International Journal of Economics and Financial Issues
Vol. 2, No. 4, 2012, pp.488-495
ISSN: 2146-4138
www.econjournals.com

Affects of Working Capital Management on Firm's Performance: Evidence from Turkey

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ABSTRACT: The working capital management has an important role for the firm's success or failure because of it's' effect on firm's performance and liquidity. The study is based on secondary data collected from 75 manufacturing firms listed on Istanbul Stock Exchange Market for the period 2002-2009 with an attempt to investigate the relationship between working capital management components and performance of the firms by using dynamic panel data analysis. The results demonstrate that firms can increase profitability measured by gross operating profit by shortening collection period of accounts receivable and cash conversion cycle. Leverage as a control variable has a significant negative relationship with firm value and profitability of firms. This means, increase in the level of leverage will lead to decline in the profitability of the firm and the value of the firm.

Keywords: Working capital management; Cash Conversion Cycle; Tobin Q
JEL Classifications: G39; C22

1. Introduction

This paper investigates the relationship between working capital management and the firms' performance for a sample of 75 manufacturing firms listed on Istanbul Stock Exchange (ISE) market for the period of 9 years from 2002 to 2009. Working capital management decisions are very important and strategic because they affect the firm profitability and firm value. Working capital management involves managing current assets and current liabilities of firms. The current assets are cash and cash equivalents, marketable securities, accounts receivable and inventories. The current liabilities are accounts payable, expenses payable, including accrued wages and taxes and notes payable. A narrower definition for the working capital is inventory + accounts receivable – accounts payable. So according to this definition, working capital management is managing inventory, accounts receivable and accounts payable.

The effective working capital management is very important because it affects the performance and liquidity of the firms (Taleb et al., 2010). The main objective of working capital management is to reach optimal balance between working capital management components (Gill, 2011). The efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholders' value (Nazir and Afza, 2008). Therefore firms try to keep an optimal level of working capital that maximizes their value (Deloof, 2003).

Most popular measurement of working capital management is cash conversion cycle (CCC) which is the time lag between purchase of raw materials or render of services and the collection of cash from the sale of goods or services rendered. If the time lag is longer, it means greater investment to working capital components and this causes greater financing needs. So interest expenses will be

higher which leads to higher default risk and lower profitability. Use of profitability as an indicator of firm performance, there can be a reverse relationship between CCC and firm performance.

This study empirically investigates the effects of working capital management on the firm's performance for the sample includes 75 Istanbul Stock exchange market manufacturing firms. There is limited research which considers effects of working capital management on firm performance for manufacturing firms listed on ISE and these studies measure only profitability as an indicator of firm performance. This paper contributes to the literature by measuring firm value as an indicator of firm performance in Turkey. The collection period of accounts receivable, average days in inventories and accounts payable are used as components of cash conversion cycle (CCC). There are two components of firm performance; one of them is profitability and the other is firm value. Gross operating profit is used as an indicator of profitability which is measured by sales minus cost of good sold (COGS) divided by total assets minus financial assets. Return on assets (ROA) or return on equity (ROE) is not considered as a measure of profitability in this study because when a firm has mainly financial assets on its balance sheet, its operating activities will contribute little to the overall return on assets (Deloof, 2003). Firm value is measured by Tobin Q which is equal to market value plus book value of debt divided by total assets. By using this formula for Tobin Q, Tobin's statistics produces a 96.6 % approximation of the original formulation (Wolfe and Sauaia, 2003). Firm size and financial leverage are used as control variables. Firm size is measured by natural logarithm of total assets and leverage is measured by dividing total liabilities to total assets.

In this paper, next section presents literature review of relevant studies. Sample and variables used in analysis are presented in section 3. The results of the analysis are discussed in section 4 and the last section is devoted to conclusion.

2. Literature Review

In literature, traditional definition of working capital is current assets minus current liabilities (Preve and Sarria-Allende, 2010). Current assets include firm's inventories, accounts receivable, and minimum level of liquidity. Firms usually finance their current assets by short-term operating liabilities. Current assets minus short-term operating liabilities are called Financial Needs for Operations (FNOs) (Preve and Sarria-Allende, 2010). Short-term liabilities don't include short- term financial debts. These FNOs will be funded by working capital. Under this framework it is clear that the amount of working capital a firm decides to use is a strategic decision because it shows how much of these FNOs are financed by long- term capital and how much by short-term financial debt. Working capital management (WCM) is financing current assets and managing current assets and current liabilities of firm. Thus, working capital management is very important for creating value for shareholders.

Shin and Soenen (1998) studied the relationship between working capital management and profitability of firms. Shin and Soenen used Net Trade Cycle (NTC) instead of Cash Conversion Cycle to measure working capital management. The difference is components of CCC are expressed as a percentage of sales in NTC. They founded a strong negative relationship between NTC and corporate profitability for a large sample of listed American firms for the periods between 1975 and 1994.

Deloof (2003) used a sample of 1009 large Belgian non-financial firms for a period of 1992-1996. He used correlation and regression analysis and found a significant negative relation between gross operating income and the collection period of accounts receivable, average days in inventories and accounts payable of Belgian firms. These results suggest that managers can create value for shareholders by reducing collection period of accounts receivable and average days in inventories to a reasonable minimum.

Jose at al. (2003)tested the corporate returns and cash conversion cycle of 2,718 firms for the period 1974-1993 by using multiple regression analysis. In their research, an aggressive liquidity management (lower CCC) is associated with higher profitability for several industries, including natural resources, manufacturing, service, Retail/wholesale, and professional services.

Lazaridis and Tryfonidis (2006) used a sample of 131 companies listed in the Athens Stock Exchange (ASE) for the period of 2001-2004.They founded a significant negative relationship between cash conversion cycle and gross operating profit. The findings reveal that managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each component (accounts receivable, accounts payable and inventory) to an optimal level.

To extend Lazaridis and Tryfonidis's findings, Gill et al., (2010) used a sample of 88 American firms listed on New York Stock Exchange for a period of 3 years from 2005 to 2007. They found statistically significant relationship between cash conversion cycle and profitability, measured through gross operating profit as in Lazaridis and Tryfonidis's research.

Mohamad and Saad (2010) used Bloomberg's database of 172 listed companies randomly selected from Bursa Malaysia main board for five year period from 2003 to 2007. Applying correlations and multiple regression analysis, they found that current assets to total asset ratio shows positive significant relationship with Tobin Q, ROA and ROI. Cash conversion cycle, current asset to current liabilities ratio and current liabilities to total assets ratio illustrate negative significant relations with Tobin Q, ROA and ROIC.

Afza and Nazir (2007) found a negative relationship between the profitability measure of firms and degree of aggressiveness of working capital investment and financing policies for 208 public limited companies listed at Karachi Stock Exchange for a period of 1998-2005. They measured Tobin Q and profitability as a firm performance. Tobin Q and profitability produced almost the same results.

Turning to empirical literature on working capital management, there are limited published studies researching the effects of working capital management on firm's performance in Turkey. Şamiloğlu and Demirgüneş (2008) used a sample consisting of Istanbul Stock Exchange (ISE) listed manufacturing firms period 1998-2007. They analyzed 5,843 Firm / quarter data by using multiple regression model. Empirical findings of the study show that accounts receivables period, inventory period and leverage affect firm profitability negatively; while growth (in sales) affects firm profitability positively. Uyar (2009) researched the relationship between cash conversion cycle with firm size and profitability of 166 firms listed on the Istanbul Stock Exchange (ISE) for the year 2007. Firm size measured by total assets and sales revenue, and profitability is measured by return on assets and return on equity. The paper showed that Retail/wholesale industry has shorter CCC than manufacturing industries. Another important of the study is that the textile industry has the longest CCC. There is a significant negative correlation between the length of CCC and the firm size. Hence, smaller firms have longer CCC. Lastly, significant negative correlation between the length of CCC and the profitability was found.

All the above studies showed that there is significant negative relationship between working capital management and firm performance. The present study investigates the relationship between working capital management components and firm performance. Firm size and leverage are tested as control variables effecting firm performance.

3. Sample and Variables

The data used in this study was obtained from the financial statements of the corporations listed on the Istanbul Stock Exchange for the period of 2002-2009. In the sample, there are 75 manufacturing firms exposed to 600 total observations. Two measures of firm's performance are used in this study. Tobin Q as a proxy of firm value and gross operating profit (GOP) as a proxy of profitability. The reason for using GOP instead of EBITDA or profit before or after tax is that we want to associate operating ''success'' or ''failure'' with an operating ratio and relate this variable to other operating variables such as Cash conversion cycle. Furthermore, the participation of any financial activity is excluded from operating activity that might affect overall profitability. Therefore, financial assets are subtracted from total assets (Amarjit, Nahum and Neil,2010). Variables measured as fallows:

GOP (gross operating profit) = sales-cogs / total assets-financial assets

GOP_{t-1} (prev. year gross operating profit) = $sales_{t-1}$ - $cogs_{t-1}$ / $total\ assets_{t-1}$ - $financial\ assets_{t-1}$

TOBIN Q (firm value) = market vale of equity + book value of debt / total assets

AR (number of days accounts receivable) = (average of accounts receivable / sales* 365)

AP (number of days accounts payable) = (average of accounts payable /cost of goods sold *365)

INV (Number of days Inventory) = (Inventory / cost of good sold) *365

OC (operating cycle) = AR + INV

CCC (cash conversion cycle) = AR+ INV- AP

FIRM SIZE (natural logarithm of assets) = ln(assets)

LEVERAGE (levrg) = total liabilities / total assets

ε = error term of the model
α = intercept

All the above variables are used. Firm size and leverage are used as control variables. Tobin Q and GOP are dependent variables. The independent variables representing working capital components identified to assess their impact on firm's performance are GOPt-1, AR, AP, INV, OC and CCC.

The relationships between the variables are examined by making use of the correlation and dynamic panel data analysis. Five models are developed to find the significant relations between working capital management variables with firm value and profitability;

MODEL 1
Model 1A GOP = α + *β* 1GOPt-1+ β2 (AR) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
Model 1B *TOBINQ* = α + *β* 1GOPt-1+ β2 (AR) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
MODEL 2
Model 2 A *GOP* = α + *β* 1GOPt-1+ *β2* (INV) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
Model 2 B *TOBINQ* = α + *β* 1GOPt-1+ β2 (INV) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
MODEL 3
Model 3 A *GOP* = α + *β* 1GOPt-1+ β *2* (AP) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
Model 3 B *TOBINQ* = α + *β* 1GOPt-1+ *β2* (AP) + *β2* (LEVRG) + *β3* (FSİZE) + *ε*
MODEL 4
Model 4A *GOP* = α + *β* 1GOPt-1+ *β2* (OC) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
Model 4B *TOBINQ* = α + *β* 1GOPt-1+ β2 (OC) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
MODEL 5
Model 5A *GOP* = α + *β* 1GOPt-1+ β2 (CCC) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*
Model 5B *TOBINQ* = α + *β* 1GOPt-1+ *β2* (CCC) + *β3* (LEVRG) + *β4* (FSİZE) + *ε*

4. Results and Analysis

4.1. Descriptive Statistics

Table 1 provides descriptive statistics of the collected variables. Total observations come to 75*8 = 600. The credit period granted by companies to their clients ranged at 93,3 days while they paid their creditors in 61,48 days on average. Inventory took an average 94, 76 days to be sold. Overall, the average operation cycle ranged at 189 days and average cash conversion cycle ranged at 128 days. The average firm size is 499,790 TL. Firms have an average of 29 percent gross operating profit and average Tobin Q rate is 1,05x. Lastly, the average of leverage is 42 percent.

Table 1. Descriptive statistics of independent, dependent and control variables (2002-2009)

Variables	Mean
GOP	0,29
TOBQ	1,05
ARDAYS	94,3
INVDAYS	94,76
APDAYS	61,48
OC	189
CCC	128
LEV	0,42
SIZE	12,20

4.2. Correlation Analysis

Table 2 provides the Pearson's correlation for the variables which are used in the regression model. Pearson's correlation analysis is used for data to find the relationship between working management and firm's performance. The results of correlation analysis show that the gross operating profit is negatively related with collection period of account receivables. The negative correlation between collection period of account receivables and gross operation profit indicates that if the average collection period increases it will have a negative impact on the profitability. The negative

correlation between leverage and Tobin Q indicates that if firms increase their leverage level it will have a negative impact on firm value.

Table 2. Pearson Correlation Analysis

	GOP	TOBQ	ARDAYS	INVDAYS	APDAYS	OC	CCC	LEV	SİZE
GOP	1								
TOBQ	0,24	1							
ARDAYS	-0,20	-0,16	1						
INVDAYS	-0,01	-0,13	0,23	1					
APDAYS	-0,07	-0,09	0,24	0,39	1				
OC	-0,12	-0,19	0,72	0,84	0,41	1			
CCC	-0,09	-0,15	0,66	0,71	-0,08	0,87	1		
LEV	-0,19	-0,24	0,15	0,13	0,38	0,18	0,003	1	
SIZE	-0,18	-0,18	-0,02	-0,24	-0,14	0,18	-0,12	0,06	1

4.3. Regression Analysis

In this section, we present the empirical findings on the relationship between working capital management and profitability of the manufacturing firms listed on the Istanbul Stock Exchange (ISE).We used Dynamic Panel Data analysis. Dynamic Panel Data models contain lags of the dependent variable as covariates and contain unobserved panel-level effects. To investigate the relationships between variables we use a Robust Generalized Method of Moment System Estimation (GMM) applied to dynamic panel data. In this study, we apply Arellano-Bover/Blundell-Bond linear dynamic panel-data estimation which is a system estimator that uses additional moment conditions based on the work of Blundell & Bond. (We have used this estimation technique because of the following reasons: i) the data collected for 8 years and there are many changes on economic conditions in Turkey economy. Via panel data we can control these time effects on our datasets, ii) there is a possibility of unobserved province specific effects correlated with the repressors', iii) in order to correct autocorrelation, lagged dependent variable in the dynamic panel data estimation catch up some of the effects of omitted variables varying over time, iv) there are strong doubts about the homogeneity of the sample because of some outliers v) because of the presence of heteroskedasticity we didn't perform Sargan Over identification test. Only for a homoskedastic error term does the Sargan test have an asymptotic chi-squared distribution. In a robust model asymptotic distribution is not known (Stata Corp, 2009).

We performed Arellano–Bond test for serial correlation in the first-differenced errors for second order autocorrelation (AR (2)). The moment conditions are valid only if there is no serial correlation in the idiosyncratic errors. Because the first difference of independently and identically distributed idiosyncratic errors will be auto correlated, rejecting the null hypothesis of no serial correlation at order one in the first-differenced errors does not imply that the model is not specified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid. Thus we only report second order autocorrelation test results.

Table 3 shows the result of regressions between independent and control variables with dependent variable; profitability. The results of model 1 A equation indicate that the coefficient of accounts receivable is negative. This means increase or decrease in average collection period will significantly affect the firm profitability. We used the total liabilities / total assets ratio as a proxy of leverage; it shows negative relationship with the dependent variable, which means that, when leverage of the firm decreases, it will positively affect its profitability.

In model 2 A, model 3 A and model 4 A , we couldn't find any relationship between number of days inventory , days of account payable and operation cycle with firm's profitability. Using these variables in the regression provided very poor results (table 3). In model 5 A, when we use cash conversion cycle (CCC) as a proxy of working capital management, the coefficient of the variable CCC is negative and significant. Thus, the lower the cash conversions cycle the higher the profitability of the firm (table 3).

Table 4 shows the result of regressions between independent and control variables with dependent variable; Firm value (TOBİNQ). In the result of regression Model 1B, Model 2B, Model 3B and Model 4B, we couldn't find any relationship between collection period, average days in inventory, average days of account payable and operating cycle. Using these variables in the regression provided very poor results (table 4). When we used the cash conversion cycle as the proxy of working capital

management, the coefficient of the variable CCC is positive and significant. Thus, the higher the cash conversion cycle, the higher the firm value (TOBINQ). The control variable leverage is negatively related with firm value. This means, if the leverage of the firm increases, it will adversely affect its firm value.

Table 3. Dynamic panel regression estimates on factors affecting Profitability

	MODEL1A	**MODEL2A**	**MODEL3A**	**MODEL4A**	**MODEL5A**
GOP_{t-1}	***0,146 (0,007)***	***0,179 (0,006)***	***0,177 (0,004)***	***0,148 (0,01)***	***0,124 (0,027)***
ARDAYS	***-0,0004 (0,004)***				
INVDAYS		-0,000027 (0,925)			
APDAYS			0,00047 (0,138)		
OC				-0,000216 (0,132)	
CCC					***-0,00042 (0,008)***
LEV	***-0, 111 (0,046)***	-0,083 (0,227)	-0,12 (0,101)	-0,086 (0,143)	***-0,138 (0,018)***
SIZE	***-0,040 (0,009)***	***-0,04 (0,011)***	***-0,042 (0,009)***	***-0,40 (0,010)***	***-0,038 (0,010)***
CONSTANT	***0,830 (0,000)***	***0,77 (0,000)***	***0,781 (0,000)***	***0,81 (0,000)***	***0,836 (0,000)***
WALD CHI2	54,56 (0,000)	42,52 (0,000)	40,71 (0,000)	50,28 (0,000)	60,30 (0,000)
AR(2)	-0,34 (0.7331)	0,076 (0,9387)	-0,189 (0,85)	-0,19 (0,84)	-0,2762 (0.78)

Table 4. Dynamic panel regression estimates on factors affecting Profitability

	MODEL1B	**MODEL2B**	**MODEL3B**	**MODEL4B**	**MODEL5B**
$TOBQ_{t-1}$	***0,467 (0,000)***	***0,478 (0,000)***	***0,468 (0,000)***	***0,484 (0,000)***	***0,478 (0,000)***
ARDAYS	0,00021 (0,859)				
INVDAYS		0,0019 (0,203)			
APDAYS			0,001 (0,352)		
OC				0,0011 (0,214)	
CCC					***0,0017 (0,003)***
LEV	***-1,31 (0,002)***	***-1,33 (0,002)***	***-1,39 (0,005)***	***-1,33 (0,002)***	***-1,45 (0,001)***
SIZE	-0,29 (0,09)	-0,312 (0,085)	-0,292 (0,082)	-0,29 (0,084)	-0,29 (0,082)
CONSTANT	***4,71 0,045***	***4,77 (0,035)***	***4,69 (0,033)***	***4,56 (0,041)***	***4,58 (0,045)***
WALD CHI2	314,5 (0,000)	277 (0,000)	241,66 (0,000)	372,63 (0,000)	370,95 (0,000)
AR(2)	1,60 (0,1080)	1,49 (0,13)	1,58 (0,1136)	1,48 (0,1374)	1,421 (0,15)

5. Conclusion

In this paper, five models developed to make an empirical research on the associations between working capital management with firm's performance. Tobin Q and gross operating profit are measured as a proxy of firm value and profitability of the firms with other independent variables for 75 selected listed companies on the Istanbul Stock Exchange in Turkey for the period 2002-2009. On the basis findings of the research, it can be conclude that

There are significant relations between working capital management and firm performance. The results show that collection period of account receivables and cash conversion cycle are negatively related with firm's profitability and this means by shortening collection period and cash conversion cycle firms can increase their profitability. According to results, relationship between other working capital management components and firm's profitability is insignificant. Relationship between leverage and firm's profitability is negative while the relationship between firm size and firm's profitability is positive. The results for firm value (TOBINQ) are insignificant except cash conversion cycle and leverage. According to results of the regression analysis, there is a positive relationship between cash conversion cycle and firm value while there is a negative relationship between leverage and firm value. This means, extending the cash conversion cycle will increase the firm value and lower leverage will lead to increasing of the firm value.

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