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Relationship Between Financial Constraints, Economic Crises and Working Capital Management of Companies Listed on Tehran Stock Exchange

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Abstract: This study aims to examine the relationship between financial constraints and economic crises, and working capital management of companies listed in Tehran Stock Exchange (TSE) for the period of 2014-2015. Cash conversion cycle and net liquidity balance were used to assess working capital management. KZ index was used to calculate the financial constraints, and to determine the economic crisis, dummy variable of economic growth rate was used. The results of panel data analysis showed that financial constraints and economic crisis has adversely affected working capital management. In other words, managers decrease the level of investment in working capital during financial and economic crisis. Moreover, we found that firm size, profitability and financial leverage have negative impact on cash conversion cycle.

Key words: Financial constraints, economic crisis, working capital management, cash conversion cycle, net liquid balance

INTRODUCTION

The required funds to continue daily activities of business unit are called working capital. In this regard, working capital management is the optimum combination of working capital items (i.e., current assets and current debts) in a way that wealth of shareholders reaches its maximum amount (Deloof, 2003). Generally, Working capital management is related to daily activities, not to the long-term decisions of business enterprise. Accessing to raw materials, granting credit to customers and collecting receivables accounts, creating the advantage of credit purchase, managing cash account, etc. will facilitate the daily operations of the business unit .

Working capital management is important because this strategy affects both the liquidity and profitability of a firm (Shin and Soenen, 1998). Banos-Caballero *et al*. (2009), Hailu and Venkateswarlu (2016), Mansoori and Muhammad, 2012a, b) reported that reducing the level of working capital would increase the firm's profitability and consequently, its value. However, further reduction in working capital is impossible, given that firms have to maintain a sufficient amount of funds and current assets to perform their daily operations. Therefore, managers must balance their level of investment in working capital.

To help managers in doing so, several researchers have provided suggestions for working capital management. Earlier studies (Appuhami 2008) focused on firm-specific variables (internal variables) to determine working capital management. Such variables are related to the operational conditions and financing capability of the companies that affect the efficiency of working capital management. Banos-Caballero *et al* (2009), Mansoori and Muhammad (2012a, b), Zariyawati (2010) focused on external variables such as macroeconomic variables that affect working capital management. These studies highlighted that both internal and external factors are important to determine working capital management.

Accordingly, the present study examines the impact of financial constraints and economic crises on working capital Management as internal and external factors respectively. Specially, economic crisis are one of the important issues during last ten years for Iranian firms, since economic sanction of Iran has dramatic effect on financing and investment polices of Iranian companies.

This research enriches the existing literature by investigating the effect of financial constraints and economic crisis on the working capital management. In particular, this study identifies the relationship between financial constrains, economic crisis and working capital decisions, Furthermore, this study provides theoretical guidelines for regulators and policy makers in dynamic business situations. As a theoretical contribution to the existing literature, this study tries to highlight the important factors that affect working capital management internally and externally.

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Literature review: Literature on working capital management has focused on two main topics. First topic is relationship between working capital management and profitability. Profitability would increase if working capital is managed effectively. An effective working capital entails lesser funds invested on working capital, which results in the reduction of the financing cost as well as in the opportunity cost of extra investing funds on working capital.

Mohammad and Saad (2010) investigated the effect of working capital management on the performance of Malaysian firms. The results of the multiple regression analysis and correlation coefficient showed that managers can increase the firm's market value and performance by effectively managing working capital. In Japan, Hailu and Venkateswarlu studied the relationship between working capital management and firm profitability on manufacturing companies in eastern, Ethiopia. Their results showed that managers can improve firm performance by effectively managing working capital.

Moreover, the researchers recommended that managers should be careful when considering the lengthening of payable deferral because it might harm the corporation's credit reputation. Mansoori and Muhammad (2012b) have investigated the effect of working capital management on firm's profitability of Singapore firms. The results showed that managers can increase profitability by managing working capital efficiently. Moreover, managers can improve firms' profitability by shortening receivable conversion period and inventory conversion period.

Second topic on working capital management is related to determinants of working capital management. In this area, researchers sought to determine the most important factors that are associated with working capital management. These factors are divided into two groups. The first group is composed of internal factors related to firm-specific characters that fall under the management's control, and can be changed by different and appropriate decisions. The second group includes the external factors, which affect working capital management and emerge from the economic conditions. These variables are not under the managers' control and might have important effects on working capital. Mansoori and Muhammad (2012a, b) examined working capital management in Singapore firms. Both internal and external variables were applied in the model to determine working capital management. The result of panel data analysis indicated that firm size, operation cash flow and GDP are negatively affected by the length of cash conversion cycle.

To determine working capital management, a sample of Spanish SMEs was studied by Banos-Caballero *et al.* (2009). The study's findings reported that firms with longer CCCs are older firms with more cash flows. In addition, the CCC was negatively associated with leverage, firm growth, fixed assets investment and ROA. The results likewise suggested that corporations would increase investment in working capital if they have better access to capital markets, which refer to the effect of the cost of financing on working capital management. With regard to macroeconomic variables, the study found no evidence for the effect of interest rates and GDP on CCC.

The relationship between capital structure and working capital management was also investigated by Bereznicka (2014). This study is tried to verify the significance and the direction of the way capital structure impacts working capital on a sample of private firms across 9 EU countries. The results of this study indicated that the way financial leverage affects working capital across size groups of companies is determined by country-specificity.

MATERIALS AND METHODS

Data and sample selection: To investigate the effect of financial and economic crisis on working capital management a sample of Iranian firms which listed in Tehran Stock Exchange (TSE) is selected. The data need for empirical testing of the research hypotheses was collected from the Rah-Avard-Novin database that included the secondary data of the financial statement of firms listed in the main board of TSE. The sample was putted up as follows. All active firms over the research period with completed required data were selected and firms with incomplete data were excluded from the sample. Because of the specific nature of firms active in banking and finance, insurance, mutual funds and business services, these firms were excluded from the sample. To investigate industry effects, the sectors with less than 10 firms eliminate from the sample. Final sample consisted of 1480 firm-year observations that include the observation of 148 firms for the 10 year from 2005-2014.

Variables and research models: Figure 1 shows two important part of working capital including operation and liquid working capital. Operation working capital refers to inventories and accounts receivables that show operation cycle of a firm. While, liquid working capital is related to cash and cash equivalent and short term investment of a company. We have used CCC and NLB as dependents variables and two proxies for working capital management.

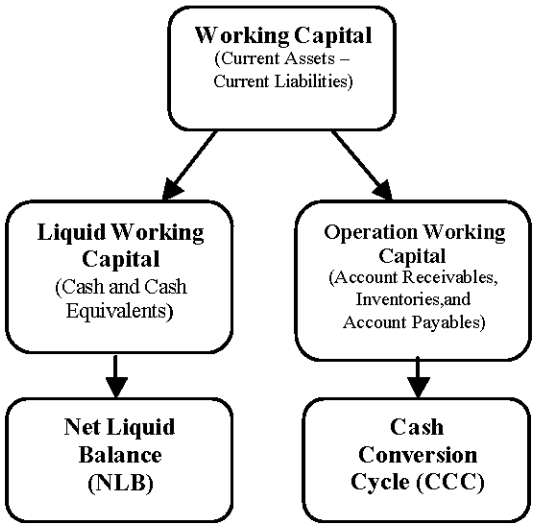

Fig. 1: Two important part of working capital including operation and liquid working capital (Mansoori and Muhammad, 2015)

In this study, to test the main hypothesis and related subordinate ones, i.e., the effect of financial constraints on various indexes of working capital management of companies listed on TSE, two following models have been used:

$$CCC_{it} = \beta_0 + \beta_1 KZ_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

$$NLB_{it} = \beta_0 + \beta_1 KZ_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

Where:

CCC_{it} = Cash conversion cycle as the first criteria and reverse index of Working capital Management at the end of fiscal period of t for the firm i

NLB_{it} = Net liquidity balance as the second criteria and direct index of Working capital Management at the end of fiscal period of t for the firm i

$SIZE_{it}$ = Size of the company i at the end of fiscal period of t

ROA_{it} = The profitability of the company I at the end of fiscal period of t

LEV_{it} = Financial leverage of the company i at the end of fiscal period of t

Kz_{it} = Financial constraints at the end of fiscal period of t for the firm of I; to calculate KZ, we used Kaplan and Zingales (1997) Model as below

$$KZ_{it} = 1.002 \times \left(\frac{CF_{it}}{TA_{it}}\right) + 0.283 * \left(\frac{M_{it}}{B_{it}}\right) + 3.139 \times \left(\frac{D_{it}}{TC_{it}}\right) - 39.368 \times \left(\frac{DIV_{it}}{TA_{it}}\right) - 1.315 \times \left(CH_{it} / TA_{it}\right)$$

Where:

CF = Net operation cash flow
TA = Total assets
M = Market value of the firm
B = Book value of the firm
D = Total firms' Loan
TC = Firms' total capital
DIV = Firms' dividends
CH = Sum of cash and short term investments

In this study, to test the second hypothesis two following models have been use

$$CCC_{it} = \beta_0 + \beta_1 KZ_{it} + \beta_3 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

$$NLB_{it} = \beta_0 + \beta_1 KZ_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

Where, Ec_t Economic crisis at the end of fiscal period of t which is a dummy variable with number 1 if economic growth rate is decreased in compare to last year and 0 otherwise.

Panel data analysis and Ordinary Least Squares regression (OLS) was used to investigate the impact of financial and economic crisis on working capital management Panel data analysis have attracted many researchers because of its three advantages (Gujarati, 2003). First, proper panel data estimation and modelling allow researchers to control for unobservable firm-specific effects or time-invariant omitted variables. Second, the efficiency of the econometric estimates is improved because both dimensions of the data, namely, cross-section and time-series, are available in the panel data which can help researchers to obtain a large number of data points, subsequently increasing the degree of freedom and reducing the collinearity between explanatory variables. Therefore, researchers can test their hypothesis even with few observations. Third, individual differences between cross-sections as well as the time differences between the periods are considered in the panel data by including dummy variables into the model.

RESULTS AND DISCUSSION

Table 1 shows the results of first hypothesis that investigate the impact of financial constraints (KZ) on the Cash Conversion Cycle (CCC). The results show a

Table 1: The impact of financial constraints on the cash conversion cycle

p-value	t-statistics	Coefficient	Statistics variables
0.0000	14.55	7.99	C
0.0447	2.01	- 0.11	KZ
0.0000	-9.33	-0.37	SIZE
0.0000	-4.59	-1.04	LEV
0.0000	-4.69	-1.30	ROA
Durbin Watson Statistic	1.746	-	-
Possibility of F-Statistic	0.0000	-	-
Jarque-Bera possibility for Residuals	0.25	-	-
Jarque-Bera statistic for Residuals	2.79	-	-
Adj. R	0.659	-	-
R	0.694	-	-

Table 2: Impact of financial constraints on net liquidity balance

p-value	t	R	Statistics variables
0.0000	7.30	0.42	C
0.0000	-5.35	-0.03	KZ
0.0000	-6.33	-0.03	SIZE
0.0000	-7.79	-0.19	LEV
0.0000	5.55	0.16	ROA
D u r b i n Watson Statistic	1.885	-	-
Possibility of Statistic F	0.0000	-	-
Jarque-Bera possibility for Residuals	0.27	-	-
Jarque-Bera statistic for Residuals	2.64	-	-
Adj. R	0.505	-	-
R	0.556	-	-

Table 3: The impact of economic crisis on cash conversion cycle

p-value	t	R	Statistics variables
0.0000	16.26	9.47	C
0.0000	5.96	-0.34	EC
0.0000	-11.13	-0.48	SIZE
0.0000	-5.23	-1.17	LEV
0.0000	-5.12	-1.38	ROA
Durbin Watson Statistic	1.939	-	-
Possibility of Statistic F	0.0000	-	-
Jarque-Bera possibility for Residuals	0.33	-	-
Jarque-Bera statistic for Residuals	2.23	-	-
Adj. R	0.667	-	-
R	0.701	-	-

Table 4: The impact of economic crisis on cash conversion cycle

p-value	t	R	Statistics variables
0.0000	5.77	0.25	C
0.0000	-4.20	-0.02	EC
0.0000	-5.04	-0.02	SIZE
0.0000	-7.83	-0.17	LEV
0.0000	7.35	0.19	
ROA Durbin – Watson Statistic	2.002	-	-
Possibility of Statistic F	0.0000	-	-
Jarque-Bera possibility for Residuals	0.34	-	-
Jarque-Bera statistic for Residuals	2.16	-	-
Adj. R	0.302	-	-
R	0.327	-	-

negative (-0.11) and significant (p-value, 0.000) relationship between KZ and CCC as a reverse index of working capital management. That is on those periods that the company faced with financial constraints, the cash conversion cycle is low. This suggests that managers decreases the level of investment in current assets specially inventories and account receivables during financial constraints. Moreover, during financial constrains firms try to use more trade credits from suppliers to finance its working capital.

The results also showed that the effect of controlling variables such as firm size, leverage and profitability on the cash conversion cycle. This suggests that in the large companies and profitable companies that have higher levels of debt in the company's capital structure, the cash conversion cycle was dramatically down; in fact, Working capital management has been optimized.

Table 2 shows the results of second hypothesis that investigate the impact of financial constraints (KZ) on the Net Liquid Balance (NLB). The results of Table 2 indicate that the impact of financial constraints on net liquidity balance was negative (-0.03) and given the p-value (0.0000), it is significant. This suggests that financial constraints as a direct criterion for working capital management has reverse impact on net liquidity balance. In other words, on those periods that the company faced with financial constraints, net liquidity balance is decreased. That is mangers decrease the level of investment in cash and cash equivalents during financial constrains.

Table 3 shows the results of third hypothesis that investigate the impact of economic crisis (EC) on the Cash Conversion Cycle (CCC). The results of Table 3 indicate that the impact of economic crisis on the cash conversion cycle was negative (-0.34) and given the p-value (0.0000), it is significant. This suggests that financial crisis has indirect impact on the cash conversion cycle. Meanwhile, managers decrease the level of investment in operation working capital during economic crisis.

Table 4 shows the results of fourth hypothesis that investigate the impact of economic crisis (EC) on the Net Liquid Balance (NLB). The results of Table 4 indicate that the impact of EC on net liquidity balance (direct criterion of Working capital Management) was negative (-0.02) and given t-statistic (0.0000), it is significant. This suggests that economic crisis has reverse impact on net liquidity balance. In other words, on those periods that the country faced with economic crisis, financial managers try to decrease the level of investment in liquid working capital. Since economic crises may constrains firms by external financing.

CONCLUSION

The main hypothesis of this study was to examine the relationship between financial constraints, economic crisis and different measures of Working capital Management (cash conversion cycle as the reverse criterion of Working capital Management) and net liquidity balance (as direct criterion of working capital). Using panel data analysis with fixed effect estimation, the results show that managers decrease the level of

investment in both operation and liquid working capital. This could be due to the firm's financial constraints during economic and financial crises. However, decreasing the level of firm's liquidity may increase risk of liquidity and consequently cost of external financing. Therefore, managers should optimize firm's working capital investment during financial and economic crisis.

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