

**EFFECTS OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY: THE  
CASE FOR SELECTED COMPANIES IN THE ISTANBUL STOCK EXCHANGE (2005-  
2008)**

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**Abstract**

*Working capital management is one of the essential determinants of firms' market value because it directly affects profitability. And, working capital management is also extremely crucial from the point of firms' sustainability. Hence, firms should establish a fine balance between profitability and risk when it comes to managing working capital. This paper mainly aims to provide some empirical evidence on the effects of working capital management on the profitability of selected companies in the Istanbul Stock Exchange for the period of 2005-2008. The panel data methods are employed in order to analyze the mentioned effects.*

**Key Words:** Working capital management, profitability.

**JEL Classification:** G29, G39

**1. INTRODUCTION**

Traditionally corporate finance involves decisions about three fields: capital budgeting, capital structure and working capital management. To handle capital budgeting and capital structure is about the management of long-term capital and attracts more attention than working capital management in finance literature (Chiou, Cheng and Wu, 2006:149). However working capital

management is also a very important field of corporate finance, because of its considerable effects on the firm's profitability and liquidity (Nazir and Afza, 2009:28).

A firm's investment in current assets such as cash, bank deposits, short-term securities, accounts receivable and inventories is called as "(gross) working capital". And the "net working capital", which is a more important and descriptive term in the context of working capital management context, refers to the current assets less current liabilities, for example accounts payable and other short-term liabilities. To put it differently, net working capital is the surplus of current assets over the short-term liabilities and represents the liquidity margin available to meet the cash demands in order to maintain the daily operations and benefit from the profitable investment opportunities (Schilling, 1996:4; Yadav, Kamath and Manjrekar, 2009:28; Padachi et al., 2008:42). Therefore it is possible to say that working capital can be regarded as lifeblood of the firm and its efficient management can ensure the success of the firm while its inefficient management may lead to the bankruptcy of the firm (Padachi et al., 2008:43).

In this framework working capital management represents the decisions dealt with the working capital and short-term financing and involves managing the relationship between a firm's current assets and current liabilities. Yet one of the main purposes of working capital management is to enable the firm sufficient liquidity to sustain its operations and to have to meet its obligations (Eljelly, 2004:48). Especially in today's global recessionary environment, all of the firms, regardless of their size and industry, need to acquire positive cash flow and liquidity (Stewart, 2009:16). On the other hand, the way that working capital is managed has also noteworthy effects on the firm's profitability (Deloof, 2003:573). So it is the fact that working capital management involves a tradeoff between profitability and risk. According to the theory of risk and return, investments with higher risk may create higher return. Thus a firm with high liquidity of working capital will have low risk to meet its obligation and low profitability at the same time (Garcia-Teruel and Martinez-Solano, 2007:164; Zariyawati et al., 2009:48).

To put it briefly, working capital management primarily aims to ensure an optimum balance between profitability and risk (Ricci and Di Vito, 2000:70). This objective can be achieved by continuous monitoring. The success of a firm heavily depends on the effective skills of financial managers (Filbeck and Krueger, 2005:11; Nazir and Afza, 2009:29).

The main objective of this paper is to provide some empirical evidence on the effects of working capital management on the profitability for a sample of 140 selected companies listed in the Istanbul Stock Exchange for the period from 2005 to 2008. This paper is structured as follows: firstly the literature about the relationship between working capital management and profitability. Then the data, methodology, and empirical findings are presented consecutively.

## **2. LITERATURE REVIEW**

Shin and Soenen (1998) used Net Trade Cycle (NTC) as a measure of working capital management in order to investigate the relationship between working capital management and corporate profitability. The NTC is calculated as  $(\text{inventory} + \text{accounts receivable} - \text{accounts payable}) \times 365 / \text{Sales}$  and represents the number of "days sales" that the company has to finance its working capital under ceteris paribus conditions. Additionally it can provide an easy estimate for additional financing needs with regard to working capital as a function of the sales growth. For these reasons they used the NTC as a measure of working capital management and found a

negative relation between the length of the firm's trade cycle and its profitability (Shin and Soenen, 1998:37-38).

On the other hand, it is possible to say that the most popular measure of working capital management is the Cash Conversion Cycle (CCC). The CCC refers to the number of days between the expenditure of the firm's cash for the purchase of raw materials and the collection of cash from product sales (Sathyamoorthi and Wally-Dima, 2008:12). Deloof (2003) investigated the relationship between working capital management and firm profitability by using CCC as a measure of working capital management. He calculated CCC as (number of days accounts receivable + number of days inventory – number of days accounts payable) and found a significant negative relation between gross operating income and the number of days accounts receivable, inventories and accounts payable by using a sample of 1009 large Belgian non-financial firms for the 1992-1996 period. So he suggests that managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a reasonable minimum.

Lazaridis and Tryfonidis (2006) found a negative relationship between profitability and CCC for 131 listed companies listed in Athens Stock Exchange for the period 2001 -2004. Similar to the results of these studies focused on large firms, The findings of Garcia-Teruel and Martinez-Solano (2007) also indicates negative relationship between profitability and CCC for small and medium sized firms from Spain.

Zariyawati et al. (2009) investigated the relationship between CCC and profitability for the Malaysian firms for the period 1996-2006. And their findings are consistent with the aforementioned studies.

### **3. DATA AND VARIABLES**

The source of financial and economic data of the selected companies is based on the ISE (Istanbul Stock Exchange) webpage. 140 companies (cross-section dimension of panel data) are randomly selected from all listed companies in the ISE, but financial companies are excluded while drawing the sample. The time-dimension of panel data runs yearly from 2005 to 2008.

The real GDP growth rates of Turkey are obtained from TurkStat (Turkish Statistical Institute) in order to reveal the effect of business cycle on company's profitability.

Table 1 presents the variables (both definition and calculation) in order to estimate the effect of working capital management on profitability by using panel data methods (See Section 4. Methodology). Roa is the dependent variable; the rest of the variables are treated as independent variables in which three of them are used as control variables, namely Debt, Size and Gdpg.

**Table 1: Variables**

Dependent Variable		
Roa	Return on assets	=Earnings before interest&tax / Assets
Independent Variables		
Ar	Number of days accounts receivable	=365X[Accounts receivable / Sales]
Ap	Number of days accounts payable	=365X[Accounts payable / Purchases]
Inv	Number of days of inventory	=365X[Inventories / Purchases]
Ccc	Cash conversion cycle	=Ar + Inv - Ap
Control Variables		
Debt	Leverage	=Debt / Liabilities
Size	Logarithm of assets	=log(Assets)
Gdpg	Real GDP growth rate	

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Working capital management is related to four variables: Ar, Ap, Inv and Ccc. Ar symbolizes the average number of days which takes the company to gather payments from customers. Ap measures how long it takes to pay company's suppliers. Inv indicates the average number of days of inventories kept by a company (Garcia-Teruel and Martinez-Solano, 2007).

**Table 2: Descriptive Statistics**

variable	obs	mean	sd	25th Perc.	median	75th Perc.
Roa	560	0.0277	0.1414	-0.0189	0.0316	0.0941
Ar	560	65.2337	48.6319	34.1618	58.1045	84.3000
Ap	560	53.9268	50.8751	26.0063	41.7416	66.9149
Inv	560	88.2322	82.1089	39.3807	68.9673	107.4345
Ccc	560	99.5391	91.8385	39.4547	88.8711	142.7767
Size	560	18.5870	1.6633	17.6345	18.7222	19.6168
Debt	560	1.1199	2.4828	0.3512	0.6723	1.5380
Gdpg	560	0.0522	0.0282	0.02800	0.05800	0.0765

Table 2 shows the descriptive statistics of the variables: the mean, standart deviation, median, first and fourth quartile. For example, the mean of Roa (Return on assets) is 2.77 percent which is close to the median value, 3.16 percent. The Roa of one quarter of the companies in the sample is below -1.89 percent. And the average growth rate of GDP in Turkey between 2005 and 2008 is 5.22 percent.

**Table 3: Correlation Matrix**

	Roa	Ar	Ap	Inv	Ccc	Size	Debt	Gdpg
Roa	1							
Ar	-0.317***	1						
Ap	-0.281***	0.409***	1					
Inv	-0.193***	0.248***	0.385***	1				
Ccc	-0.184***	0.525***	0.007	0.812***	1			
Size	0.198***	-0.065	-0.134***	-0.092**	-0.042	1		
Debt	-0.188***	0.014	0.027	0.015	0.006	-0.015	1	
Gdpg	0.127***	-0.199***	-0.175***	-0.075*	-0.076*	-0.031	-0.050	1

\*\*\*Significant at 99% \*\*Significant at 95% \*Significant at 90%.

Table 3 reports the sample correlation matrix for the previously defined variables. At the first look, it is obvious that the correlations between Roa and other variables are statistically significant, and the signs of the relevant correlation coefficients are expected. It is also easily seen that the correlations between Debt and other variables (except Roa) are insignificant. The remaining coefficients in the above correlation matrix could be straightforwardly interpreted.

#### 4. METHODOLOGY

The panel data methodology is employed to capture the effects of working capital management on profitability for the selected companies in the ISE. By using the previously defined variables, the four different panel data models are estimated:

$$\text{Roa}_{it} = \alpha_0 + \alpha_1 \text{Ar}_{it} + \alpha_2 \text{Size}_{it} + \alpha_3 \text{Debt}_{it} + \alpha_4 \text{Gdpg}_{it} + \eta_i + \lambda_t + u_{it} \quad (\text{I})$$

$$\text{Roa}_{it} = \alpha_0 + \alpha_1 \text{Ap}_{it} + \alpha_2 \text{Size}_{it} + \alpha_3 \text{Debt}_{it} + \alpha_4 \text{Gdpg}_{it} + \eta_i + \lambda_t + u_{it} \quad (\text{II})$$

$$\text{Roa}_{it} = \alpha_0 + \alpha_1 \text{Inv}_{it} + \alpha_2 \text{Size}_{it} + \alpha_3 \text{Debt}_{it} + \alpha_4 \text{Gdpg}_{it} + \eta_i + \lambda_t + u_{it} \quad (\text{III})$$

$$\text{Roa}_{it} = \alpha_0 + \alpha_1 \text{Ccc}_{it} + \alpha_2 \text{Size}_{it} + \alpha_3 \text{Debt}_{it} + \alpha_4 \text{Gdpg}_{it} + \eta_i + \lambda_t + u_{it} \quad (\text{IV})$$

$i = 1, 2, \dots, 140$ .  $t = 2005, 2006, 2007, 2008$ .

$\eta_i$ : Unobservable heterogeneity (individual effect) which is specific for each firm.

$\lambda_t$ : Parameters of time dummy variables.

$u_{it}$ : The error term.

The structure of unobservable heterogeneity is very crucial for determining the appropriate method of panel data estimation. If there is a correlation between the dependent variables of the estimated model and the unobservable heterogeneity for each firm, fixed effects method is a sound choice to reach consistent estimation process. But if there is no correlation between them, random effects method, which is based on generalized least squares, is more efficient than fixed effects. And

fortunately, Hausman's specification test (1978) is used to decide the character of the effects: random or fixed (Baltagi, 2001; Wooldridge, 2002).

## 5. RESULTS

Table 4 gives the coefficient estimates from the formerly stated panel data regressions, namely Model I, Model II, Model III and Model IV:

**Table 4: Effects of Working Capital Management on Profitability**

	Model I	Model II	Model III	Model IV
Ar	-0.0007*** (-5.67)			
Ap		-0.0005*** (-4.41)		
Inv			-0.0002** (-2.4)	
Ccc				-0.0002** (-2.51)
Size	0.0133*** (3.06)	0.0123*** (2.76)	0.0132*** (2.9)	0.0136*** (3.02)
Debt	-0.0085*** (-3.97)	-0.0088*** (-4.05)	-0.0084*** (-3.83)	-0.0083*** (-3.79)
Gdpg	1.566*** (4.77)	1.599*** (4.84)	1.7851*** (5.41)	1.8057*** (5.48)
Constant	-0.2089** (-2.5)	-0.2109** (-2.46)	-0.2452*** (-2.82)	-0.2552*** (-2.96)
Hausman test	0.3833	0.4130	0.2679	0.2239

\*\*\* Significant at %99 \*\*Significant at %95. Student t-statistic in parantheses. The p-value of Hausman test for each equation lies at the last line of the table. Random-effect estimation used as a result of Hausman (1978) test. Coefficients of time dummy variables not reported here, but all significant at 99%.

All results for all models are found statistically significant, and the signs of coefficients are same as the ones from the correlation matrix (Table 3). A company's return on assets is increased by shortening number of days accounts receivable, accounts payable and number of days of inventory. And reducing cash conversion cycle provides positive contribution to company's return on assets. The estimation results indicate that working capital management is exceptionally vital for a company.

When it comes to the control variables; while a company's size has positive effect on profitability, its debt ratio negatively affects its profitability. Moreover, the high values of the coefficients of the real GDP growth rate in Turkey highlight the importance of economic growth regarding companies' profitability.

## 6. CONCLUSION

In the light of the results of the estimated models for Turkey, working capital management unquestionably influences the companies listed in the ISE. The findings are similar to the previous studies (Deloof, 2003; Lazaridis and Tryfonidis, 2006; Garcia-Teruel and Martinez-Solano, 2007; Zariyawati et al., 2009). The companies should focus on working capital management in order to increase their profitability by seriously and professionally considering the issues on their cash conversion cycle which is derived from the number of days accounts payable, the number of days accounts receivable, and the number of days of inventories.

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