

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

Table 3: the Result of the First Hypothesis Test

Dependant Variable: Gross Operating Profitability(GOP) General Least Square (Cross Section Weight)										
	ACP	ITID	APP	CCC	LOS	CR	DR	FATA	*Adjusted R2*	F-Statistics
first hypothesis regression		GOPit= β0 + β1(ACP it)+ β2(LoS it) + β3(CR it) + β4(DRit) + β5(FATA it) + ε								5775/126
t-statistics	-7/74	-	-	-	71/1	86/9	66/8-	69/6	67/0	-
P-Value	000/0	-	-	-	086/0	000/0	000/0	000/0	-	000/0
Coefficient	-0.0002	-	-	-	0.0032	0.0032	-0.1325	0.3195	-	-
VIF	1/1	-	-	-	0/1	5/1	5/1	1/1	-	-

Table 4: the Result of the Second Hypothesis Test

Dependant Variable: Gross Operating Profitability(GOP) General Least Square (Cross Section Weight)										
	ACP	ITID	APP	CCC	LOS	CR	DR	FATA	*AdjustedR2*	F-Statistics
second hypothesis regression		GOPit= β0 + β1(ITID it)+ β2(LoS it) + β3(CR it) + β4(DRit) + β5(FATA it) + ε							1358/217	
t-statistics	-	-9/03	-	-	48/5	04/12	09/93-	74/6	64/0	-
P-Value	-	000/0	-	-	000/0	000/0	000/0	000/0	-	0000/0
Coefficient	-	-0.00009	-	-	0.0092	0.0916	0.3387	0.3387	-	-
VIF	-	1/1	-	-	1/1	5/1	5/1	1/1	-	-

Table 5: the Result of the Third Hypothesis Test

Dependant Variable: Gross Operating Profitability(GOP) General Least Square (Cross Section Weight)										
	ACP	ITID	APP	CCC	LOS	CR	DR	FATA	*AdjustedR2*	F-Statistics
Third hypothesis regression		GOPit= β0 + β1(APP it)+ β2(LoS it) + β3(CR it) + β4(DRit) + β5(FATA it) + ε							1071/113	
t-statistcs	-	-	91/2	-	44/1-	1	60/10-	62/11	66/0	-
P-Value	-	-	003/0	-	147/0	313/0	000/0	000/0	-	000/0
Coefficient	-	-	2.94E-05	-	-0.0027	0.0092	-0.1616	0.6148	-	-
VIF	-	-	1/1	-	0/1	4/1	5/1	1/1	-	-

Therefore we can conclude that there is a negative significant relation between the average collection period and profitability. And VIF statistics amounts according to the table (3) are less than 5 which indicate that there is absence of multicollinearity between the predictors in the regression model.

The Second Regression Model: H_1 hypothesis states that there is a significant relation between Inventory Turnover in Days and profitability. As it was already mentioned the regression model relates to the second model hypothesis. As it is observed in table (4), H0 hypothesis is rejected in confidence level of 0.95 and H_1 hypothesis is accepted. So it can be concluded that there is a negative significant relation between Inventory Turnover in Days and profitability. VIF statistics amounts in table (4) are less than 5 which indicate that there is absence of multicollinearity between the predictors in the regression model.

The Third Regression Model: H_1 hypothesis states that there is a significant relation between the Average Payment Period and profitability. As it was already mentioned, the regression model relates to this third model hypothesis. As it is observed in table (5), H0 hypothesis is rejected in confidence level of 0.95 and H_1 hypothesis is accepted. Finally it can be said that the relation is negative. But this conclusion is not compatible with the propounded views that state profitability increases by increasing Average Payment Period (or delaying the payment period of payable accounts. So in this research to have a correct conduction and calculate the correct related ratios, weighted least squares have been used and the calculated ratio is positive by means of weighted least squares so we conclude that there is a direct significant relation between Average Payment Period and profitability. This conclusion deals with the views which state that increasing Average Payment Period, The profitability increases. Also VIF statistical amount is less than 5.

The Fourth Hypothesis Test: H_1 hypothesis states that there is a significant relation between cash conversion cycle and profitability. As it was already mentioned, the regression model related to this hypothesis is the fourth model. Table (6) presents the results considering

Table 6: the Result of Fourth Hypothesis Test

Dependant Variable: Gross Operating Profitability (Weighted Least Squares)										
	ACP	ITID	APP	CCC	LOS	CR	DR	FATA	*AdjustedR2*	F-Statistis
Fourth hypothesis regression	GOPit= β0 + β1(CCC it)+ β2(LoS it) + β3(CR it) + β4(DRit) + β5(FATA it) + ε								8280/202	
t-statistics	-	-	-	92/12-	79/3	10/12	95/8-	08/6	66/0	-
P-Value	-	-	-	000/0	0002/0	000/0	000/0	000/0	-	000/0
Coefficient	-	-	-	-0.0001	0.0066	0.0927	-0.1200	0.2952	-	-
VIF	-	-	-	1/2	1/1	5/1	4/1	1/1	-	-

Hypothesis 4. H0 hypothesis is rejected and H1 hypothesis is accepted. So we can conclude that there is a negative significant relation between cash conversion cycle and profitability which is consistent with the view that a decrease in the cash conversion cycle will generate more profits for a company Also VIF statistical amount is less than 5.

CONCLUSION

The results of the research show that in the studied companies there is a significant relation between working capital management and profitability. There is also a negative significant relation between cash conversion cycle and gross operating profit. Also there is a negative significant relation between cash conversion cycle, Inventory Turnover in Days, Average Collection Period except Average Payment Period.

At the end we can conclude that working capital management has a great effect on the profitability of the companies and the managers can create value for the stockholders by decreasing receivable accounts and Inventory and the managers must look for the methods that by means of them and correct management be effective on the profitability of the companies.

Considering the results, research suggestions are in this way;

Considering the result of the research, one of the company aims must be decreasing cash conversion cycle (if no disorder is created in the company operation), it will improve the performance. Since longer the cash conversion cycle, more need the company will have to be provided financially out of the company. It causes expenses increase and value decrease in the company. In general, the following cases decrease cash conversion cycle;

- By means of reduce inventory conversion cycle by processing them and quick sale of the products.
- By decreasing average collection period by speeding receivables reception.
- By delaying or making debts payment period longer by slowing company's payments, this operation continues up to the time that doesn't cause expense increase and sale [2].
- The results of a survey show that decrease for 10 days in cash conversion cycle of American companies leads to 12.76% to 13.02% in their profitability. It was specified in the research that the companies whose cash conversion cycle is 10 days less than the companies average, their stock return is 1.7% more than the companies average [3].

The results of other researches show that one day cash conversion cycle decrees cause 1.3 million euro increase in market value [17].

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