



# The International Journal of Applied Economics & Finance

ISSN 1991-0886

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## The Effect of Working Capital Management on Firm Profitability: Evidence from Turkey\*

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**Abstract:** The aim of this study is to analyze the effect of working capital management on firm profitability. In accordance with this aim, to consider statistically significant relationships between firm profitability and the components of cash conversion cycle at length, a sample consisting of Istanbul Stock Exchange (ISE) listed manufacturing firms for the period of 1998-2007 has been analysed under a 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.

**Key words:** Working capital, working capital management, firm profitability, cash conversion cycle, Istanbul stock exchange

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### INTRODUCTION

In general, it is possible to discuss finance theory under three main threads as capital budgeting, capital structure and working capital management. The first two of them are mostly related with financing and managing long-term investments. However, financial decisions about working capital are mostly related with financing and managing short-term investments and undertake both current assets and current liabilities simultaneously (Mueller, 1953; Scherr, 1989; Moyer *et al.*, 1992; Pinches, 1992; Brealey and Myers, 1996; Brigham and Gapenski, 1996; Damodaran, 2002; Aksoy, 2005). So, most of the time, it is reasonable to term short-term financial management as working capital management (Ross *et al.*, 2003).

Efficiency in working capital management is so vital for especially production- firms whose assets are mostly composed of current assets (Horne and Wachowitz, 1998) as it directly affects liquidity and profitability of any firm (Raheman and Nasr, 2007). According to Kargar and Bluementhal (1994) bankruptcy may also be likely for firms that put inaccurate working capital management procedures into practice, even though their profitability is constantly positive. Hence, it must be avoided to recede from optimal working capital level by bringing the aim of profit maximization in the foreground, or just in direct contradiction, to focus only on liquidity and consequently pass over profitability. While excessive levels of working capital can easily result in a substandard return on assets; inconsiderable amount of it may incur shortages and difficulties in maintaining day-to-day operations.

Working capital is also a major external source of capital for especially small and medium sized and high-growth firms. These firms have relatively limited access to capital markets and tend to overcome this complication by short-term borrowing. Working capital position of such firms is not only an internal firm-specific matter, but also an important indicator of risk for creditors (Moyer *et al.*, 1992). Higher amount of working capital enables a firm to meet its short-term obligations easier. This results increase in borrowing capability and decrease in default risk (and

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\*Originally Published in *The International Journal of Applied Economics and Finance*, 2008

consequential decrease in cost of capital and increase in firm value). So, it is possible to state that efficiency in working capital management affects not only short-term financial performance (profitability), but also long-term financial performance (firm value maximization).

Liquidity, as a function of current assets and current liabilities, is an important factor in determining working capital policies and indicates firm's capability of generating cash in case of need. Current, acid-test and cash ratios as traditional measures of liquidity are incompetent and static balance sheet based measures that can not provide detailed and accurate information about working capital management effectiveness (Finnerty, 1993; Jose *et al.*, 1996). Formulas used for calculating them consider both liquid and operating assets in common. However, considering operating assets like receivables and inventories with cash and cash-equivalent assets is illogical for basic principles of cash management. Besides, mentioned traditional ratios are also not meaningful in terms of cash flows (Richards and Laughlin, 1980).

Drawing attention to limitations of traditional liquidity ratios, Hager (1976), Richards and Laughlin (1980), Emery (1984a), Kamath (1989), Gentry *et al.* (1990), Schilling (1996) and Boer (1999) have insisted on using ongoing liquidity measures in working capital management. Ongoing liquidity refers to the inflows and outflows of cash through the firm as the product acquisition, production, sales, payment and collection process takes place over time. As the firm's ongoing liquidity is a function of its cash (conversion) cycle (Pinches, 1992), it will be more appropriate and accurate to evaluate effectiveness of working capital management by cash conversion cycle, rather than traditional liquidity measures.

Cash conversion cycle as a part of operating cycle (Fig. 1) is an ongoing liquidity measure developed by Gitman (1974). Closely related with operating cycle, cash conversion cycle is, in brief, the part of operating cycle financed by the firm itself (McLaney, 1997) and is simply calculated by adding inventory period to accounts receivables period and then subtracting accounts payables period from it. It focuses on the length of time between the acquisition of raw materials and other inputs and the inflow of cash from the sale of goods (Arnold, 1998). The shorter this cycle, the fewer resources the firm needs to tie up.

Traditional approach to interaction between cash conversion cycle and profitability posits that relatively long cash conversion periods tend to decrease profitability. Trade activities of a firm can be considered as a process in circulation where cash is converted into assets and assets into cash. Cash available for trade activities of the firm has an important multiplier effect due to its turnover ratio. Higher cash turnover ratios enable managers to minimize short-term investments whose rates of return are relatively lower compared to long-term investments and consequently increase profitability.

Studies regarding working capital are mostly related with improving models to determine optimal liquidity and cash balance, rather than analyzing underlying reasons of relationships between liquidity,

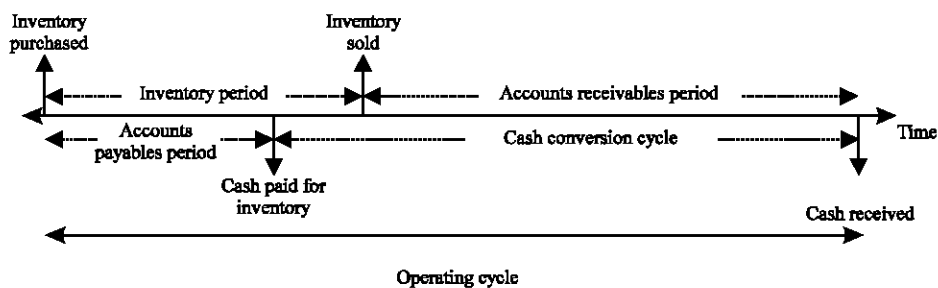


Fig. 1: Operating and cash conversion cycles. Fundamentals of corporate finance (Ross *et al.*, 2003)

working capital management practices and profitability. Pioneer studies of Baumol (1952) about an inventory management model and of Miller (1966) about a cash management model may be considered as the best-known studies in this field. Though foundations and assumptions of these models are not well-established in terms of applicability, they inform managers about problems related with working capital management practices. Later on, Johnson and Aggarwal (1998), similarly, have developed a cash management model focusing on cash flows and argued that cash collection and cash payment processes should have to be handled independently.

As mentioned before, traditional measures of liquidity are in lack of expressing the effects of cash flows; hence, the effectiveness (and quality) of working capital management practices in terms of firm profitability should be revised by components of cash conversion cycle. Literature review consisting some of previous studies -though limited in scope and outnumbered-regarding with the relationship between profitability and working capital management practices is given below.

In a study by Kamath (1989) about working capital management practices in retailing firms, it has been concluded that there is a reverse relationship between cash conversion cycle and profitability. The results of a more detailed study by Soenen (1993) have shown that, in case of overlooking industrial differences, there does not exist any statistically constant relationship between cash conversion cycle and profitability. However, in case of considering industrial differences, the relationship between the mentioned variables has shown dissimilarities across industries as positive in some industries and negative in others. In another study of Shin and Soenen (1998), a sample consisting of American manufacturing firms for the period of 1974-1995 has been analysed and a statistically negative relationship between cash conversion cycle and profitability has been confirmed. In a similar study to our study, Deloof (2003) has discussed possible relationships between cash conversion cycle and profitability by dividing cash conversion cycle into its components (inventory, accounts receivables and accounts payables periods). Results of the study have concluded that increases in all of these periods affect profitability negatively. Empirical findings of Lazaridis and Tryfonidis (2006)'s study have been similar to Deloof (2003)'s. According to the results of their study based on a sample of 131 Athens Stock Exchange listed companies for the period of 2001-2004, cash conversion cycle affects profitability negatively. According to the findings of another study from a different perspective, it has been concluded that the effect of cash conversion cycle on profitability is stronger than the effect of current ratio on it (Eljelly, 2004).

This study aims to analyze the effect of working capital management on firm profitability, an indicator of short-term financial performance.

## **MATERIALS AND METHODS**

### **Sample Selection and Data**

The aim of this study is, as mentioned before, to investigate the effect of working capital management on firm profitability. In accordance with this aim, a sample of Istanbul Stock Exchange (ISE) listed manufacturing companies for the period of 1998-2007 is analysed. Financial data is taken from the quarterly financial statements of listed companies in ISE database. In the multiple regression analysis, 5,843 firm/quarter data is used.

### **Regression Analysis**

This study investigates the effects of accounts receivables period, inventory period, cash conversion cycle, firm size, firm growth, leverage and fixed financial assets on firm profitability. The dependent variable of the regression model is return on assets. Three of totally seven independent variables of the regression model are directly related with working capital management. These are

Table 1: Definitions of Variables

Variables	Calculation	Symbol
Return on assets	Net income/total assets	ROA
Accounts receivables period	[Accounts receivables×365]/sales	ACRP
Inventory period	[Inventories×365]/cost of sales	INVP
Cash conversion cycle	[ACRP+INVP]-[(Accounts payables×365)/cost of sales]	CCC
Firm size	$\ln_{Total\ assets}$ (Natural logarithm of total assets)	SIZE
Firm growth (in sales)	$[\text{Sales}_t - \text{Sales}_{t-1}] / \text{sales}_{t-1}$	GROWTH
Leverage	Total debt/total assets	LEV
Fixed financial assets	Fixed financial assets/total assets	FIX

Table 2: Descriptive statistics (5,843 ISE Listed Manufacturing Firms-1998-2007)

Variables	Mean±SD	Minimum	Maximum
ROA	0.0206±0.10370	-0.8724	0.6652
ACRP	139.0786±54.9037	50.5784	299.2946
INVP	135.6185±53.0588	50.5120	299.2859
CCC	153.1316±48.0425	59.5562	299.3328
SIZE	17.5647±1.03540	14.1020	19.4990
GROWTH	0.3272±0.19260	-0.5320	0.5490
LEV	0.4049±0.12710	0.0600	0.6490
FIX	0.0365±0.03260	0.0002	0.1000

Table 3: Empirical results of dependent variables

Dependent variable	Standardized coefficients		
	β-value	t-value	Sig.
ROA			
Constant		1.709	0.088*
ACRP	-0.056	-4.156	0.000***
INVP	-0.067	-4.794	0.000***
CCC	-0.006	-0.427	0.669
SIZE	0.018	1.404	0.160
GROWTH	0.128	9.974	0.000***
LEV	-0.130	-9.979	0.000***
FIX	0.013	1.015	0.310
N	5.843		
Adj. R <sup>2</sup>	0.048		
F (sig. 0.000)	42.849		
Durbin-Watson	1.745		

\*\*\*, \*Significant at 0.01 and 0.1 levels, respectively

accounts receivables period, inventory period and cash conversion cycle, respectively. The other four independent variables are variables that are frequently used as control variables in similar studies. Dependent and independent variables are presented in Table 1.

Regression model is as follows:

$$ROA_i = \alpha_i + \beta_{11}ACRP_i + \beta_{12}INVP_i + \beta_{13}CCC_i + \beta_{14}SIZE_i + \beta_{15}GROWTH_i + \beta_{16}LEV_i + \beta_{17}FIX_i + \epsilon_i$$

where,  $\alpha_i$  is constant;  $\beta_{1-7}$  are coefficients of variables 1 thru 7 and  $\epsilon_i$  is residual term.

## EMPIRICAL RESULTS

The relationships between dependent and independent variables are analysed by the regression model mentioned earlier. Descriptive statistics (Table 2) and empirical results are given in Table 2 and 3, respectively.

Empirical findings of the study indicate that ACRP and INVP, which are -as mentioned before- directly related variables with working capital management, have significantly negative effects on firm

profitability. This means that while accounts receivables and inventory periods lengthen, profitability decreases, or vice versa. The other variables that have significant effects on firm profitability are GROWTH and LEV, affecting it positively and negatively, respectively (Table 3). This means that any increase in sales leads profits to grow, while any increase in debt causes profitability to fall. The other variables included in the regression model (CCC, SIZE and FIX) have no statistically significant effects on firm profitability.

## CONCLUSION

In financial management, it is possible to mention that studies regarding working capital management are not as popular as the ones related with capital budgeting and capital structure. From this perspective, this study aims to analyze determinants of firm profitability by means of variables related with working capital management practices using a sample of Turkish manufacturing firms for the period of 1998-2007. Empirical results show that, for the mentioned sample and period, accounts receivables period, inventory period and leverage significantly and negatively affect profitability of Turkish manufacturing firms, while firm growth (in sales) significantly and positively. However, it is also concluded that cash conversion cycle, size and fixed financial assets have no statistically significant effects on firm profitability of Turkish manufacturing firms for the period of 1998-2007.

Results suggest that firm profitability can be increased by shortening accounts receivables and inventory periods. The negative relationship between accounts receivable period and profitability may be due to that customers want more time to assess quality of products they buy from firms with declining profitability (Deloof, 2003). However, this empirical finding conflicts with some of financial models explaining trade credit. Trade credits are, in general, more profitable short-term investments than marketable securities (Emery, 1984b), so it is rational for, especially, high-profit firms that are more liquid, to transfer relatively high amounts of trade credit to their buyers. Because, according to the liquidity theory, liquid firms are less likely to demand trade credit and more likely to offer it. Another empirical finding is similar, the negative relationship between inventory period and profitability and this may be the result of declining sales leading to lower profits and more inventory, as stated in Deloof (2003)'s study.

Leverage is another variable affecting firm profitability negatively. This finding may be explained by the suggestions that highly-leveraged firms are softer competitors that will curtail investment (Myers, 2003), so their insufficient power of competition may lead decreases in profitability. The only variable in the model of the study that has significantly positive effect on profitability is firm growth (in sales). In case of that firm may gain some advantages like monopoly or bargaining power due to growth as a reflection of economies of scale (Küster and Demirgüneş, 2007), a positive relationship between growth and profitability is expected.

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