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The Impact of Market Risk on Working Capital in the Listed Companies in Tehran Stock Exchange

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ABSTRACT

The current study is to examine the impact of working capital policies on the firms' market risk. The purpose of the paper is to study the influence of market risk on working capital of the listed companies in Tehran stock exchange. To do so, 74 companies were randomly selected during 2005 to 2012 and ADF, Fisher, Hausman were applied to determine the time series. There has been also applied Eviews software for statistical analysis. The obtained results indicating that there is a positive and significant association between firm risk with current assets, accounts receivable, accounts payable, cash conversion cycle, and there is a negative and significant association between market risk and inventories.

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INTRODUCTION

One of the most important issues of the financial managers of companies is how to manage various current assets and debts, that's because they can make significant impact on financial decisions of companies, and the main reason of failure of bankrupt companies comes back to the undesirable condition and unsuitable management of working capital, hence the managers should have good definition about working capital and recognize the related factors impacting on them (Noravesh & Vafadar, 1999). Market risk is the effecting factor on working capital which financial managers can act conservative and boldly based on them (Saghir *et al*, 2011).

In a challenging economy which international organizations seek for new ways to improve their financial performance and decrease risk, working capital is regarded as the important source for improving the financial performance. Considering that active working capital management is the essential need of the organization's ability to adjusting with challenging economy. Working capital management seeks for balancing between keeping liquidity to supporting daily operations and maximizing short-run investment opportunities (Bahar moghaddam *et al*, 2001). Most financial literatures have started their working capital chapter with inherent balance between risk and revenue, because working capital policies are another form of the issue. High risk and revenue strategy and more emphasis on financing strategy refers to a bold policy; less risk and revenue is called a moderate strategy, and finally the lowest risk and revenue is called a conservative policy (Di lov, 2012). Although investment decisions are the most important issue in financial decisions, there is little attention given to working capital and emphasis on the importance of business is the one of the priorities of the big corporate treasury.

In this regard, Zohdi *et al*, (2009) concluded that there is a positive and significant relation between working capital policy and firm risk and also between firm size and its risk. Izadinia & Taki (2009) examined the impact of working capital on profitability of the listed companies in Tehran stock exchange during 2003 to 2007. Madhou (2013) in a research "impact of operational risk and market risk on working capital" concluded that keeping the inventories high and cash are important in big firms and small firms, respectively, and low leverage companies should prioritize internal investment instead of external investment. Saghir *et al*, (2011) dealt with the impact of capital management on profitability of the listed companies in Tehran stock exchange during 2001 to 2006, and the findings indicated that there is a negative and significant association between profitability and cash conversion cycle. The results of Lapland and Mousavi (2006) demonstrating that there is a positive and significant relation between firm size, sale growth with working capital management.

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Generally, the current paper tries to examine and describe the relation between market risk and working capital using concepts and financial management theories and library studies in the listed companies in order to give suitable information to managers and investors to make decisions.

2. Research methodology:

2.1. Research method:

The current study is descriptive based on a purpose and correlation based on nature and method. Regarding the study can be utilized in investors' decision-making process; the kind of investigation is regarded as applied studies. Conducting descriptive study plan, the researcher don't manipulate the variables or don't make a new condition for occurring events. According to this classification, due to no variable has been manipulated, the collected data description would be enough. Correlation investigations including the studies in which they tries to determine or discover the relation between various variables using correlation coefficient. In a correlation study, the main goal is to determine the association between two or more variables, its size and amounts.

2.2. Research hypotheses:

- Market risk impacts on current asset.
- Market risk impacts on inventories.
- Market risk impacts on accounts receivable.
- Market risk impacts on accounts payable.
- Market risk impacts on cash conversion cycle.

2.3. Research's population and statistical sample:

The statistical population of the research is composed of the listed companies in Tehran stock exchange. There are 580 listed companies and their information are gathered during 2005 to 2012 and 74 companies were randomly selected.

2.4. Data collection method:

The library method is firstly used to collect the data and information in this study. In the library method, the research theoretical basics are gathered through books, Farsi and Latin professional journals. Then, CD photo and statistical album of Tehran stock exchange, Tehran stock exchange formal website and other related websites, and accounting information of the listed companies as well as other information sources is used to gather the study samples.

2.5. Operational definition of the research variables:

Table 1: Operational definition of the research variables.

Dependent variable	
Variable name	Definition and way measuring
Working capital	It is obtained from current asset minus current debt (Shabahang, 2002)
Current asset	It is referred to cash and other assets which is expected to be converted to cash during current operation unit, or sold or be consumed (Bakhtiari, 2006).
Accounts receivable	It has been extracted from the total accounts receivable of the firm balance sheet.
Inventory	Inventories are the assets which are kept for sale of a business unit in a normal way. It is purchased and kept to produce a product or provide a service and its nature is consumable and is consumed for business unit indirectly (No. 8 standard)
Accounts payable	It has been extracted from the total accounts receivable of the firm balance sheet.
Cash conversion cycle	Cash conversion cycle= days of inventory conversion+ accounts receivable collection period- accounts payable postponed days
dependent variables	
Market risk	β stock is used in the following formula to obtain market risk: $\beta = \frac{cov(R_i, R_m)}{\partial^2 R_m}$ Where, Ri is the expected returns of shareholders. $R_i = \frac{(p_{it} - p_{it-1}) + D_{it}}{p_{it-1}}$ P_{it}= share price at the end of the period; P_{it-1}= share price at the beginning of the period, D_{it}= dividend per share. R_m: portfolio return of market which is obtained so: $R_m = \sum_{i=1}^{n} w_{i} * R_i$ W_i= weight of the stock

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2.6. Research model:

Pattern 1: Existing a relation between market risk and working capital

$$WCit=\beta 0+\beta 1APit+\beta 2ARit+\beta 3INVit+\beta 4CASHit+\beta 6MRit+\varepsilon it$$

WC: working capital; AP: accounts payable in the time t; AR: accounts receivable in the time t; INV: inventories in the time t; CASH: cash in the time t; MR: market risk in the time t.

Second pattern: Existing a relation between market risk and cash conversion cycle

$$CCCit = \rho 0 + \rho 1CCCit-1 + \rho 2APit + \rho 3ARit + \rho 4INVit + \rho 5CASHit + \rho 7MRit + \varepsilon it$$

CCC: cash conversion cycle

2.7. Data method and analysis:

In this research, combined data is used to test the hypotheses. Time (studied years) and sectional (studied firms) are mixed together in this method. Combined data is used in order to increase the number of observations, enhancing freedom degree, decrease heteroskedasticity and study of changes dynamics. To estimate the efficiency of a regression model, it has been selected between common effects, fixed effects and random effects using suitable tests. Firstly, ADF test is used to determine whether x_t time series has static process (zero accumulation order) or divergent (one accumulation order), ADF can be used. Applying a suitable method for combined data is necessary like examination of the variables' staticness. We use modified Wald test 1 to examine group wise heteroskedasticity among surpluses of regression fixed effects model. Also, F and Hausman 2 test is used to determine either fixed effects method 3 or random effect 4. To describe the explanatory power of explanatory variables, adjusted coefficient of determination (Adjusted R^2) is used, and F-fisher test is applied in order to examine the significance of variables and overall adequacy of the model. Statistical analyses are also made using EXCEL and EVIEWS 7 software.

3. Research's results:

3.1. Descriptive Statistics:

Table 2: Central and dispersal indexes of each research's variables.

Variable name	Min.	Max.	Average	SD	Skewness	Kurtosis
Market risk	-2.51	709.07	29.62	2.47	-3.596	0.512
Current asset	51142	5026587	1962457	1225.26	5.478	-0.774
Inventory	19155	8326598	2956325	1402.65	-15.247	-0.956
Accounts receivable	1027	5263145	2015637	1126.55	-8.147	0.247
Accounts payable	1529	2654168	732341	1.477	2.625	0.629
Cash conversion cycle	42.36	2708.96	452.69	16.326	3.782	-0.514

3.2. Examination of heteroskedasticity:

In this chapter, we will deal with estimating heteroskedasticity which result from firms' different properties. Whenever sectional units have similar variance and their variances are different across the units, group wise heteroskedasticity would be available. The results show that we should accept H_0 of similar variance.

Table 3: The results of heteroskedasticity test using modified Wald test.

Description	Chi-square statistics amount	Possibility
Modified Wald statistics	-7748.62	0.5785

3.3. The estimation method model- significance test of fixed effects method:

The current estimation method is based on combined data (panel). This method is composed of a mixture between "time series data" and "sectional data". There are some defects in each mentioned models which it repaired if they are mixed together. F-test and Hausman test is firstly used to determine either fixed effects or random effects that the obtained results are offered in the following tables :

3.3.1. F statistics test:

Table 4: The results of F statistics test.

Description	Statistics amount	Freedom degree	Possibility
Cross-section F	2.014573	73	* 0.000
Cross-section Chi-square	141.252148	73	* 0.006

* 5% error level

3.3.2. Hausman test:

Table 5: The results of Hausman test.

Description	Statistics amount	Freedom degree	Possibility
Cross-section F	7.926354	9	* 0.004

* 5% error level

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Regarding the results of the two test (F, Hausman), the obtained possibility is less than 5%, therefore, fixed effects method should be used in the regression model

3.4. The first hypothesis test:

Table 6: The first hypothesis of regression model.

Variable name	Impact factor	Estimation deviation	T statistics	Significance level
Fixed	0.415	0.336	2.285	* 0.003
Market risk	0.163	0.295	1.925	* 0.012

* 5% error level

Table 7: Explanation and significance ability of whole model.

R		Durbin-Watson	ANOVA	
Coefficient of determination	Adjusted coefficient of determination		F	Sig.
0.411	0.403	1.609	7.442	** 0.000

** 1% error level

According to the table 6, the lack of correlation between errors is not rejected due to Durbin-Watson statistics ranged from 1.5 to 2.5 and the regression can be used. Regarding the significance of F test (7.442) in error level less than 0.01, it can be concluded that the regression model which is composed of independent, control and dependent variables is a good model and independent and control variable series are able to describe the changes in working capital changes. The amount of the adjusted coefficient of determination is equal with 0.403, it indicates that 40.3% of all changes of dependent variables are dependent on independent and control variables of the model. Also, the impact factor of market risk variable on current asset is equal with 0.163, and indicating market risk has positive and direct impacts on current asset. On the other hand, regarding the t statistics significance level (market risk on current assets, 0.012), H_0 is rejected with 95% confidence and 5% error level, it can be said that market risk has influence on current asset.

3.5. The second hypothesis test:

Table 8: The first hypothesis of regression model.

Variable name	Impact factor	Estimation deviation	T statistics	Significance level
Fixed	0.199	0.536	1.774	* 0.021
Market risk	-0.055	0.378	-1.036	0.104

* 5% error level

Table 9: Explanation and significance ability of whole model.

R		Durbin-Watson	ANOVA	
Coefficient of determination	Adjusted coefficient of determination		F	Sig.
0.515	0.506	2.144	7.715	** 0.000

** 1% error level

According to the table 8, the lack of correlation between errors is not rejected due to Durbin-Watson statistics ranged from 1.5 to 2.5 and the regression can be used. Regarding the significance of F test (7.715) in error level less than 0.01, it can be concluded that the regression model which is composed of independent, control and dependent variables is a good model and independent and control variable series are able to describe the changes in working capital changes. The amount of the adjusted coefficient of determination is equal with 0.506, it indicates that 50.6% of all changes of dependent variables are dependent on independent and control variables of the model. Also, the impact factor of market risk variable on current asset is equal with 0.163, and indicating market risk has negative and weak impacts on current asset. On the other hand, regarding the t statistics significance level (market risk on current assets, 0.104), H_0 is rejected with 95% confidence and 5% error level, it can be said that market risk has not influence on inventory.

3.6. The third hypothesis test:

Table 10: The first hypothesis of regression model.

Variable name	Impact factor	Estimation deviation	T statistics	Significance level
Fixed	0.296	0.285	1.667	*0.042
Market risk	-0.136	0.476	-1.969	*0.013

* 5% error level

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Table 11: Explanation and significance ability of whole model.

R		Durbin-Watson	ANOVA	
Coefficient of determination	Adjusted coefficient of determination		F	Sig.
0.459	0.446	1.697	7.342	** 0.000

** 1% error level

According to the table 10, the lack of correlation between errors is not rejected due to Durbin-Watson statistics ranged from 1.5 to 2.5 and the regression can be used. Regarding the significance of F test (7.342) in error level less than 0.01, it can be concluded that the regression model which is composed of independent, control and dependent variables is a good model and independent and control variable series are able to describe the changes in working capital changes. The amount of the adjusted coefficient of determination is equal with 0.446, it indicates that 44.6% of all changes of dependent variables are dependent on independent and control variables of the model. Also, the impact factor of market risk variable on current asset is equal with -0.163, and indicating market risk has negative and weak impacts on current asset. On the other hand, regarding the t statistics significance level (market risk on current assets, 0.013), H_0 is rejected with 95% confidence and 5% error level, it can be said that market risk has not influence on accounts receivable.

3.7. The fourth hypothesis test:

Table 12: The first hypothesis of regression model.

Variable name	Impact factor	Estimation deviation	T statistics	Significance level
Fixed	0.247	0.663	2.145	* 0.004
Market risk	0.298	0.526	1.926	* 0.012

* 5% error level

Table 13: Explanation and significance ability of whole model.

R		Durbin-Watson	ANOVA	
Coefficient of determination	Adjusted coefficient of determination		F	Sig.
0.467	0.451	1.962	7.127	** 0.000

** 1% error level

According to the table 12, the lack of correlation between errors is not rejected due to Durbin-Watson statistics ranged from 1.5 to 2.5 and the regression can be used. Regarding the significance of F test (7.127) in error level less than 0.01, it can be concluded that the regression model which is composed of independent, control and dependent variables is a good model and independent and control variable series are able to describe the changes in working capital changes. The amount of the adjusted coefficient of determination is equal with 0.451, it indicates that 45.1% of all changes of dependent variables are dependent on independent and control variables of the model. Also, the impact factor of market risk variable on accounts payable is equal with 0.298, and indicating market risk has positive and direct impacts on current asset. On the other hand, regarding the t statistics significance level (market risk on accounts payable, 0.012), H_0 is rejected with 95% confidence and 5% error level, it can be said that market risk has not influence on accounts payable.

3.7. The fourth hypothesis test:

Table 14: The first hypothesis of regression model.

Variable name	Impact factor	Estimation deviation	T statistics	Significance level
Fixed	0.512	0.289	1.925	* 0.014
Market risk	0.337	0.452	2.105	* 0.007

* 5% error level

Table 15: Explanation and significance ability of whole model.

R		Durbin-Watson	ANOVA	
Coefficient of determination	Adjusted coefficient of determination		F	Sig.
0.496	0.483	1.745	7.623	** 0.000

** 1% error level

According to the table 14, the lack of correlation between errors is not rejected due to Durbin-Watson statistics ranged from 1.5 to 2.5 and the regression can be used. Regarding the significance of F test (7.623) in error level less than 0.01, it can be concluded that the regression model which is composed of independent, control and dependent variables is a good model and independent and control variable series are able to describe the changes in working capital changes. The amount of the adjusted coefficient of determination is equal with

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0.451, it indicates that 48.3% of all changes of dependent variables are dependent on independent and control variables of the model. Also, the impact factor of market risk variable on cash conversion cycle is equal with 0.337, and indicating market risk has positive and direct impacts on cash conversion cycle. On the other hand, regarding the t statistics significance level (market risk on cash conversion cycle, 0.007), H_0 is rejected with 95% confidence and 5% error level, it can be said that market risk has not influence on cash conversion cycle.

4. Conclusion and Recommendation:

The major purpose of the study is to examine the impact of market risk on working capital of the listed companies in Tehran stock exchange. The results indicate that the market risk has positive and significant impact on the factors such as current asset, accounts payable, cash conversion cycle that they are consistent with the results of Smith (1980), Troll & Solana (2004), and Zohdi *et al*, (2010) stating there is a positive and significant relation between working capital policy and firm risk. As well, market risk has a positive and significant impact on accounts payable, i.e. the risk of current debt repayment grows with increasing systematic risk. According to the research of Rezazadeh & Heidarian (2010), it is said that despite financial problems, the companies tend to postpone their debts repayment.

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