

Relationship between Working Capital Management and the Performance of Firm in Different Business Cycles

Maryam Pakdel ¹, Majid Ashrafi ^{1*}

¹ Department of Accounting, Aliabad Katoul Branch, Islamic Azad University, Aliabad Katoul, IRAN

*Corresponding Author: Mjd_Ashrafi@yahoo.com

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ABSTRACT

Working capital management is one of the issues that plays an important role in the management structure of an organization and as one of the main force moving forward organizations, it is important to obtain huge economic benefits. This study focused on the relationship between working capital management and the performance of firm in different business cycles. A sample consist of 80 companies listed in Tehran Stock Exchange from 2002 to 2013 have been selected. In this study, the cash conversion cycle is considered as a measure of working capital management, which consists of days account receivable, days inventory and days account payable. Hypotheses of this study were analyzed using panel method data and the results show that there is a significant negative relationship among the management of working capital and firm performance. Among the components of cash conversion cycle, only day's account receivable has negative and significant relationship with firm performance. The results also show that the various business cycles do not modify the relationship between working capital management and the performance of companies.

Keywords: working capital management, days account receivable, days inventory, days account payable, performance

INTRODUCTION

Working capital management is a key component of corporate finance management because it directly affects profitability (Gill et al., 2010). Working capital is the firm's investment in short-term assets such as cash, short-term securities, accounts receivable and inventory, and net working capital is defined as current assets minus current liabilities (Mohammadi, 2009). Nowadays, working capital management that is the management of resources and current expenditures to maximize shareholder wealth, as part of the task of financial management is important (Cot & Latham 1999). For amazon.com companies in the mid-2000s, working capital management is the key to healthy cash flow and they believe that companies with poor working capital management strategy gradually lose their flexibility and competitive advantage (BahaarMoghadam et al., 2012). Business cycles are fluctuations in total production, income and national employment, which usually lasts from 2 to 10 years and its main indicator, is development or recession in the most sectors of the economy. The economic boom period, refers to the periods that the real GDP started to grow and in the recession period it refers to the periods that it is accompanied by a reduction of real GDP and intercourse with it due to a drop in sales, firms make decisions on reducing the number of workers, buy less raw material and stop development projects in order to reduce spending their expenditures. According to the literature, studies about the relationship between working capital management and the performance of companies in the Tehran Stock Exchange has been done, however, no research regarding the relationship between working capital management on the performance of companies in different business

cycles have been performed. This study could be a step for theoretical studies about an important part of financial management i.e. the company's working capital management. According to spread of the culture of working capital management, it may solve some companies problems so this study scientifically and academically is necessary.

Literature Review and Development of Hypotheses

Cash conversion cycle that is a comprehensive and efficient tool for managing the working capital is widely used in studies. Cash conversion cycle is elapsed time between a company's funding for supplying raw materials and the collection of sales of the finish goods; that in this study we consider it as a measure of working capital management. The purpose of efficient working capital management practices is shorten the cash conversion cycle in order to optimize the levels that are perfectly suited to the requirements of a company. Short-term cash conversion cycle as fast collection of receivables and payment obligations to producers is associated with firm performance. In their study, Karadagli (2012), Yeboah and Kwakuagyei (2012), Aregbeyen (2011), Gill et al (2010), Lazaridis and Tryfonidis (2006), Wang (2002) and Lotfi et al (2012) concluded that there is a negative relationship between the cash conversion cycle and profitability. Cash conversion cycle has three components: days account payable, days account receivable, days inventory. A company by independent optimizing each of these three components minimizes the cash conversion cycle, for example, accounts payable is considered as flexible and affordable source of firm's funding. Delays in payments to firm's producers increase payable accounts payable which in turn significantly reduce cash conversion cycle and provides more efficient working capital. In their research, Samadi Largany and Aymani (2013) concluded that there is a positive relationship between the payment obligations period and profitability. Surplus inventories and longer cash conversion cycle of accounts receivable are leading to an increase in the cash conversion cycle. As a result, companies with low inventory that collect their receivables quickly, have shorter cash conversion cycle and are more efficient, which ultimately have a positive impact on performance.

Given the above, the following hypotheses are considered:

H₁. Working capital management has a negative relationship with the firm performance.

H₁₁. There is a negative relationship between the days account receivable and the firm performance.

H₁₂. There is a positive relationship between the days account payable and the firm performance.

H₁₃. There is a negative relationship between the day's inventory and the firm performance.

Changes in the macroeconomic will effect on investments and the way of company's providing financial capital. Economic recessions and crises attach great importance to liquidity and focus on working capital Conditions. Korajczyk and Levy (2003) suggest that companies that are in financial distress, compared with companies that are not financial distress reacts differently to macroeconomic uncertainty. Such periods indicate that longer periods of time are more likely to collect accounts receivable and inventory due to stop sales. As a result, companies must have additional requirements for working capital. Due to the increasing challenges of undesirable economic terms we assume that working capital management should be seen as more important than the performance during economic recessions. Furthermore, due to the improvement in fixed capital investments and demand during the economic boom has been assumed that the relationship between working capital and profitability in improved economic terms would be less significant (Graham et al., 2014). In an empirical research, Einarsson and Marquis (2001) found that levels of trust and Citation of corporates to funding by bank to meet the needs of working capital in the United States are counter-cyclical and increase with the weakening of the economic situation. Braun and Larrian (2005) also concluded that working capital requirements and conditions are considered as the main cause of business dependence on external financial funding. They suggest that companies that highly depended on foreign financial funding have been most affected by the economic crisis and should be more cautious in terms of the decline and fall of the economy, including the supply of reserves in the working capital during crisis, Chiou et al (2006) pointed to the importance of the economic situation and assess the determinants of working capital to the indexes of trade and found a positive relationship between indexes of trade and working capital requirements.

H₂. Various business cycles moderate the relationship between working capital management and firms' performance. (Intensity of negative relationship of working capital management and the company's performance in the Tehran Stock Exchange increases during the economic recession and the intensity of negative relationship between working capital management and the company's performance in the Tehran Stock Exchange decreases during the boom in the economy.

H₂₁. The intensity of negative correlation between the days accounts receivable and firms' performance increases during the economic downturn.

H₂₂. The intensity of negative correlation between the days accounts receivable and firms' performance decreases during the economic boom.

H₂₃. The intensity of positive correlation between the days account payable and firms' performance increases during the economic downturn.

Table 1. Test Engine Specifications

Variable	Variable name	Symbol	Calculation Method
1 Independent Variable	Working capital management	CCC	$(\text{Days Account Receivable} + \text{Days Inventory}) - (\text{Days Account Payable})$
	Days Account Receivable	DAR	$\left(\frac{\text{Accounts Receivables}}{\text{Sales}}\right) * 365$
	Days Account Payable	DAP	$\left(\frac{\text{Accounts Payables}}{\text{Cost of goods Sold}}\right) * 365$
	Days Inventory	DI	$\left(\frac{\text{Inventory}}{\text{Cost of goods Sold}}\right) * 365$
2 Dependent Variable	Operation	Q	$\left(\frac{\text{Market value of Equity} + \text{book value debt}}{\text{book value assets}}\right)$
3 Moderating Variable	recession dummy variable	D ₁	Variable 4 Years of the Lowest GDP Growth
	boom dummy variable	D ₂	Variable 4 Years Most of the Highest GDP Growth
4 Control Variable	Firm Size	SIZE	Natural Logarithm of Sales
	Leverage	LEV	$\frac{\text{Total Debt}}{\text{Total Assets}}$
	GROWTH Opportunities	GROWTH	$\left(\frac{\text{book Value Of Intangibles Assets}}{\text{Total Assets}}\right)$

H₂₄. The intensity of positive correlation between the days account payable and firms' performance decreases during the economic boom.

H₂₅. The intensity of negative correlation between the day's inventory and firms' performance increases during the economic downturn.

H₂₆. The intensity of negative correlation between the day's inventory and firms' performance decreases during the economic boom.

METHODOLOGY

From an objective viewpoint, this research is practical and from the viewpoint of nature and method, it is causal. Data collection method is through library. As well as the main reports and financial statements of under evaluation companies collected through tadbir pardaz software and Codal network. Spatial and temporal scope of the study is the Tehran Stock Exchange In a twelve-year period from 2002 to 2013. The study population consisted of listed companies on the stock exchange. And considered restrictions include the following:

- 1- Financial firms (banks and institutions financial, investment firms, financial intermediaries).
- 2- Companies that do not have required and extractable information since 2002 to 2013.
- 3- Companies that their financial year does not end on 29 March
- 4- Companies that changed their financial year between years of 2002 to 2013.
- 5- Companies that have a three-month period to stop the transaction in studied period.

After applying the above restrictions, a total of 80 companies as sample were selected randomly.

Statistical Models and Variables

The statistical model is as follows:

$$Q_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \epsilon_{it} \quad (1)$$

$$Q_{it} = \beta_0 + \beta_1 DAR_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \epsilon_{it} \quad (2)$$

$$Q_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \epsilon_{it} \quad (3)$$

$$Q_{it} = \beta_0 + \beta_1 DAR_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \epsilon_{it} \quad (4)$$

$$Q_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 D_1 + \beta_3 D_2 + \beta_4 (D_1 \times CCC_{it}) + \beta_5 (D_2 \times CCC_{it}) + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \beta_8 GROWTH_{it} + \epsilon_{it} \quad (5)$$

$$Q_{it} = \beta_0 + \beta_1 DAR_{it} + \beta_2 D_1 + \beta_3 D_2 + \beta_4 (D_1 \times DAR_{it}) + \beta_5 (D_2 \times DAR_{it}) + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \beta_8 GROWTH_{it} + \epsilon_{it} \quad (6)$$

$$Q_{it} = \beta_0 + \beta_1 DAP_{it} + \beta_2 D_1 + \beta_3 D_2 + \beta_4 (D_1 \times DAP_{it}) + \beta_5 (D_2 \times DAP_{it}) + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \beta_8 GROWTH_{it} + \epsilon_{it} \quad (7)$$

$$Q_{it} = \beta_0 + \beta_1 DI_{it} + \beta_2 D_1 + \beta_3 D_2 + \beta_4 (D_1 \times DI_{it}) + \beta_5 (D_2 \times DI_{it}) + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \beta_8 GROWTH_{it} + \epsilon_{it} \quad (8)$$

RESULTS

Data Analysis

Descriptive statistics: To determine the general characteristics of the variables, as well as estimation of model and detailed analysis, familiarity with descriptive statistics of variables is required. Descriptive statistics calculate

Table 2. Descriptive statistics variables

Variable	Mean	Median	Max	Min	Standard deviation	Observation
Q	1.5930	1.3216	11.7900	0.2100	0.6099	960
D1	0.3329	0.0000	1.0000	0.0000	0.4442	960
D2	0.6659	0.0000	2.0000	0.0000	0.8884	960
CCC	260.6705	222.2975	8772.99	-51.4900	136.7946	960
DAR	117.0273	86.1394	3626.65	0.0200	81.5389	960
DAP	51.1631	35.9230	1565.25	0.0300	98.0472	960
DI	194.8063	158.8904	8899.89	0.2600	38.0826	960
LEV	0.6540	0.6595	2.1200	0.0000	0.1343	960
SIZE	12.7351	12.6724	16.6700	0.0000	0.9695	960
GROWTH	0.0144	0.0049	0.7100	0.0000	0.0158	960

Table 3. Correlation Matrix of Variables

		Q	CCC	DAR	DAP	DI	D1	D2	SIZE	LEV	GROWTH
Q	Pearson Correlation	1	-	-	-	-	-	-	-	-	-
	Sig. (2-tailed)										
	N	960									
CCC	Pearson Correlation	-0.011	1	-	-	-	-	-	-	-	-
	Sig. (2-tailed)	0.731									
	N	960	960								
DAR	Pearson Correlation	-0.097**	0.428**	1	-	-	-	-	-	-	-
	Sig. (2-tailed)	0.003	0.000								
	N	960	960	960							
DAP	Pearson Correlation	-0.024	-0.705**	0.018	1	-	-	-	-	-	-
	Sig. (2-tailed)	0.451	0.000	0.585							
	N	960	960	960	960						
DI	Pearson Correlation	0.015	0.516**	0.087**	0.103**	1	-	-	-	-	-
	Sig. (2-tailed)	0.648	0.000	0.007	0.001						
	N	960	960	960	960	960					
D1	Pearson Correlation	-0.002	0.035	0.017	-0.011	0.036	1	-	-	-	-
	Sig. (2-tailed)	0.959	0.276	0.609	0.738	0.260					
	N	958	958	958	958	958	958				
D2	Pearson Correlation	-0.027	-0.040	-0.001	0.047	-0.006	-0.499**	1	-	-	-
	Sig. (2-tailed)	0.408	0.213	0.973	0.142	0.856	0.000				
	N	958	958	958	958	958	958	958			
SIZE	Pearson Correlation	-0.109**	-0.171**	-0.192**	0.039	-0.117**	0.146**	-0.063	1	-	-
	Sig. (2-tailed)	0.001	0.000	0.000	0.233	0.000	0.000	0.053			
	N	960	960	960	960	960	958	958	960		
LEV	Pearson Correlation	0.017	0.004	0.061	0.019	-0.009	-0.045	-0.010	0.091**	1	--
	Sig. (2-tailed)	0.598	0.897	0.060	0.555	.786	0.163	0.760	0.005		
	N	960	960	960	960	960	958	958	960	960	
GROWTH	Pearson Correlation	0.026	0.011	-0.004	0.045	0.084**	-0.033	-0.024	-0.104**	0.008	1
	Sig. (2-tailed)	0.414	0.730	0.902	0.165	0.009	0.305	0.456	0.001	0.795	
	N	960	960	960	960	960	958	958	960	960	960

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

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

the parameters of population and including central indexes and population dispersion and so on. **Table 2** shows descriptive Statistics variables including mean, median, maximum, minimum, and standard deviation, etc. For example, for variable performance (TQ) mean, median, maximum and minimum equal with 1.59, 1.32, 11.79, and 0.21, respectively.

The correlation matrix of variables: **Table 3** indicates the correlation between variables in level $\text{sig} \leq 0.01$ and $\text{sig} \leq 0.05$. For example, the correlation coefficient of performance variable (TQ) and collection period (DAR) is -0.097 which is significant at the level of 0.05.

Before testing the hypothesis based on the results, we must ensure the accuracy of the results. For this aim, F-test was used to determine the significance of the model. Probability of calculated F statistics for all of four models is equal to (0.0000) and it can be claimed that the fitted regression model is significant. According to the determination coefficient of fitted model, model (1) is equal to 0.0541 and model (2) is equal to 0.0595; model (3) is equal to 0.0483 and model (4) is equal to 0.0488, It can be argued that what percentage of changes in the dependent variable (performance), is explained by the independent variables. Durbin-Watson statistic values for all four models were in the range of 1.5 to 2.5 and show that there is no correlation between the errors. The results of heteroscedasticity of variance test show that in all the research models there is a problem of heteroscedasticity of variance (Because all probability, or calculated p-value are less than 0.05). So the final estimation of these models

Table 4. Statistical results of models 1 to 4

Model	1		2		3		4	
Variable	Coefficient	Probe	Coefficient	Probe	Coefficient	Probe	Coefficient	Probe
C	3.1682	0.0000	2.2365	0.0000	2.0892	0.0000	2.1129	0.0000
CCC	-9.7400	0.0146	-----	-----	-----	-----	-----	-----
DAR	-----	-----	-0.0002	0.0030	-----	-----	-----	-----
DAP	-----	-----	-----	-----	-0.0001	0.7207	-----	-----
DI	-----	-----	-----	-----	-----	-----	-6.8800	0.1601
SIZE	-0.0730	0.0005	-0.0788	0.0000	-0.0680	0.0000	-0.0688	0.0000
LEV	0.3006	0.0000	0.3232	0.0002	0.2964	0.0007	0.2887	0.0009
GROWTH	0.5405	0.1244	0.4887	0.1508	0.5502	0.1128	0.5769	0.1013
F	13.6690 (0.0000)		15.1045 (0.0000)		12.1394 (0.0000)		12.2594 (0.0000)	
R2	0.0541		0.595		0.0483		0.0488	
DW	1.7541		1.7500		1.7397		1.7489	
Heteroscedasticity	0.0000		0.0000		0.0000		0.0000	
Housman	0.0002		0.0001		0.0001		0.0002	

is done using GLS test. Hausman test results show that for all models fixed effects method should be used. The estimated coefficient CCC for the independent variable in **Table 4** indicates that there is a significant negative relationship between the cash conversion cycle and performance when error level is 0.05. Because, estimated p-value for this independent variable coefficient is less than 0.05. The estimated coefficient of independent variable DAR in **Table 4** shows that there is a negative and significant relationship between debt collection period and performance at error level of 0.05. The reason is that the estimated p-value for this independent variable coefficient is less than 0.05. The estimated coefficient of independent variable DAP in **Table 4** indicates that there is no significant relationship between payment period and performance at error level of 0.05. The reason is that the estimated p-value for coefficient of this independent variable is greater than 0.05. The estimated coefficient for the independent variable DI in **Table 4** indicates the lack of a significant relationship between the level of inventory turnover and performance at error level of 0.05. The reason is that the estimated p-value for coefficient of this independent variable is greater than 0.05. With this description, we conclude that the first and second hypothesis is confirmed.

Before testing the hypothesis based on the results, we must ensure the accuracy of the results. For this aim, F-test was used to determine the significance of the model. Probability of calculated F statistics for all of four models is equal to (0.0000) and it can be claimed that the fitted regression model is significant. According to the determination coefficient of fitted model, model (5) is equal to 0.6751, and model (6) is equal to 0.6677; model (7) is equal to 0.6782 and model (8) is equal to 0.6765, it can be argued that what percentage of changes in the dependent variable (performance), is explained by the independent variables. Durbin-Watson statistic values for all four models were in the range of 1.5 to 2.5 and show that there is no correlation between the errors. The results of heteroscedasticity of variance test show that in all the research models there is a problem of heteroscedasticity of variance (Because all probability, or calculated p-value are less than 0.05). So the final estimation of these models is done using GLS test. Hausman test results show that for all models should be used of fixed effects method. The estimated coefficient D_1*CCC , D_1*DAR , D_2*CCC , D_2*DAR , D_1*DAP , D_2*DAP , D_1*DI , D_2*DI for the independent variable in **Table 5** shows that there is no significant relationship between the interactive effect of the cash conversion cycle, the period of collection of receivables, payment of obligations, inventory turnover period, recession period and boom period with performance at error level of 0.05. The reason is that the estimated p-value for coefficient of this independent variable of research is greater than 0.05. With this description, we conclude that the fifth to eighth hypothesis is rejected.

Table 5. Statistical Results of model 5 to 8

Model	5		6		7		8	
Variable	Coefficient	Probe	Coefficient	Probe	Coefficient	Probe	Coefficient	Probe
C	1562.283	0.0000	1791.42	0.0000	1.6033	0.0000	1731.80	0.0000
D ₁	84.9582	0.0017	84.1177	0.0004	0.0301	0.2500	62.3983	0.0272
D ₂	2.8575	0.8446	18.9340	0.2164	0.0080	0.5304	14.9889	0.2990
CCC	0.0427	0.5462	-----	-----	-----	-----	-----	-----
D ₁ * CCC	-0.0841	0.3208	-----	-----	-----	-----	-----	-----
D ₂ * CCC	0.0128	0.7609	-----	-----	-----	-----	-----	-----
DAR	-----	-----	-0.0602	0.6444	-----	-----	-----	-----
D ₁ * DAR	-----	-----	-0.1368	0.3297	-----	-----	-----	-----
D ₂ * DAR	-----	-----	-0.1140	0.2359	-----	-----	-----	-----
DAP	-----	-----	-----	-----	-0.0002	0.5455	-----	-----
D ₁ * DAP	-----	-----	-----	-----	0.0005	0.1207	-----	-----
D ₂ * DAP	-----	-----	-----	-----	0.0000	0.7751	-----	-----
DI	-----	-----	-----	-----	-----	-----	0.0729	0.4169
D ₁ * DI	-----	-----	-----	-----	-----	-----	0.0245	0.8441
D ₂ * DI	-----	-----	-----	-----	-----	-----	-0.0541	0.3504
SIZE	-43.9262	0.0890	-59.8503	0.0313	-0.0453	0.0616	-57.9183	0.0197
LEV	782.6507	0.0000	773.1536	0.0000	0.7830	0.0000	796.9487	0.0000
GROWTH	156.4651	0.6211	159.456	0.6122	0.0661	0.8396	121.2623	0.7225
F	18.6348 (0.0000)		18.0190 (0.0000)		18.9003 (0.0000)		18.7512 (0.0000)	
R ²	0.6751		0.6677		0.6782		0.6765	
DW	1.8090		1.7932		1.8082		1.7994	
Heteroscedasticity	0.0006		0.0009		0.0009		0.0005	
Hausman	0.0000		0.0000		0.0000		0.0000	

DISCUSSION AND CONCLUSION

The aim of this study was to investigate the relationship between working capital management and performance of companies in different business cycles. Working capital management is one of the key areas of financial management and managing organizations because it directly affects the liquidity and profitability of the company. The possibility of bankruptcy for companies exposed to improper management of working capital even when profitability is positive. Working capital management, including planning and control of current assets and liabilities is such a way that can mitigate the risk of failing to meet short-term commitments on the one hand and on the other hand it avoids excessive investment in these assets. In this study, the relationship between the components of working capital management and performance of companies in different business cycles has been studied. Components intended for working capital management are: days account receivable, days inventory, days account payable. According to theoretical foundations, reducing the cash conversion cycle is a desirable state that Companies are looking for. According to the results it can be said that there is a significant negative relationship between cash conversion cycle and firm performance. Cash conversion cycle represents a period of time that the company's operating cash spent to produce a product item. And managers can reduce cash conversion cycle as much as possible, creating a positive value and profitability for their shareholders and this requires good liquidity planning and proper management of receivables and payables and the proper exploitation of investment opportunities and financing. According to the results it can be said that there is a significant negative relationship between collection period and firm's performance. Days account receivable is considered as a measure to estimate the amount of time required to collect cash proceeds of the sales. Managers can with reduction as much as possible of the collection period create a positive value and profitability for their shareholders and this will be achieved with good management of accounts receivable and effective administration of proceeds.

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