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 analyzed 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

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; Bradley 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 Wachowicz, 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 in borrowing capability and decrease in default risk (and

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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., 1986). 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 to improving models to determine optimal liquidity and cash balance, rather than analyzing underlying reasons of relationships between liquidity, 

![Operating cycle](image)

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 statically 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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Calculation</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on assets</td>
<td>Net income/total assets</td>
<td>ROA</td>
</tr>
<tr>
<td>Accounts receivables period</td>
<td>[Accounts receivables−365]/sales</td>
<td>ACRP</td>
</tr>
<tr>
<td>Inventory period</td>
<td>[Inventories−365]/cost of sales</td>
<td>INVP</td>
</tr>
<tr>
<td>Cash conversion cycle</td>
<td>[ACRP+INVP]/[(Accounts payable−365)/cost of sales]</td>
<td>CCC</td>
</tr>
<tr>
<td>Firm size</td>
<td>log10([Natural logarithm of total assets])</td>
<td>SIZE</td>
</tr>
<tr>
<td>Firm growth (in sales)</td>
<td>[Sales−Sales1]/sales1</td>
<td>GROWTH</td>
</tr>
<tr>
<td>Leverage</td>
<td>Total debt/total assets</td>
<td>LEV</td>
</tr>
<tr>
<td>Fixed financial assets</td>
<td>Fixed financial assets/total assets</td>
<td>FIX</td>
</tr>
</tbody>
</table>

Table 2: Descriptive statistics (3,843 ISIE Listed Manufacturing Firms-1998-2007)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>0.0206</td>
<td>0.10370</td>
<td>-0.8724</td>
<td>0.6652</td>
</tr>
<tr>
<td>ACRP</td>
<td>139.0786</td>
<td>54.9037</td>
<td>50.5784</td>
<td>299.2946</td>
</tr>
<tr>
<td>INVP</td>
<td>135.6185</td>
<td>53.0588</td>
<td>50.5120</td>
<td>299.2859</td>
</tr>
<tr>
<td>CCC</td>
<td>153.1316</td>
<td>48.0425</td>
<td>59.5562</td>
<td>299.3328</td>
</tr>
<tr>
<td>SIZE</td>
<td>17.5675</td>
<td>1.05340</td>
<td>14.1020</td>
<td>19.4930</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.3272</td>
<td>0.19260</td>
<td>-0.5320</td>
<td>0.5490</td>
</tr>
<tr>
<td>LEV</td>
<td>0.0496</td>
<td>0.12710</td>
<td>0.0000</td>
<td>0.0490</td>
</tr>
<tr>
<td>FIX</td>
<td>0.0565</td>
<td>0.03260</td>
<td>0.0002</td>
<td>0.1000</td>
</tr>
</tbody>
</table>

Table 3: Empirical results of dependent variables

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Standardized coefficients</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td>1.709</td>
<td>0.089*</td>
</tr>
<tr>
<td>ACRP</td>
<td>-0.056</td>
<td>-4.156</td>
<td>0.000***</td>
</tr>
<tr>
<td>INVP</td>
<td>-0.067</td>
<td>-4.794</td>
<td>0.000***</td>
</tr>
<tr>
<td>CCC</td>
<td>-0.006</td>
<td>-0.427</td>
<td>0.669</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.018</td>
<td>1.404</td>
<td>0.160</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.128</td>
<td>9.974</td>
<td>0.000***</td>
</tr>
<tr>
<td>LEV</td>
<td>-0.130</td>
<td>-9.979</td>
<td>0.000***</td>
</tr>
<tr>
<td>FIX</td>
<td>0.013</td>
<td>1.015</td>
<td>0.310</td>
</tr>
<tr>
<td>N</td>
<td>3.845</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.048</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F (sig. 0.000)</td>
<td>42.849</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>1.745</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, *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:

\[ \text{ROA}_i = \alpha + \beta_1 \text{ACRP} + \beta_2 \text{INVP} + \beta_3 \text{CCC} + \beta_4 \text{SIZE} + \beta_5 \text{GROWTH} + \beta_6 \text{LEV} + \beta_7 \text{FIX} + \epsilon_i \]

where, \( \alpha \) is constant; \( \beta_1, \ldots, \beta_7 \) 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 (Küller and Demirgüç-Kunt, 2007), a positive relationship between growth and profitability is expected.

REFERENCES


