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CAPITAL MANAGEMENT IN FLOW AND PERFORMANCE OF THE LISTED COMPANIES IN TEHRAN'S STOCK EXCHANGE

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ABSTRACT

The purpose of this research was to discuss capital management in flow and performance of the listed companies in Tehran's Stock Exchange. The type of research falls into the category of applicable researches and data is collected through descriptive-correlative methods. The population of the research includes medical, chemical, non-metallic minerals, basic metals and automotive production industrial companies listed in Tehran's stock exchange. Random samples taken from the list of companies in Tehran's exchange were selected according to the following criteria: 1-should be listed in Tehran's exchange market since 2007; 2-end of company's financial period should be set to 29.12; 3-Banks and financial institutes are omitted for the purpose of homogenization of data and 4-their preferable data should be available from different sources. Required data for this research is collected from Rahavard-Novin, Dena shares, and official website of Tehran stock exchange data bases through library methods. Stata software was used for testing the statistical data, calculation of coefficients and calculation of needed values for statistical analyses such as t and F tests, calculation of Regression equation's parameters, calculation of correlation coefficients, dispersal diagrams and etc. results indicated that capital's performance index in flow, capital utility index, capital's efficiency in flow, cash conversion cycle, size of the company and growth in company's sales have significant effects on asset performance.

Keywords: *Capital Inflow, Performance, Stock Exchange*

INTRODUCTION

Working capital efficiency management is the representative and the criteria of health of an organization which require reduction in capital problems or in other words cost of financing. Lack of efficiency in working capital management causes illness in organizations and new financial management is aimed at reducing the level of working capitals without neglecting the risk of lack of inventory (Santano, 2006). Efficiency of working capital management includes planning and controlling working capitals and working debts through avoiding over investment in working capitals and prohibiting improper flow of working properties for completing tasks and being responsive. Cash conversion cycle is known as an index which indicates the efficiency of working capital management. Success of a commercial organization is entirely depending on efficiency of managers in their ability to manage received accounts, paid accounts and inventories (Sean *et al.*, 2010).

Efficient working capital management is one of the main requirements for success of commercial organizations. Lack of management in handling working capitals could be associated with significant costs. Over investment in working capitals allocates company's limited financial sources to itself while, these investments can be implemented in more beneficial situations. This issue leads to bearing the cost of lost opportunities. On the other hand, under-investment in working capitals also could be costly. For instance insufficiency of cash prevents the company to comply with its obligations. Also holding an insufficient amount of inventories prevents sales and causes customer dissatisfaction (Deloff, 2003).

Several researchers have discussed the effects of working capital management on firms and organizations. For instance, results of researches conducted by Caballero *et al.*, (2013) showed that there is reverse U Shape relation among working capital and performance of the firms and optimal level of working capital is less for companies which have increased financial limitations. Results of the research conducted by Avgandyp *et al.*, (2012) indicated that there is a negative significant relation between cash conversion cycle, market value and performance of the company. Their findings also indicated that debt levels have

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negative relations with performance of the company and positive relations with market value. Findings of research conducted by Saghir *et al.*, (2011) showed a significant negative relation among profitability and cash conversion cycle. Muhammad and Saeed (2010) discussed the influence of working capital management on performance and the value of companies listed in Malaysia's stock exchange between 2003 and 2007. Results of their research indicated a negative significant relation among cash conversion cycle and its related compartments and performance and value of the company. Results of research conducted by Zryavty *et al.*, (2009) indicated that there is a negative significant relation among cash conversion cycle and profitability. Setayesh and Mansouri (2010) conducted a research on 195 companies listed in stock exchange and showed that there is a negative significant relation between cash conversion cycle and charge collection and inventory's flow period and profitability of companies during 2009. Capital's return rate is applied as the criterion for benefaction measurement and cash conversion cycle and its compartments are applied as criteria of working capital management. Vakili *et al.*, (2010) conducted a research on 86 firms during 2002-2007 indicated that there is a reversed relation among working capital management and profitability. Also the results of research conducted by Muhammadi (2010) showed that there is a negative significant relation among cash conversion cycle and its compartments including charge collection periods, inventories flow periods and creditor's settlement periods; and company's profitability. The variable of proportion of net profits by sum of properties is used as criterion for measuring profitability and cash conversion cycle and its compartments are used as criteria of working capital management. Discussing the relation among indexes of working capital management and asset performance can provide information regarding changes and management of working capitals and also determine the efficiency of working capital management (Jahankhani and Talebi, 2009). In general, incomes, expenses, working capitals and working debts are closely related to each other and management of working capitals and debts effects sales and expenses. As a result, proper management leads to increased efficiency and profitability. Analysis of working capitals management is a criterion for assessing the abilities of managers regarding obtaining the organization's goals. With respect to this content, in this research we have tried to discuss the relation among indices of working capital management and performance of assets in companies listed in Tehran's stock exchange.

Hypotheses

H1: There is a significant relation among the index of performance of working capital management and asset performance.

H2: There is a significant relation among the index of utility of working capital management and asset performance.

H3: There is a significant relation among cash conversion cycle and asset performance.

MATERIALS AND METHODS

Methodology

This research is an applicable study with descriptive-correlative data collection method. The subject of this study is to discuss the relation among the indices working capital management and asset performance in top companies of exchange market which include medical, chemical, non-metallic minerals, basic metals and automotive industries. Time period of the study starts from 2008 and finishes in 2013. Randomly selected companies that are listed in Tehran's stock exchange are chosen based on the following criteria:

- 1- Being listed in Tehran's stock exchange since 2008.
- 2- End of company's financial period should be set to 29.12.
- 3- Banks and financial institutes are omitted for the purpose of homogenization of data.
- 4- Their preferable data should be available from different sources.

With respect to these conditions, companies are discussed which are available based on the aforementioned criteria and for this purpose, the availability sampling method is adopted. Required data for this research is collected from Rahavard-Novin, Dena shares, and official website of Tehran stock exchange data bases through library methods.

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Research Variables and their Measurement Method

Variables of this research are categorized in three distinct categories of Control, dependent and independent variables. Independent variables include criterion of performance of working capital management, criterion of utility of capital management and index of asset efficiency. Control variables, structure of sales growth capital, size of the firm and ratio of financial assets to total assets.

In this research efficiency of assets is regarded as a dependent variable according to research models. Asset efficiency is calculated through the following:

$$EOA = \frac{\text{benefits preceding to tak}}{\text{sum of assets}}$$

Four independent variables are defined in this paper according to models implemented in this study.

Working capital management performance index (PL_{wcm}). This index explains the manner of implementation of working assets and their role in sales of commercial organizations. On the other hand it explains the efficiency in implementation of working capitals and identifies any reduction in the level of working capitals compared to previous period. If this index is equal to 1 or higher values, it indicates the proper performance and efficiency of the company in this term. And if it is smaller than 1, the results are vice versa. This index is calculated as follows (Afra and Nazir, 2011).

$$PL_{wcm} = \frac{\sum_{P=1}^I \frac{W_{i(t-1)}}{W_{it}}}{N}$$

$$Is = \frac{\text{curent period sales}}{\text{preious period sales}}$$

W_i: different compartments of working capitals of company I during the year t.

N: number of current working capital's compartments.

I: 1, 2, 3..., N

Index of utility of working capital management (UI_{wcm}) introduces the issue that if the company is capable of using the entire working capitals for obtaining its goals. If this index is equal to 1 or larger values, it indicates the proper efficiency and performance of the company in this term and if it is equal to values smaller than 1, the results are vice versa. This index is calculated as follows:

$$UI_{wcm} = \frac{A_{t-1}}{A_t}$$

$$A_2 = \frac{\text{working capital}}{\text{sales}}$$

Index of efficiency of working capital management (EL_{wcm}) is known as a criterion for defining the efficiency of working capital management. If this index is equal to 1 or larger values, it indicates the proper efficiency and performance of the company in this term and if it is equal to values smaller than 1, the results are vice versa. This index is calculated as follows:

$$EL_{wcm} = pl_{wcm} \times UI_{wcm}$$

Cash conversion cycle: This variable was considered as a criterion of efficiency of working capital management in previous works. Cash conversion cycle is equal to sum of collection period of received accounts and inventory's cycle period, minus payment period for paid accounts (Osama and Yasinya, 2011).

Working capital management and performance of firms are influenced by several factors. The following variables are controlled:

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Capital structure (CS) shows the ratio of debts to entire assets. Sales growth (SG) is calculated through calculation of difference between sales in the current year and base year. Financial assets ratio (FAR) shows the ratio invested assets in other units to investment in different types of deposits and the ratio of bonds to total assets.

Size of the firm is equal to natural logarithm of sales.

Data Analysis Methods

For performing statistical tests, calculation of coefficients and calculation of required values for statistical analyses such as t and F tests, calculation of Regression equations parameters, correlation coefficients, dispersal diagrams and etc. the State software is used.

RESULTS AND DISCUSSION

Findings

Findings of this study were categorized into two categories of descriptive and inferential. Descriptive results are shown in first section and inferential results, or in other words hypotheses testing results are shown in second section.

Descriptive Results

Table 1: Descriptive statistics of research variables

Elongation	Skewedness	Standard deviation	Mean	Research variable
6.729279	0.379206	0.144678	0.130179	Asset efficiency
960.7695	30.76067	2.722943	0.28949	Performance index of working capital
885.9379	29.13742	9.17414	1.452314	Utility index of working capital
991.7363	31.47389	764.2724	24.96387	Efficiency index of working capital management
991.8783	31.47725	298.1451	9.904934	Capital structure
603.4843	23.22242	11.0749	0.806821	Sales growth
3.066536	-0.04924	3.790378	74.96015	Cash conversion cycle
6.200544	0.55767	0.689578	5.532082	Size of the firm

In order to avoid false regression in estimations, first the reliability of variables must be assured of. For this purpose LLC and ADF and PP tests are performed.

Table 2: Results of unit root tests of model variables (ADF, PP and LLC).

Test						Variable
ADF- Dicky - Fuller		PP-Fisher chi-square		Levin, Lin & chu		
Prob	Test statistic	Prob	Test statistic	Prob	Test statistic	
0.0024	261.055	0.0000	383.603	0.0000	-16.2878	EOA
0.0000	340.996	0.0000	1105.79	0.0000	-5.633	PL
0.0000	304.182	0.0000	956.302	0.0000	-10.4102	UI
0.0000	306.610	0.0000	991.82	0.0000	-9.453	EL
0.0005	272.575	0.0000	689.063	0.0000	-13.502	CP
0.0001	278.538	0.0000	801.744	0.0000	-13.6229	CC
0.0000	296.832	0.0000	1218.02	0.0000	-11.302	GS
0.0000	374.414	0.0126	242.989	0.0000	-24.320	SIZ

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Inferential Results and Model Estimation

Inferential results are divided in two parts. The first part is allocated to recognition of the pattern and the second part is allocated to model estimation.

Pattern recognition

Panel data regression has fundamental differences with time series and cross sectional data regressions. Panel model's overall form can be showed as follows:

$$\text{Relation (1): } y_{it} = \alpha + X'_{it} \beta + \varepsilon_{it} \quad i = 1, 2, \dots, N \quad t = 1, 2, \dots, T$$

I , shows cross sectional units (families, agencies, countries and etc.). α is a scalar and β is a $K \times 1$ vector. X_{it} Matrices include K descriptive variables. In most panel models, a one way error compartment is used which is defined as follows:

$$\text{Relation (2): } \varepsilon_{it} = \mu_i + u_{it}$$

In this relation, μ_i is considered as imperceptible individual effects and u_{it} shows the remaining disturbances. According to these assumptions, two methods of consistent effects and random effects are introduced for estimation of static panel models.

Consistent effects model: X_{it} is correlated to μ_i

Random effects model: X_{it} is dependent from μ_i

In consistent effects model it is assumed that μ_i are estimated constant coefficients. u_{it} is the remaining of total disturbances which features identical independent distribution (IID). It is also independent from explanatory models for all cross sectional units and the entire time period. In random effects model it is assumed that μ_i is random and features uniform distribution. It is also assumed that term u_{it} has also a uniform distribution that is independent from the term μ_i . In this model, descriptive models are considered for all cross sectional units and time periods, independent from μ_i and u_{it} . Random effects model is a proper stipulation only if individual units are selected randomly. Random effects method is usually applied for discussing micro economic data.

Also when the number of individual units is large, application of consistent effects model results in loss of freedom degree for the purpose of estimation of individual effects coefficients. Also in this case, application of random effects method is recommended.

With respect to the hypothesis in random and consistent effects models, selection of model only with imitation from the method of selecting the studied sample is not acceptable. For selecting a proper model for estimation of panel data there are two casual tests:

Consistent effects test: in this test, the significance of all coefficients which show the individual effects is discussed. Hypothesis zero of this test implies that all consistent effects are equal to zero:

$$\text{Relation (3): } H_0: \mu_1 = \mu_2 = \dots = \mu_{N-1} = 0$$

This test can be performed with F statistic. In fact, consistent effects test is a simple test which is carried out through comparing the residual sum of squares in bound state to calculation of minimum average squares on the mode and also the sum of squares in unbound state which is the result of estimation of LSDV with consistent effects. Declination of the hypothesis zero of this test indicates the existence of individual effects.

Hausmann test: a basic assumption in random effects model, is the independency of individual effects from model's explanatory variables. Hypothesis zero of this test is the independence of explanatory variables from individual effects:

$$\text{Relation (4): } H_0: E(u_{it} | X_{it}) = 0$$

In case of declination of this hypothesis it can be said that the hypotheses of the random effects do not hold and consistent effects model should be used.

On this basis, for the purpose of considered models, consistent effects test and Hausmann test are performed.

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Tables number 3, 4 and 5 report the results of consistent effects and Hausmann tests. In all three considered models in consistent effects test for hypothesis zero which indicated lack of individual effects for this hypothesis, two statistics of F and Chi-do are used. In other words, results of consistent effects test indicate the existence of individual effects. In order to choose between random effects and consistent effects tests, results of Hausmann tests are used. Hypothesis zero of Hausmann test implies that there is no correlation among individual effects and explanatory variables. In fact, the situation for implementing the random effects method is undeniable. Results of Hausmann test, indicates that hypothesis zero is declined in all three models and on this basis, results of random effects test and Hausmann test indicate that consistent effects method is more appropriate for estimation of panel model that was described in this study.

Table 3: Consistent effects and Hausmann test results for first model

Prob.	Statistic	Test
		Consistent effects test
0.0000	10.412	F statistic
0.0000	765.28	Chi-do statistic
0.0000		Hausmann test
0.0000	56.921	Chi-do statistic

Table 4: Consistent effects and Hausmann test results for second model

Prob.	Statistic	test
		Consistent effects test
0.0000	10.435	F Statistic
0.0000	766.43	Chi-do statistic
		Hausmann test
0.0000	71.423078	Chi-do Statistic

Table 5: Consistent effects and Hausmann test results for third model

Prob.	Statistic	Test
		Consistent effects test
0.0000	10.542	F statistic
0.0000	771.92	Chi-do statistic
		Hausmann test
0.0000	66.725	Chi-do statistic

Model Estimation

With respect to the results of consistent effects and Hausmann tests, all three considered models are estimated via consistent effects pattern.

Estimation of first pattern

Considered relation in first pattern is as follows:

$$EOA = \beta_0 + \beta_1 PL + \beta_2 CP + \beta_3 CC + \beta_4 GS + \beta_5 SIZ + \varepsilon$$

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Table 6: First model's estimation results

Variable	Estimated coefficient	Standard dev.	Test statistic	Prob.
C	-0.110749	0.096447	-1.148290	0.2512
PL	0.007786	0.002065	3.770460	0.0001
CP	0.002104	0.000914	2.301969	0.0345
SIZE	0.041766	0.011970	3.489230	0.0005
CC	-0.000140	0.000101	-1.383864	0.1667
GS	0.001511	0.000733	2.060555	0.0396
R-squared	0.741307	Mean dependent var		0.130179
Adjusted R-squared	0.487646	S.D. dependent var		0.144678
S.E. of regression	0.103559	Akaike info criterion		-1.597728
Sum squared resid	9.533998	Schwarz criterion		-1.079939
Log likelihood	899.0710	Hannan-Quinn criter.		-1.400875
F-statistic	10.08764	Durbin-Watson stat		1.013925
Prob (F-statistic)	0.000000			

According to obtained results in estimation of the first model, the following content could be brought up:

1- With respect to results, obtained coefficients for PL are positive and since their probability is smaller than 0.05, they are statistically significant. As a result, PI leaves a positive significant effect on efficiency of assets and on this basis; first hypothesis of the research is accepted. On this basis, optimization of performance of working capital optimizes the efficiency of assets.

2- With respect to results, obtained coefficient for CP is positive and since their probability is smaller than 0.05, they are statistically significant. As a result, cash conversion cycle leaves positive significant effects on efficiency of assets and in this regard, fourth hypothesis of the research is accepted.

3- With respect to results, obtained coefficient for Size are positive and since its probability is smaller than 0.05, it is statistically significant. As a result, firm size leaves positive significant effects on performance of assets and sixth hypothesis of the research is accepted.

4- With respect to results, obtained coefficient for CC is negative and since its probability is larger than 0.05, it is statistically non-significant. On this basis the criterion of capital structure does not leave any significant effect on efficiency of assets and fifth hypothesis of the research is declined.

5- With respect to results, obtained coefficient for GS are positive and since its probability is smaller than 0.05, it is statistically significant. As a result, sales growth leaves positive significant effects on performance of assets and seventh hypothesis of the research is accepted.

Estimation of second pattern

Considered relation in second pattern is as follows:

$$EOA = \beta_0 + \beta_1 UI + \beta_2 CP + \beta_3 CC + \beta_4 GS + \beta_5 SIZ + \varepsilon$$

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Results of estimation of the latter pattern via consistent effects method are summarized in table7.

Table 7: Second model's estimation results

Variable	Estimated coefficient	Standard deviation	Test statistic	Prob.
C	-0.102332	0.096320	-1.062414	0.2883
UI	0.007696	0.003658	2.103882	0.0457
CP	0.002566	0.000540	4.751852	0.0000
SIZE	0.040006	0.011990	3.336621	0.0009
CC	-0.000195	7.09E-05	-2.751481	0.0061
GS	0.002118	0.000973	2.379548	0.0450
R-squared	0.742715	Mean dependent var		0.130179
Adjusted R-squared	0.489219	S.D. dependent var		0.144678
S.E. of regression	0.103400	Akaike info criterion		- 1.600802
Sum squared resid	9.504737	Schwarz criterion		- 1.083013
Log likelihood	900.5987	Hannan-Quinn criter.		- 1.403949
F-statistic	10.14501	Durbin-Watson stat		1.011406
Prob (F-statistic)	0.000000			

1- With respect to results, obtained coefficient for UI is positive and since its probability is less than 0.05, it is statistically significant. On this basis, the criterion of utility of working capital leaves significant effects on efficiency of assets and the second hypothesis of research is accepted.

2- With respect to results, obtained coefficient for CP is positive and since its probability is less than 0.05, it is statistically significant. On this basis, the cash conversion cycle leaves significant effects on efficiency of assets and the fourth hypothesis of research is accepted.

3- With respect to results, obtained coefficient for Size is positive and since its probability is less than 0.05, it is statistically significant. On this basis, size of the firm leaves significant effects on efficiency of assets and the sixth hypothesis of research is accepted.

4- With respect to results, obtained coefficient for CC is negative and since its probability is larger than 0.05, it is statistically non-significant. On this basis, the criterion of capital structure leaves no significant effects on efficiency of assets and the fifth hypothesis of research is declined.

5- With respect to results, obtained coefficient for GS is positive and since its probability is less than 0.05, it is statistically significant. On this basis, the growth of sales leaves significant effects on efficiency of assets and the seventh hypothesis of research is accepted.

Estimation of the third pattern

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Considered relation in second pattern is as follows:

$$EOA = \beta_0 + \beta_1 EL + \beta_2 CP + \beta_3 CC + \beta_4 GS + \beta_5 SIZ + \varepsilon$$

In this pattern the criterion of efficiency of working capital management is used. Results of estimation of the latter pattern are summarized in table8.

Table 8: Third model's estimation results

Variable	Estimated coefficient	Standard deviation	Test statistic	Prob.
C	-0.062147	0.096866	-0.641580	0.5213
EL	0.002865	0.000843	3.397091	0.0007
CP	0.002266	0.000908	2.495237	0.0179
SIZE	0.031600	0.012277	2.573974	0.0102
CC	-0.007306	0.002128	-3.432976	0.0006
GS	0.002932	0.001257	2.332538	0.0345
R-squared	0.746973	Mean dependent var		0.130179
Adjusted R-squared	0.493975	S.D. dependent var		0.144678
S.E. of regression	0.102917	Akaike info criterion		-1.610158
Sum squared resid	9.416231	Schwarz criterion		-1.092368
Log likelihood	905.2483	Hannan-Quinn criter.		-1.413304
F-statistic	10.32071	Durbin-Watson stat		0.993844
Prob(F-statistic)	0.000000			

According to obtained results, the following content could be brought up in estimation of the third model:
 6- With respect to results, obtained coefficient for EL is positive and since its probability is less than 0.05, it is statistically significant. On this basis, index of efficiency of working capital leaves significant effects on efficiency of assets and the third hypothesis of research is accepted.

7- With respect to results, obtained coefficient for CP is positive and since its probability is less than 0.05, it is statistically significant. On this basis, cash conversion cycle leaves significant effects on efficiency of assets and the fourth hypothesis of research is accepted.

8- With respect to results, obtained coefficient for Size is positive and since its probability is less than 0.05, it is statistically significant. On this basis, size of the firm leaves significant effects on efficiency of assets and the sixth hypothesis of research is accepted.

9- With respect to results, obtained coefficient for CC is negative and since its probability is larger than 0.05, it is statistically non-significant. On this basis, the criterion of capital structure leaves no significant effects on efficiency of assets and the fifth hypothesis of research is declined.

10- With respect to results, obtained coefficient for GS is positive and since its probability is less than 0.05, it is statistically significant. On this basis, the growth of sales leaves significant effects on efficiency of assets and the seventh hypothesis of research is accepted.

Discussion and Conclusion

Purpose of this research is to discuss the relation among criterions of working capital management in companies listed in Tehran's stock exchange. In order to discuss the efficiency of working capital management, three indices of performance, utility and efficiency are used. Results indicated that index of efficiency of working capital and its compartments (efficiency index, utility and performance). Leave significant effects on efficiency of assets. Cash conversion cycle also leaves a significant effect on efficiency of assets. Size of the firm leaves positive and significant effects on performance of assets. Results also indicated that structure of capital does not imply any significant effect on performance of the assets. Working capital efficiency management is the representative and the criteria of health of an organization which require reduction in capital problems or in other words cost of financing. Lack of efficiency in working capital management causes illness in organizations and new financial management is aimed at reducing the level of working capitals without neglecting the risk of lack of inventories.

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With respect to the results of this research, as the management and performance of working capital is optimized, efficiency of assets also improves. On this basis firms are required to adopt a proper planning for optimized management and performance of working capital. Also results indicate that there is a relation between dependent and independent variables. This issue requires firms to reconsider cash conversion cycles, amount of sales and capital structure in order to improve the efficiency of their assets.

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