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THE EFFECT OF FINANCIAL CONSTRAINTS ON THE RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND FINANCIAL PERFORMANCE OF LISTED COMPANIES IN TEHRAN STOCK EXCHANGE

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ABSTRACT
A large part of organization's capital is dedicated to working capital and its management has great importance. There is an invert U-shaped relation between working capital management and firm's financial performance. Regarding to this point that financing conditions may play important role in this relation, the aim of this study is to investigate the impact of financial constraints on the relationship between working capital management and financial performance. It's a descriptive-correlation study and is based on analysis of panel data. Our sample includes the financial data of 108 listed companies in Tehran Stock Exchange during the period 1386 to 1391. Using expense of external financing as a proxy of financial constraints, it is shown that these financial constraints have meaningful impact on the relationship between working capital management and firm's financial performance. And the optimal level of working capital is lower for firms that are more constrained financially. Our results suggest that because of cost of recede from it, managers should pay attention to the optimal level of working capital; and also they should prevent negative effects on firm's performance that are caused by lost sales, not using of discounts for payments before maturity, or extra financial expenses.

KEYWORDS: Working capital management, financial performance, optimal level of working capital management, financial constraints

INTRODUCTION

The capital is the main foundation of financial management and it can be said all business activities need capital. Capital is all financial resources consumed by company and financial management defines the framework of the relations between capital and organization. Today, in all business units, working capital is a great part of organization capital and its management is of great importance (Fathi and Tavakoli, 2009). Working capital is an important factor and it needs adequate control and management. Working capital management attempts to achieve the conditions that the firm is not encountered with extra liquidity or shortage of money (Dianati Lotfi, Azadbakhsh, 2012). Efficient working capital management includes planning and control of current debts and assets as the inability risk of fulfilling the short-term obligations on one hand and avoiding overinvestment in these assets can be eliminated. Bankruptcy is possible even for the firms exposed to false working capital management, even by positive profitability (Rahman and Nasr, 2007).

The results of the study of Caballero, Teruel and Solano (2013) show that there is an inverse U-shaped relation between investment in working capital and firm performance. It means that investment in working capital and firm performance has positive relation in low levels of working capital and in high levels, they are related as negative and this indicates optimal level of investment in working capital and in this level, costs, benefits are balanced and firm performance is maximized.

Fazzari and Petersen (1993) state that investment in working capital is sensitive to financial constraints than investment in fixed capital. Empirical evidences show that investment in working capital depends upon financing in an enterprise. Hill, Kelly and Highfield (2010) state that the firms with high financing capacity and high access to capital market hold high level of working capital (Caballero et al., 2013). As a positive level of working capital needs financing, we expect that optimal level of working capital is less for the firms with high financial constraints. The main problem of study is "Is there any inversed U-shaped relation between working capital management and financial performance of the firms with high financial constraints. After introduction, at first theoretical basics and review of literature are explained, then the study method is elaborated. Finally, empirical results of data analysis are presented and conclusion is presented.

Theoretical basics of study

The definition of working capital in accounting is current asset minus current debts and it indicates the investment of firm in cash flow, selling securities, accounts receivable and inventory of materials and goods minus current debts (Shabahang, 2008). Working capital management is determining the volume and composition of resources and working capital consumption as the shareholder wealth is increased (P.Neveu, 2001). Current asset management to fulfill the short-term obligations of firm is working capital management (Rahman and Nasr, 2007).

To perform operational activities and investment, business units need cash flow. The required cash flow should be provided via financing activities. Financing is done via various resources. Each financing source has specific effects on return and risks of business unit owners (Shabahang, 2008). Different financing sources are divided into three types of financial sources without cost, internal financial sources and external financing sources. The financial sources without cost include commercial creditors, pre-payment of customers and accounts receivable. The internal financial sources of firms include cumulated profit and non-cash expenses as depreciation, external financing sources, receiving loan from financial institutions or bonds issuing and its selling to public, preferred stock issue and common stock issue (Jahankhani, 1994).

Beaver (1989) defined efficient market: An efficient market is efficient based on its information system if the prices changes are occurred when all investors observe the signs given by information system. In other words, the price changes are occurred when awareness of information is universal. In this case, the prices indicate the information provided by accounting system (Salimifar, Shirzour, 2010).

Modigliani and Miller (1985) state that in an efficient market, the amount and type of investment of business units are independent form financial structure and their liquidity. In other words, according to financial neoclassic literature, efficient market with timely financing of the projects with bright and positive perspective causes that the managers (firms) invest until the final return rate of investment is zero (Biddle and Hilary, 2006). The assumption of non-defect of market is non-realistic due to the problems of agency and information asymmetry. Agency theory: This theory is about a person delegating the decision making regarding distribution of financial and economic sources or service to another person in a definite contract. The first person is called owner and the second one is called agent. The relationship between shareholder and manager is an example of agency (Namazi, 2005). The first problem of agency is regarding the conflict of benefits between shareholder and manager. Thus, this is probable that the manager doesn't act along with the shareholder benefits. Embezzlement and financial scandal of manager and eliminating the benefits of shareholder form the firm are extreme examples of the benefits conflict.

The second problem of agency is about shareholder inability regarding the manager operation (Jensen, 1998). The shareholder cannot follow the measurements of manager daily to be sure whether the manager decisions are consistent with the shareholder benefits or not. This is called information asymmetry in agency theory. The manager has much executive information than shareholder regarding the actions performed in organization. This extra information of manager in agency theory is called private information. The private information increases information asymmetry between shareholder and owner (Namazi, 2005). In case of capital market defects, internal and external financing sources cannot be perfect substitutes (Arsalan, Florackis and Ozkan, 2006). It should be said that financing is not infinite by firms and firms have financing constraints in this regard (Karimi and Sadeghi, 2009). The firms with financial constraint have low and costly access to external financing (Ozkan and Ozkan, 2004). Thus, by this definition, all firms can be considered as the firms with financial constraints but the financial constraint levels are different. Generally, the firms without financial constraint or low financial constraint are those with high liquidity assets and their net asset is high. Thus, financial constraints are those avoiding financing all the required money of good investment for firms (Kanani, 2007).

If both groups of managers and investors maximize their personal benefits and supervising the agent performance requires cost, this implicitly indicates that the agent is not intended to finance the owner and maximizing his wealth (Amir Aslani, 2005). The benefits contradiction leads to the concern of owners (shareholders) as they investigate the managers' performance to be sure of optimal allocation of their resources from managers (Namazi and Zeraatgari, 2009). The firms' performance is the basis of many decisions. One of the important factors considered by most of

creditors, investors, managers and other economic activists is performance. In other words, firm performance is the result of activities and return of investment in a definite period (Shanazarian, 2010).

Review of Literature

Local studies

Shabahang (1994) investigates the working capital constituents and the role of financial manager in applying management on working capital and the result of the study show that overinvestment in current assets creates the costs of lost opportunity and underinvestment is costly in current assets. He states regarding current debts as short-term loan is used to support investment in current assets. Also, it is required to consider some cases as financing expense, reliability, constraints and flexibility in financing selection.

Kashanipour and Taghinezhad (2009) investigated the impact of financial constraints on cash flow sensitivity to cash flows among 96 firms listed on TSE during 2002-2008 by panel data. They applied the criteria of firm size, firm life, dividend ratio and business group in the position of agent of financial constraints show that cash flows have not significant impact on cash flow holding level and there is no significant difference between cash flow sensitivity to cash flows in the firms with financial constraint and the firms without financial constraint.

Foreign researches

Sapriza and Zhang (2004) applied Q Tubin model for good investment by considering financial constraints of firms and evaluated their impacts on firms risk and expected returns. One of the results of their study is as financial constraints reduce firm value and investment rates and these inverse impacts are of great importance for small firms and the firms with financial pressure. They found also that the firms with financial constrain has less risk and their achieved expected return is lower than non-constrained firms.

Denis and Sibilikov (2009) evaluated the relationship between financial constraints, investment and value of cash holding. They found that cash flow holdings have high value for the firms with financial constraint compared to the firms without financial constraint.

Kieschnick, Laplante and Moussawi (2011) studied the relationship between working capital management and firm value. They considered the studies of Faulkender and Wang (2006) as reference evaluation model and analyzed the valuation of an added dollar investment in net operating working capital by the shareholders of joint firms of USA. They considered extra stock earnings as the agent of firm value. The results showed that averagely an extra invested dollar in net operating working capital is less than value of cash holdings. They also found that averagely, the increase of net operating working capital reduced extra stock earnings and this reduction was big for the firms with limited access to external investment.

Caballero et al., (2013) evaluated the relationship between working capital management and firm performance for a sample of non-financial England firms. They results showed an inverse u-shape relation between investment on working capital and firm performance. The results of the study showed that the managers avoid negative impacts on firm performance due to lost sales, not using cash discounts for payments before maturity and extra financial expenses. This study also evaluated whether optimal level of working capital was sensitive to alternative scales of financial constraints or not? The results showed that this level was low for the firms with high financial constraints.

MATERIALS AND METHODS

This study is applied in terms of purpose and descriptive-correlation in terms of method and is ex post facto in terms of time scope and applies the historical information of the sample firms. The data are analyzed by Excel software. Also, Eviews software is used for statistical tests.

Study scope

The study area is the firms listed on TSE during 2007-2012. This study is regarding financial management and accounting.

Measurement of study variables

Independent variable is the one acting as cause and affects other variables (Rezvani, 2011). The independent variable of the study is working capital management.

The dependent variable is the one dependent upon independent variable and it is the effect of independent variable (Rezvani, 2011). The financial performance is dependent variable.

In a study, we cannot study the effect of all variables on each other at the same time. Thus, the researcher controls the impact of some variables and neutralizes them. These variables are called control variables (Sarmad and Bazargan, 1998). In this study, firm size, leverage, growth opportunities and return on assets are control variables.
The independent variable as working capital management is computed by the following formula:

$$365 \times \frac{Accounts\ receivable}{Sales} + 365 \times \frac{Inventory\ and\ goods}{Sales} - 365 \times \frac{Accounts\ payable}{Sales} \quad (1)$$

Q Tubin financial performance criterion is used as dependent variable as:

$$\frac{Book\ value\ of\ debts + Market\ value\ of\ equity}{Book\ value\ of\ assets} \quad (2)$$

Also, the control variables of the study are computed as:
Firm size: It is computed by natural logarithm of sales.

Leverage: $\frac{Total\ debts}{Total\ assets}$ (3)

Growth opportunities: $\frac{Book\ value\ of\ intangible\ assets}{Total\ assets}$ (4)

Return on assets: $\frac{Earnings\ before\ interest\ and\ tax}{Total\ assets}$ (5)

Financial constraint: This variable is the multiplication of independent variable of working capital management and a dummy variable as 1 for the firms with high financial constraint and 0, for other firms. To separate the firms with high and low financial constraint, external financing expense criterion is used as follows.

External financing expense: Fazzari, Hubbard and Petersen (1988) consider the firms as constrained if the external financing expense is very expensive. Thus, by considering external financing expense, we can say the firms are encountered with financial constraints or not. This expense is achieved by financing expenses to total debts. Specifically, the firms with high external financing expenses than median have high financial constraints.

The hypothesis of financial constraints
There is a significant non-linear relation between working capital management and the performance of the firms with high financial constraints.

The study sample and population
The present study population is including the firms listed in TSE during 2007 to 2012. The following features are considered in the study sample.

1- They are listed in TSE since 2007 and continued their membership until 2012.
2- The fiscal year leads to 29 of Esfand.
3- The required information is available in the study period.
4- The firm has not fiscal year change in the study period.
5- It is not belonging to banks and financial institutions (investment, financial brokerage, holding and leasing firms)

By considering the above conditions, 108 firms are selected for 6 years, 648- years-company.

Unit root test in pooled data
The reliability of the study variables means the mean and variance of variables are fixed over time and variable covariance is fixed in various years. Thus, using these variables in model doesn't create spurious regression (Namazi and Kermani, 2008). Baltagi (2005) states that when the period is short and below 10 years, there is no need to stationary test. Also, Wooldrige (2009) states that if the sections are more than time, panel stationary test is not required. As the number of sections is equal to 108 firms and the time period is 6 years, panel stationarity test is not performed.

Data analysis method

This study applies panel data method. The panel data method is used to increase statistical power compared to statistical data analysis as time series or cross section. By considering the changes of variables in each section and time as common, all the available data are used and the observations error is reduced. Although in cross section statistical data, the statistics range is wide, in pooled data evaluation method, much information is used. Thus, by increasing statistics and information, degree of freedom is increased and the estimations regarding study population are efficient (Gujarati, 2003).

Diagnostic tests

To determine the type of applied model in pooled data, various tests are used. The most common tests are Chow test to use fixed effect model to pooled data estimated model. Hausman test is used for fixed effect model to random effect model (Zaranezhad and Anvari, 2005). To determine the applied model in pooled data, Chow and Hausman tests are applied.

The results of Table 1 show that the mean firm performance is 1.295. These results show that the mean dependent variable in the studied period is positive and it can be said averagely, all firms created value. The study of explanatory variables shows that the mean working capital management is 165.892. It means that almost 166 days take that cash flow is turned into cash flow after business cycle.

Table 1- Descriptive statistics of study variables

Variable	Mean	Medium	Max	Min	SD
Firm performance	1.295	1.143	4.601	0.489	0.526
Working capital management	165.892	149.434	1563.548	-1938.245	181.442
Firm size	13.159	13.088	18.492	9.155	1.380
Leverage	0.640	0.643	2.077	-0.395	0.234
Growth opportunities	0.005	0.002	0.049	0	0.007
Return on assets	0.109	0.0909	3.907	-0.403	0.192

Source: Study findings

As shown in Table 2, at confidence interval 99% null hypothesis, the pooled data is rejected. Based on the panel data of both models, we need Hausman test. As shown in Table 2 at confidence interval 99%, random effect model hypothesis is rejected and H1 as fixed effect model is supported.

Table 2- The results of Chow and Hausman tests

Chow Test		Hausman Test	
F-Limer statistics	8.440	Chi-square statistics	44.791
Probability	0.000	Degree of freedom	8
Result	Reject H_0	Significance	0.000
		Result	Reject H_0

Source: Study findings

Formula 6 is the financial constraint model showing the relationship between working capital management and firm performance as non-linear.

$$Q_{i,t} = \beta_0 + \beta_1 NTC_{i,t} + \delta_1 DFC_{i,t} NTC_{i,t} + \beta_2 NTC_{i,t}^2 + \delta_2 DFC_{i,t} NTC_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 ROA + \varepsilon_{i,t} \quad (6)$$

As shown in Table 3, the intercept in financial constraints model based on external financing expense is 0.6314. The significance of F statistics with probability 0.000 indicates significance of total study model. The adjusted coefficient of determination shows that independent variable determines 73% of dependent variable. Durbin-Watson statistics is about 1.86 and it shows that there are not evidences of serial auto-correlation problem in disturbance terms of estimated model. Thus, the results are not spurious and we can rely on the mentioned results.

Table 3- The results of estimation of financial constraints model

Variable	Coefficients	Statistics	Significance
Intercept	0.631	3.9403	0.000
Working capital management (NTC)	0.016	3.4165	0.000
Financial constraint ($DFC \times NTC$)	-0.048	-5.9272	0.000
Squared working capital management (NTC^2)	-0.012	-6.7123	0.000
Squared financial constraint ($DFC \times NTC^2$)	0.009	4.2019	0.000
Firm size ($SIZE$)	0.030	2.5905	0.009
Leverage (LEV)	0.449	6.5305	0.000
Growth opportunities ($GROWTH$)	-1.897	-2.5139	0.012
Return on assets (ROA)	0.280	3.2084	0.001
Adjusted coefficient of determination (R^2)		0.729	
Durbin-Watson		1.857	
F statistics		16.190	
Probability		0.000	

Source: Study findings

Based on the results in Table 3, probability of H0 is the lack of non –linear relation between working capital management and firm performance with high financial constraint is zero. Thus, H0 is rejected at error level 1% and there is a significant non-linear relationship between working capital management and firm performance with high financial constraint.

We can investigate whether optimal level of working capital management is different with high and low financial constraint or not. According to the method of Lee and Xiao (2011), we can derive from the following equation:

$$Q_{i,t} = 0.0169\, NTC_{i,t} - 0.012\, NTC_{i,t}^2 \qquad (7)$$

In the firms with low financial constraint, critical point of our sample is 70 days. For the firms with hihg financial constraint, the financial constraint variables have coefficinet 1 and the following equation is obtained:

$$Q_{i,t} = -0.0314\, NTC_{i,t} - 0.0025\, NTC_{i,t}^2 \qquad (8)$$

The critical point of the sample in the firms with high financial constraint is -623 days. The comparison of the critical points in equations 2, 3 supports that when financing condition of firms is considered in our analyses, the firms with high financial constraints have low optimal level of working capital.

As working capital management coefficient is postive and its square is negative, the results of the considerable u-shape relation between financial perfomrance and working capital management of the firms with high financial constriant is supported. However, these firms have low working capital optimal level compared to the firms with low financial constraint. This shows that investment in working capital depends upon the financing condition of a firm as internal financing, access to capital markets or financing expenses. Indeed, the capital market defects impact (information

asymetry and agency costs) on financing of firms can be justified, the fact that friction of capital market can increase external financing expense regarding internal financing, it causes that external cpaital is not a perfect substitute for internal cash. Because, the lower the investment in working capital, the lower the external financing. This hypothesis is in line with the results of the study of Caballero et al., (2013), Kieschnick et al., (2011) and Sapriza and Zhang (2004). Our results show that the managers consider optimal level of working capital due to the costs of being far from it. They avoid negative effects on firm performance due to the lost sales, not using cash discounts for payments before maturity or extra financing expenses. As working capital is of great importance namely in small firms with more current assets, it is proposed that the firms establish a committee to investigate this issue and take economic decisions to observe the good level of working capital. Financial managers of the firms can avoid costly external financing by exact investigation of internal factors of firms. This study is conducted in all firms and it is possible a difference among various industries is ignored. It is proposed to investigate the present study regarding each industry as separately and compare the results in various industries to have clear conclusion. Instead of using Q Tubin financial performance index, we can use other performance indices as economic value added and cash value added. We should consider time and place limitation in the results of the study. In this study, only a sample of the firms listed on TSE during 2007 to 2012. As the study sample is selected among the firms listed on TSE, the sample firms are not the representatives of all active economic units in terms of working capital management and firm performance and generalizing the results to other firms should be done cautiously. As to compute the study variables, financial statements based on historical costs, in case of adjusting financial statement information for inflation, it is possible the study results are different from current results.

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