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The Effect of Working Capital Adjustment Speed on Reducing the Risk of Bankruptcy by Considering the Entity Risk Management Effectiveness

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Abstract

Objective: The current research is willing to trace the effect of the speed of adjustment of working capital in reducing the risk of bankruptcy with emphasis on the effectiveness of the Entity Risk Management (ERM)

Methodology:: In this regard, a sample of 124 companies listed in Tehran Stock Exchange during the years 2013-2022 which selected on the pattern of systematic elimination and finally the research hypothesis tested with aid of multiple linear regression based on panel data.

Results: The results of the hypothesis test showed there is revers relation between the speed of adjustment of working capital and the risk of bankruptcy and the company's risk management also intensifies this relationship.

Innovation: The current research provides useful evidence for company managers and capital market agents that with better management Short-term working capital and achieving optimal working capital can control financial crises and the risk of bankruptcy reduction and the formation of a good risk committees in the companies play an important role in this regard by implying company risk management

Keywords: Bankruptcy Risk, Entity Risk Management, Liquidity Conversion Cycle, Working Capital Adjustment Speed.

JEL Classification: M41 ،H42

1. Introduction

Due to the rapid progress in science and new technologies, companies and economic enterprises are always facing new competitors in the competition market. And has been trying to create competitive advantages for itself in order to reduce the risks ahead and maintain its position in the competition market, therefore in this situation, companies should act in such a way that by increasing the efficiency in the cash conversion cycle, they bring maximum value along with bring the least risk to investors) Garikai and Sibindi, 2022). On the other hand, companies throughout their life always have been faced with various internal and external risks, and failure to control them led to increasing of the risk of bankruptcy. Investors always in investing seek to ensure the return of their capital, and in fact, they consider that mentioning the principal investing is more important than making a profit. Therefore, collecting information about the level of financial inability of companies which may lead to the failure of the company are the main approaches for shareholders, creditors, etc. in the capital market (Habib and Kayani, 2022.) Gordon (1971) Bankruptcy refers to a situation where the company has faced a decrease in profitability, and finally, in the future, the possibility of not repaying the interest and principal. It increases the debt or it is stated in theoretical literature that bankruptcy is a situation in which the cash flow operating activates of the company is less than its interest costs obligated to pay to long-term debt providers (Surata, 2019). Fluctuations in cash flow are important factors in debts paying abilities which leads companies to increases the risk of their bankruptcy. Therefore, proper management of cash conversion cycle and short working capital duration of the company is the important factors for the company not to be involved in the financial crisis) (Fernandez and Sanchez, 2023.).

Wen et al (2019) in their research entitled optimal working capital management and company performance stated achieving optimal working capital will improve the financial performance and get out of the financial limit of the company. The role of working capital efficiency is very important in manufacturing company's performance in order to increase its value, because most of the assets of these companies consist of current assets. Most activities are a trade-off between risk and return. Working capital, in fact, short-term investment needed for financing are investment activities and optimal working capital management will lead to higher performance of companies (Nastitti et al., 2019). The distance between the cost of purchasing materials and receiving the amounts of sold goods is actually a kind of liquidity conversion cycle. If this distance in companies gets longer, it means that more investment should be made in working capital. As a result, the company will suffer from inadequate liquidity. On the other hand, the cycle of converting liquidity with increasing sales leads to more profitability (Baros et al, 2021). Therefore, every organization, regardless of the level of profitability, the size and nature of the business it has, has an optimal amount of its requires working capital (Filback and Kruger, 2005).

Regarding the determination of effective and optimal working capital, management should be able and allowed to invest in future opportunity growth, repay short-term obligation and reduce financing costs. With However, optimizing the use of working capital is not easy. The company cannot reduce its operation and without minimizing future growth and sales the invested resource cannot be reduced. The optimal level of working capital gets to balancing between risk and return (Soruta, 2019). So Companies should determine their optimal working capital according to the context and business situation. In other words, the longer cash conversion cycle may increase sales and subsequently increase profitability due to high investment in inventory of materials and goods and the use of granting trade credit to buyers (credit sales). But if the company abandons profitable operation, having longer cash conversion cycle has an opportunity cost to the company; Due to the benefits and costs of working capital management and It is expected there was planned an optimal level of cash conversion cycle

which maximizes the value of the company (Garikai and Sibandi, 2022) The aim of working capital management is to optimize the cash conversion cycle and subsequently increase the efficiency of working capital. On the other hand, inefficient management of working capital not only reduces profitability, but also ultimately leads to an increase in the possibility of financial crisis. Therefore, achieving the optimal level of working capital is one of the necessities of the operating cycle of companies and is closely related to reduction The financial bankruptcy of the company and vice versa the success of the companies (Fernandez and Sanchez, 2023). Therefore, the question comes to mind whether the speed of adjustment of working capital has an effect on reducing the risk of bankruptcy of companies? One of the main and important duties of managers is to deal with the risks facing the company and its management (Aghaei et al., 2017). With management Comprehensive risk, the risks can be minimized and the value of the investors' and beneficiaries' shares can be maximized and in line with those advantages increased competitiveness (Rostami et al., 2022).

Risk management is the process of identifying, evaluating and taking action to control and correct risks .It is possible that the specific consequences are damage or lack of change in the current situation, which can be minimized with risk management (Gordon et al., 2009). Therefore, when managers have documented risk and crisis management plans in their companies and Forming risk committees to prevent critical situations, the company will not face complete failure and increase the risk of bankruptcy sometimes it is the lack of attention to the benefits of risk management that makes companies involved in financial crises.

Since so far in Researches conducted in the country and abroad on the effects of the speed of adjustment of working capital on reducing the risk of bankruptcy has not been discussed and there are no definite findings in this field, the present research is innovative in combining the subject and adding the subject In this context, the company's comprehensive risk management aims to answer the general question of whether the interaction of risk management and the speed of achieving optimal working capital can reduce the risk of bankruptcy of a business? In the continuation of the structure of the research, first, the development of theoretical foundations, hypotheses and current empirical finding of the research has been presented and then the research method and operational definitions of the research variables provided and finally the findings and conclusions of the research presented.

2. Literature Review and Theoretical Background

Investment decisions play a key role in maximizing the wealth and value of a company. Along managing the business there is two things of great importance which includes handling capital structure and current cash management (working capital management) and using the optimal level of these two items. If financial managers do not pay attention to these two important items, they will have to pay an extensive cost. Working capital management provides a delicate balance between working capital components and vital support for future earnings or cash flows of companies provided different times (Fernandez and Sanchez, 2023). Dadashzadeh and Hejazi (2019) in a research titled the relationship between financial flexible value, investment efficiency and capital adjustment speed in such cases state there is a meaningful relation between financial flexible value and with the efficiency of investment in net working capital and the speed of adjustment of working capital, and companies in decisions related to optimizing investment and circulation policy around working capital, it has paid to having sufitionet flexible condition which can be used in the long term to empower financial valuation and make profitable investment opportunities for companies. Companies can reduce their financing costs while by innesesery use of cash resource in the operating cycle of the company they will cause the company's investments to be wasted due to the lack of sufficient liquidity, instead it will equip the company

for higher production and sales and thus the company can achieve the optimal level of commercial credits. Hence, to balance and make decisions in this context, basic management efforts are needed to achieve optimal working capital by speeding up the achievement it can create a balance between risk and efficiency and maximize the value of the company (Wan et al., 2019). So, despite as there is an optimal level of working capital, companies are always actively trying to reach it faster. Entity's liquidity problems can leads to serious consequences for go on of a business in the short term. Short-term assets and liabilities should be given more attention. Because of the key role of them in generating profitability and wealth. Every company which have tendency to reach for high level of optimum working capital should try to effectively balance liquidity and profitability condition (Azizi and Jokar, 2020). Platonic Et al. (2022) in a research entitled access to external financial resources, bargaining power and speed of adjustment of working capital, stated when the amount of working capital is optimal, the value of the company will be maximized. This issue causes companies should adjust their working capital ratio towards the optimal ratio (target). In companies that have more access to resources they have external finance and have more bargaining power in commercial negotiations, the speed of adjustment of working capital is higher. Regarding the standard level of working capital, there are two opposing views, while one view states that in condition with more moistening cash; the company has more ability to get discounts through early payment of its obligation. In addition, companies can increase their sales volume by offering generous credit terms to their customers (Mandipa and Sibindi, 2022).

However, the other group ofr researchers argue that higher levels of working capital can increase the risk of bankruptcy because the short-term assets have the lowest productivity and it is not appropriate to involve the entire resource of the company in this area. Considering these views, there is a possibility that the speed of moving to optimal working capital for each company not only increases profitability but also lead to going far from the financial crisis (Habib and Kayani, 2022).

Azizi and Jokar (2020) in a research titled investigating the existence of the optimal level of working capital management and the critical point of inflation and its impact on The level of cash mentioning stated that with the increase in inflation, the amount of cash held by companies increases at first; But When inflation reaches a certain level, the amount of cash held by companies decreases with the increase in inflation. Effective working capital management can be a useful tool for managers that if managed well can play an important role in inflationary conditions for the level to maintain the cash of commercial entities and earn a lot of benefits for them.

A financial crisis is a situation where the company is in a situation in terms of its liquidity cannot meet its obligations and the situation becomes dire. Therefore, it can be assumed that there is an inverse relation between working capital and the fundamentals of the company's performance, and working capital can increase the profitability of the company up to a certain level, but after that level, the increase in working capital can increase the bankruptcy and Reduce the value of the company, and here the discussion of optimal working capital will become very important) (Alavi and Memarian, 2020).

Norouzi and Afaltooni (2019) in a research titled investigating the optimal level of working capital management and the effect of financial restrictions on the optimum level, stated that nowadays in all commercial units, the working capital consist the majority of the company's assets and working capital management is one of the important duties of the financial manager and plays an important role in achieving the goals, policies and successes of the company and there is an optimal level of working capital management which is related to the company value. The results also showed Financial restrictions have a significant and direct effect on the optimal level of working capital management. Working capital

consists of the upper part of the companies' balance sheet which includes current assets of the companies. But the net working capital can be calculated by reducing current debt from current assets. The optimal level of working capital for the operating of each business unit may be different. Because of the different condition and also companies have different financial constraints which affect the optimal level of their working capital (Harris, 2005).

Ashrafi Shahri et al., (2015) in a research titled optimizing of working capital management using intelligent systems in pharmaceutical companies stated that the optimal values of accounts receivable circulation period show that to reach for the best profitability in the pharmaceutical industry, credit sales should be collected in short-term periods (up to 45 days) and credit sales is a good way to attract customers. Purchases from raw material sellers should be done on credit, rather than early withdrawal of resources be prevented, but the payment period should not exceed 54 days. Chauhan and Banerjee (2018) in a research entitled financial restrictions and optimal working capital stated that the empirical results show that there is no evidence about systematic behavior following of target working capital among Indian manufacturing companies. The further results also showed a reluctance to follow target working capital is not completely affected by the different characteristics of the firm and therefore appears to be a systematic characteristic among Indian companies. Even if optimal working capital exists, emerging market lead companies may not actively pursue it due to several financial constraints and management considerations. Making decisions about the company's investment in working capital is important for managers and determining the optimal level for them is a difficult task (Wan et al., 2019).

Working capital is an important factor for the success of any commercial entity and it requires sufficient control and handling. Mandipa and Sibindi (2022) in a research with title of working capital management methods and financial performance stated that if companies have optimal capital management methods to follow the circulation, these measures will affect their financial performance. Working capital management seeks to achieve conditions that the company does not face surplus or shortage of liquidity. If the company faces a lack of liquidity and Failure to maintain the surface desirable liquidity for a company makes that company not to be successful in using short-term investment opportunities. It is possible that the business unit will face problems in fulfilling its obligations on timely and it will have a bad effect on its reputation. Such a company due to shortage Resources will not be able to take advantage of favorable market conditions and accept profitable projects. This company is able to provide all the facilities would not be necessary to use cash discounts. The continuation of this situation may increase the company's financial risk (Dianati Deilami et al., 2013).

Khan et al (2016) in a research entitled is there an optimal working capital? The role of restrictions financially, stated that companies with more (less) financial constraints have a shorter (longer) business operation cycle. Hence financial managers should try to maintain an optimal level of working capital to optimize the company's profit performance, as investing in capital work above the optimal point has a negative effect on the profitability of the company. Fernandez and Sanchez (2023) in their research with title of bankruptcy risk and financial policies, conclude companies with a closer level to the optimal working capital, performing positively for years, and in turn, companies with excess working capital have faced the more risk of bankruptcy. Working capital management decisions include difficult decisions in various aspects, such as managing accounts receivable and accounts Payable and maintaining an optimal level of inventory. According to these issues, working capital management as one of the most important issues of every entity are discussed (Chohan and Banerjee, 2018). Soruta (2019) in a research titled working capital management during the global financial crisis has shown that the adjustment of working capital is weaker during the crisis. In addition, the negative

relation between working capital surplus and company performance during the crisis is more significant, especially for larger companies. However, it does not seem that this situation remain for a long run, because to finance recourse in surplus circulation one, companies borrow from banks and reduce their internal liquidity both in crisis periods and outside of it. Effective management of working capital increases the free cash flow of the company, and as a result, the company's growth opportunities and shareholders' returns increase.

Therefore, companies try to have an optimal level of working capital that maximizes the value of the company. On the other hand, ineffective management of working capital not only reduces profitability, but ultimately leads to an increase in risk Bankruptcy will occur (Fernandez and Sanchez, 2023). Zahedi et al (2019) in a research entitled working capital policies and the risk of the company stated the reason for the failure of most of the bankrupt companies is the unfavorable situation and management Inadequate working capital, although these companies have a good financial situation in the long term, but due to insufficient capital in circulation, they lose their ability to compete and go on. Business entities using different policies in relation by handling working capital, they can affect the company's liquidity. These strategies can be based on the amount of risk and return they are effective. The research results indicate that there is a positive and significant relationship between working capital policy and company risk. The way of managing working capital has an important effect on the liquidity, profitability and operating efficiency of the company and managing working capital is an important part of the company's business strategy in order to create value for shareholders (Afaltooni et al., 2019). Habib and Kayani (2022) also in their research by considering the effect of working capital management on company's financial distress showed efficiently working capital handling has negative and significant effect of on the possibility of financial distress of companies. But maintaining a high amount in working capital where there is a profitable investment opportunity may impose an opportunity cost to company; in a way The main reason is that the longer cash conversion cycle and its inefficiency may be the main reason when the company is financially constrained Bankruptcy of companies (Fernandez and Sanchez, 2023). According to the stated contents, the first hypothesis of the research is proposed as follows:

H1: The speed of working capital adjustment has a negative effect on the company's bankruptcy risk.

On the other hand, major environmental changes with technological rapid progress get more difficult to good handling of the companies. The most important factor that companies always they face in the business environment is more related to how to well deal with encontrage risks, so that these factors play a fundamental role in achieving the company goals including increasing shareholders' gains and obtaining high stock returns (Jiang et al, 2023). One of the main and important tasks of the managers comes back to way of handling the company facing risks. The goal of every activity in every commercial unit is to achieve the highest level effectiveness and efficiency from its operation. To achieve this goal, all efforts must be made, and one of these solutions is business unit risk management (Gordon et al., 2009) Risk management consist of some related process of risk assessment and designing strategies for risk identification. Researchers believe that comprehensive risk management creates a broader approach to risk management compared to its traditional aspect (Aghaei et al., 2017). Along that Jiang et al., 2023 showed in their research that Risk management improves the efficiency of the company's investment by limiting over-investment as well as under-investment of they perform.

Subsequent analyzes show that the positive effect of risk management on investment efficiency due to the reduction information asymmetry and free cash flow problems and these companies experience less financial constraints. By accepting the systematic management approach of overall facing risks by an organization, it could be seen reducing the overall risk which leads companies to bankruptcy besides

increasing result of the performance and in the last providing high value of the organization (Rostami et al., 2022) .Companies are always looking for ways to deal with the lack certainties are the condition they operate and upon that take step to handle them and risk management has been introduced as an efficient tool for managers of organizations. Rostami et al., (2022) stated that risk management is able to accelerate the achievement to optimal financial leverage, to reduce the risks faced by the company during the life cycle. Surveys also show that one of the main that cause to the downfall and bankruptcy of large companies such as Enron and WorldCom come back to them lack of efficient and effective risk management unit. Creating a Comprehensive and effective risk management system is one of the important and main duties of managers and it is very important to be aware of the risks ahead and how to control them in one's position (Soleimani Amiri and Gerveie, 2016).

Aref Menesh et al (2021) in a research by investigating whether performance an organization will be affected by risk management, shows the in such a way that the executive management is able to improve the performance of the company upgrade if risk management is done correctly, possible risks can be prevented by controlling future events. At another definition from the Association of Chartered Accountants of Iran, risk management means responding and investigating the crises and threats of a project. In this way, it will be a controlled way to overcome the crisis, which will ultimately lead to the least damage or unpleasant consequences had Besides, the correct management of possible risks can reduce the costs of overcoming crises and obstacles (Ghaderi et al., 2019).

According to the above mentioned content, the speed of adjustment of working capital and achieving optimal working capital can be according to the theoretical literature by achieving the optimal cash liquidity cycle, it reduces the financial crisis and the risk of bankruptcy of the company, as well as the nature of risk management it aims to reduce and deal with the company's risk in order to prevent the company from failing. Therefore, the second hypothesis of the current research is as follows has been mentioned:

H2: Enterprise Risk Management can intensify the decrease effect of the adjustment speed of working capital over bankruptcy risk of the Companies.

3. Research Methodology, Model and Variables, Population and Sample:

The current research is classified as applied one from research objective viewpoint and also from a methodological point of view as descriptive because it investigates an event after it has occurred It Is of the type of causal and post-event correlation. The statistical population studied in this research is all listed companies in Tehran Stock Exchange along period for ten years from 2013 to 2022.Companies in the systematic elimination were selected as the final sample that the conditions which they have had the following terms of comparability, the financial year chosen by the company is at the end of March and they have not changed the financial year during the period (10 years) that has been reviewed, and second the required information disclosed by those companies and its information get be available. Also, the companies don't include banks, insurances and investment companies because of the deferent way of financial statement format. Finally By applying the above conditions, 124 companies was included in the final screening of the statistical population as the final sample.

Analyze The information of the sample companies using the combined panel data method and using Eviews12 software and using the error tool The powerful standard for the final test of the hypotheses has been carried out, combined data with the application of time and place dimensions in different periods provides more complete and reliable results to the researcher and regression by applying the powerful standard error tool can be the best outcome to examine relationships in the present study.

Operational definitions of variables:

Independent variable: working capital adjustment speed (SLCCC)

In many studies regarding the calculation of the adjustment speed of financial factors, the partial adjustment model has been applied (Flnneri and Rangan, 2015). In partial adjustment model, the actual and optimal working capital should be estimated first, but the effect of capital in the optimal circulation cannot be calculated directly (Eztekin T., 2006). Therefore, by placing multiple factors of each company on working capital companies have been shown to be effective according to theoretical foundations and previous researches, the optimal working capital has been calculated. However, there are some factors outside of the company that influence this way, which cannot be brought under control, so finally this factors are included as the estimator's error.

Estimated calculation of optimal working capital according to Baños- Caballero et al. (2010), Ahangar (2020) and Aflatooni et al. (2022) is estimated using the following model and it is assumed that more or less investment in working capital, indicates a longer or shorter cash conversion cycle, and this cycle is a function of company level and macroeconomic variables (Aflatooni et al., 2022).

$$LCCC^*_{it} = \beta' x_{it} + u_{it}$$

Where in; ؛$LCCC^*_{it}$ is the optimal cash conversion cycle lengthx_{it}; is characteristic vector that explains the length of the optimal cash conversion cycle and β' is a coefficient of the estimated and u_{it} also the residual value is the pattern (Dung et al, 2014).

The characteristics of the company as stated in accordance with the researches of Banus Caballero et al. (2010) and Ahangar (2020) and Aflatooni et al. (2022) has been selected and used.

$$LCCC^*_{it} = \beta_1 CFO_{it} + \beta_2 FCOST_{it} + \beta_3 MTB_{it} + \beta_4 SIZE_{it} + \beta_5 TANG_{it} + \beta_6 Z - SCORE_{it} + \beta_7 ROA_{it} + \beta_8 LEV_{it} + \beta_9 GDPG_{it} + u_{it}$$

This there is:

1) **Operating cash flow (CFO):** is equivalent to the ratio of operating cash flow to total assets.
2) **Financial Costs (FCOST):** It is equivalent to financial ratios on interest-bearing debts.
3) **Growth opportunities (MTB):** is equal to the Q - Tobin ratio and equal to the ratio of the total market value of the company's shares and the book value of liabilities to its assets book value of company.
4) **Size of the company (Size):** is equal to the natural logarithm of total assets.
5) **The ratio of tangible fixed assets (TANG):** is equivalent to the ratio of fixed assets to total assets.
6) **Profitability (ROA):** is equivalent to the ratio of net profit to total assets.
7) **Financial leverage (LEV):** is equal to the ratio of total debt to total assets.
8) **Growth GDP (GDPG):** is equivalent to the percentage of annual changes in gross domestic product.
9) **Risk of financial crisis (Z-SCORE):** the equivalent score obtained from the Altman model modified by Kurdistan et al (2013) (Its model is presented below in the company bankruptcy section).

The length of the cash conversion cycle (LCCC): equal to the length of the receivables collection period (the ratio of accounts receivable to sales, multiplied by 365) and in addition, the length of the inventory conversion period (the ratio of the inventory of materials and goods to the cost of goods sold, multiplied by 365 (minus The length of the repayment period of accounts payable (the ratio of accounts payable to sales, multiplied by 365) is (Aflatooni et al 2022) By placing the characteristics of the company in the first model, the optimal working capital can be calculated with the second model.

Where; $LCCC^*_{it}$the rest is the pattern and u_{it} other factors are introduced in detail in the previous

paragraph, optimal cash conversion cycle length and has been introduced.

The partial adjustment model that was mentioned in the above and used in the current research to calculate the adjustment speed, the partial adjustment model is Fama and French (2002) which will be combined with the following model and its theory model is as follows. And its mathematical model is presented:

$$\Delta LCCC_{it} = \lambda(LCCC^{*}{}_{it} - LCCC_{it-1}) + v_{it}$$

Where in; $\Delta LCCC_{it}$ length of real cash conversion cycle of period t, adjustment speed and optimal cash conversion cycle t-1 length; where in; $\Delta LCCC_{it}$ it is the result of subtracting the length of the real cash conversion cycle of period t from the length of the real cash conversion cycle of period t-1; $LCCC^{*}{}_{it}$ it, optimal cash conversion cycle length; L_{it-1}, the length of the real cash conversion cycle of period t-1; λ, the speed of adjustment and v_{it}, the specification of one-way residuals, which is subject to the fixed effects of the characteristics of each company and is actually (u_{it}it model 2).

In fact, this allows the company to reduce the gaps between the actual and target cash conversion cycle lengths by one unit per year. A value close to one indicates a higher adjustment speed. In order to obtain the final adjustment speed, the following model was used, which was obtained from the combination of the above two models.

$$LCCC^{*}{}_{it} = \emptyset_1 CFO_{it} + \emptyset_2 FCOST_{it} + \emptyset_3 MTB_{it} + \emptyset_4 SIZE_{it} + \emptyset_5 TANG_{it} + \beta\emptyset_6 Z - SCORE_{it} + \emptyset_7 ROA_{it} + \emptyset_8 LEV_{it} + \emptyset_9 GDPG_{it} + (1 - \lambda) LCCC_{it-1} + v_{it}$$

Where in; Ø_1 to Ø_9 is equal to $\lambda\,\beta'$ ،λ ؛is the rate of adjustment and $LCCC_{it-1}$ ،is the real cash conversion cycle of period t-1. The rest of the components are according to the above model, which was previously introduced to the characteristics of each company.

The presented model generally shows that companies always seek to make decisions that the distance between two cycle lengths reduce the actual and target cash conversion and achieve the optimal cash conversion cycle, which is the primary hypothesis that all companies are moving towards the optimal cash conversion cycle at the same speed) (Fama and French, 2002); Finally, by subtracting the estimation coefficient $LCCC_{it-1}$ from the number 1, the adjustment speed has been calculated.

The speed of adjustment of working capital= $1 - (1 - \lambda)$

Independent variable: risk management (ERM)

In order to operationalize risk management in the present research, taking a model from Ghaderi and Tari Verdi's (2019) and Rostami et al. (2022) from the model of Gordon et al (2009) and using the following comprehensive model.

$$ERMI_{i,t} = \beta_0 + \beta_1 EU_{it} + \beta_2 CI_{it} + \beta_3 FS_{it} + \beta_4 FC_{it} + \beta_5 MBD_{it} + \varepsilon_{it}$$

ERMI (risk management components according to the Coso model), EU (environmental uncertainty factor), CI (level of competition in industries), FS (Firm Size), FC (Firm Complexity) and MBD (supervisory role of the board of directors of companies). In the introduced model, the residual (ε) is the model and the lower the remaining component of the model is, it indicates the high risk management of the company and the lower the remaining component of the model Increase, indicates less risk management in the company. Therefore, the absolute value of the remainder obtained by multiplying by negative one, the sign the provider of risk management in the present study.

Risk management components (ERMI)

In 2006, to measure risk management, it is as follows:

$$ERM_I = \sum_{k=1}^{2} Strategy + \sum_{k=1}^{2} Operation + \sum_{k=1}^{2} reporting + \sum_{k=1}^{2} Compliance$$

Strategy

Strategy refers to the solutions that companies adopt to maintain competition in the market. To maintain the competitive situation, companies Who are active in a specific industry, try to make the most of the sales opportunities that have arisen and sell higher Compared to the average of this factor in the industry, it shows a successful competitive strategy and maintaining the company's position, and on the other hand, with measurement The company's ability to contain and control risk can be used to test the effectiveness of risk management. Therefore, to measure the strategy competitively, the following two relationships can be used) (Ghaderi and Tari Verdi, 2019 and Rostami et al, 2022).

$$Strategy_1 = \frac{Sales_{it} - \mu Sales}{\sigma Sales}$$

In the above model, the items are as follows, Sales (company sales), μSales (average industry sales) and σSales (standard deviation of sales of companies in the industry) are.

$$Strategy_2 = \frac{\Delta\beta - \mu\Delta\beta}{\sigma\Delta\beta}$$

In the above model, the items are as follows, Δβ (company beta in year t minus company beta in year t-1), μΔβ (average beta of industries) and σΔβ (standard deviation of beta Δβ in all companies in industry)

Productivity (Operation)

Productivity is actually operationalized by connecting business inputs and outputs in the process of setting up a business. If the output of the company surpasses the inputs, it shows the high performance and productivity of the company. To operationalize the productivity of two models to the following description can be used:

$$Operation_1 = \frac{Sales}{Total\ Assets}$$

In the above model, the items are as follows, Sales (Total Assets), $Total\ Assets$(Total assets of the company).

$$Operation_2 = \frac{Sales}{Number\ of\ Employees}$$

In the above model, the items are as follows, Sales (Total Assets),
$Number\ of\ Employees$(Number of company personnel)

Financial reporting risk management

Reporting at this stage is the degree of reliability of the company's financial reports, the disclosure of fraud-free and transparent reports in a way of survival it can guarantee the company and reduces the risk of the company. To operationalize this factor from the adjusted Jones model according to the model the following is used, which shows the weakness in financial reporting and because both cases are voluntary and non-voluntary commitment factors. Usually it can be negative, both factors were used, because their relative strength is more reliable) (Rostami et al, 2022 and Gordon et al., 2009).

$$Reportin = \frac{|\text{Non} - \text{discretionary accruals}|}{|\text{Non} - \text{discretionary accruals}| + |\text{Optional accrual items}|}$$

In this model, first, the total items are calculated to be obtained (net profit minus operating cash) (Mashaikhi et al., 2002) Also, all non-optional method items are obtained from the following model:

$TA_{i,t} /A_{i,t-1} = \alpha_1(1/A_{i,t-1})+\alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t}) /A_{i,t-1}+\alpha_3 (PPE_{i,t}/A_{i,t-1}) +\varepsilon_{i,t}$

In the extreme model, TA (total income items), $\Delta REV_{i,t}$ period (t) changes relative to t-1, ($\Delta REC_{i,t}$) changes that accounts receive Period t is relative to 1-t, (t,PPE_i) (fixed asset), $A_{i,t-1}$ (is the book value of the assets of period $_{1-t}$) and $\varepsilon i,t$ (residual of the model). The calculation of alpha coefficients in the above model is calculated with the following model of non-discretionary benefit items (NDA):

$NDA_{i,t} = \alpha_1(1/A_{i,t-1})+\alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t}) /A_{i,t-1} +\alpha_3(PPE_{i,t}/A_{i,t-1})+\varepsilon_{i,t}$

The discretionary accrual items (DA) after the NDA has been specified have been operationalized with the following model, which is actually equal to the rest of the model:

$DA_{i,t} = (DA_{i,t} /A_{i,t-1}) - NDA_{i,t}$

In the second model, which actually shows the health of financial reports from the point of view of a reference called the auditor:

Reporting2= (Material Weakness) + (Auditor Opinion) + (Restatement)

Material Weakness (the number of paragraphs in the auditor's report), Opinion Auditor (two-valued qualitative variable based on the opinion). Auditor Opinion (if it is declared acceptable, the code will be 1, otherwise it will be 0). Restatement (If the updated financial statements are presented, the code will be 1, otherwise 0 will be considered).

Compliance

Compliance and alignment with regulations can reduce risk. In order to operationalize compliance, the following two models can be used (Rostami et al, 2022and Gordon et al., 2009.)

$$\text{Compliance1} = \frac{\text{Audit fees}}{\text{Net assets}}$$

$$\text{Compliance2} = \frac{\text{Net profit (loss).}}{\text{Net assets}}$$

Environmental uncertainty (EU)

Environmental uncertainty is defined as an increase in unpredictable future events (Rostami et al, 2022). Therefore, Environmental uncertainty is an influential factor in risk management. This uncertainty is due to the large fluctuations in companies it can disrupt their performance and create complex conditions; it affects risk management (Gordon et al., 2009 and Rostami et al, 2022). Therefore, in order to operationalize this factor, the following three declared factors have been used:

(a)Coefficients of Income changes (CN (Sit), (b) Coefficients of capital cost changes (C) Coefficients of changes in net profit before tax(CV)) (Iit) and lit is the net profit before tax of the company in the current period.

$$EU = Log\ (\sum_{k=1}^{3} CV(X_k))$$

$$CV(X_k) = \frac{\sqrt{\frac{\sum_{t=1}^{11}(Z_{k,t} - \bar{Z}_k)}{n}}}{|\bar{Z}_k|}$$

In the above model CV (X_k) (uncertainty change coefficient), t (periods under study), X_{kt} (uncertainty k in the current period) and Zk (the average change of uncertainty k during n years).

K= (1, 2, 3) for uncertainty: 1) the coefficient of changes in sales of companies, 2) the coefficient of

changes in the cost of capital of companies and, 3) the coefficient Changes in pre-tax profits of companies.
The cost of capital is derived from the following model:

$$WACC = \left(\left(\frac{E_M}{E_M + D_M}\right)K_S + \left(\frac{D_M}{E_M + D_M}\right)K_D\right)$$

In the above model, D_M (book amount of debt), EM (market value of capital owners), and K_D (minimum rate announced by the central bank) K_S (shareholders' cost rate) is used to implement the expected cost rate of ordinary shares from Gordon's model in the following way has been:

$$K_S = \frac{D_0(1+g)}{P_0} + g$$

In the presented model, D0 (is the cash dividend of the stock for period t), P_0 (is the first stock price of the period), and g (is the dividend growth rate). g The following pattern has been calculated:

gt = ROE * [(1-(DPS_t / EPS_t)]

In the above relation:
DPS_t (cash dividend distribution) and 1-Pt (stock price of the first period), gt (profit growth rate) ROE (return on equity) and EPS (earnings per Shares are Industry Competition).

Industry competition: (CI)

Shows concentration in industries, where low concentration means high competition, which is operated by the following model has been:

$$CI = 1 - \sum_{i=1}^{n}\left(\frac{S_{it}}{TotalS_{st}}\right)^2$$

In the presented model, CI (the share of each company in the desired industry), Sit (the amount of sales of companies during the current period) and Sst (the amount The total sales of the industry during the current period is (Rostami et al, 2022 and Gordon et al., 2009).

Firm size (FS)

Firm size is the natural logarithm of total assets.

Complexity of the company (FC)

The complexity of the company will provide non-integrated information and weakness in the internal control of the employer, so In order to reduce the complexity, strong management of organizational risks is necessary, as the correlation coefficient of income and profit is negative one, according to the following relationship was obtained (Ghaderi and Tari Vardi, 2019)

FC =-1* CORREL(revenues & earnings)

Supervision of the Board of Directors (MBD)

Considering the minimum number of members of the board of directors of companies which is 5 people, managers with experience and Different specializations and thoughts can be beneficial to increase the performance of the company because the number of managers affects the value of the company Its risk-taking has an impact, and the size of the board of directors has an impact on the decision-making process and the effectiveness of the board of directors. Some Research on group decision-making in the fields of economics and social psychology has shown that more effort is needed for a large group to reach a consensus. Therefore, according to Qadri and Tari Verdi (2019) to measure the supervision of the board of directors from the ratio the number of people in the board of directors is based on the logarithm of the company's sales revenue.

The second independent variable: bankruptcy risk (RISK)

In the current research, in order to adapt the financial crisis models to the local environment of Iran, from the adjusted model of Kurdestani et al. (2013) and According to the research of Afaltouni et al. (2022) and Memarian and Mustafa Alavi (2019) it is used that the final model Is below:

In this model, Score-T represents the score related to financial ability as follows:

$$T - score_{it} = 0.291(X1) + 2.458(X2) - 0.301(X3) - 0.079(X4) - 0.05(X5)$$

X_1: Ratio of working capital to total assets
X_2: The ratio of accumulated profit and loss to total assets
X_3: Operating profit (loss) ratio to total assets
X_4: the ratio of book value to the total value of debts
X_5: The ratio of income to total assets.

In the above relationship, the indicators are the same as the indicators in the above relationship, and the lower the index obtained for a company, the lower the financial status It is more unfavorable so that if the company is T<-0.14, the possibility of financial crisis of the company is very high.

Control variables of the research:

Company size (SIZE): natural logarithm of total assets.

Return on assets (ROA): ratio of net profit to total assets.

Institutional ownership (INST): from the percentage of shares held by institutional owners such as banks, insurance companies, etc. and persons who have at least 5% of shares

The company is at their disposal. It has been used.

Family Ownership (Family): Family owners try their best to preserve their heritage for future generations. Family owned It Is recognized that the real shareholder is the owner of at least 20% of the company's ordinary shares or one of the members of its board of directors. The sole owner of at least 5% of ordinary shares or the total shares of the real member of the board of directors and his family members, at least 5 The percentage of the total ordinary shares of the company, finally, the year-companies that are included in the above definition are coded as 1 (otherwise) 0) (Mehrazin and Colleagues, 2013.

Independence of directors (IND): the ratio of non-executive directors of the board of directors to all members.

Sales growth (growth): Sales revenue minus the previous period's sales divided by the previous period's sales.

Liquidity (Cash): the ratio of operating cash to total assets.

Financial leverage (LEV): ratio of total debt to total assets.

Introduction of regression models to test research hypotheses

Based on the theoretical and experimental literature, such as Afaltouni et al.'s research (2022), Ghaderi and Tari Vardi (2019) and Rostami et al. (2022). A model consisting of Introduced variables to test research hypotheses has been designed and introduced as follows:

$$\begin{aligned} RISK_{it} = {} & \beta_0 + \beta_1 SLCCC_{it} + \beta_2\, ERM_{it} \\ & + \beta_3 (SLCCC_{it} \times ERM_{it}) \\ & + \beta_4\, SIZE_{it} + \beta_5 ROA_{it} \\ & + \beta_6\, LEV_{it} + \beta_7\, INST_{it} \\ & + \beta_8\, growth_{it} + \beta_9 Family_{it} \\ & + \beta_{10} Cash_{it} + \beta_{11}\, IND_{it} + \varepsilon_{it} \end{aligned}$$

4. Findings

Descriptive statistics of research variables

First, descriptive statistics are presented in the table below to show the distribution of data.

Table (1) it shows statistics. In general, the most important criteria are the average value and the standard deviation of the data distribution. For example, average the speed of adjusting the working

capital of the companies is 62%, which shows that the companies dynamically cover 62% of the gap annually. They reduce the actual working capital towards the optimal working capital. The average financial leverage of companies is 55% which shows that on average, half of the company's assets are made up of debt. The highest standard deviation belongs to the ownership of institutional investors (30.6) and the lowest is owned by the company's liquidity (0.13).
As can be seen in table (2), the total number of companies under investigation is equal to 1240.

1088 years – companies equivalent to 87.74 percent of the years – companies have no risk of bankruptcy and the number of 152 years – companies equivalent to 12.26 Percentage of the year – companies have bankruptcy risk. Also, the number of 1052 years – the company is equivalent to 84.84 percent of the year Companies, non-family and the number of 188 years-companies equal to 15.16 percent of the year-companies have family ownership.

According to the results obtained in table (3), it can be seen that the significance level of the variables in the Manani test was less than 5%. And it indicates the significance of the variables.

Table 1) Descriptive statistics of quantitative research variables

Variable	Mean	Max.	Min.	S. dev.	Skewness	Kurtosis
SLCCC	0.62	0.97	0.12	0.24	-0.36	2.01
ERM	-0.61	-0.014	-1.76	0.45	-0.72	2.71
SIZE	14.71	19.2	11.3	1.51	0.73	3.65
ROA	0.14	0.55	-0.20	0.15	0.60	3.25
LEV	0.55	0.97	0.13	0.20	-0.12	2.37
INST	58.8	94.9	0.0000	30.6	-0.81	2.34
growth	0.34	1.65	-0.34	0.42	0.87	3.85
CASH	0.11	0.52	-0.18	0.13	0.66	3.54
IND	0.65	1.00	0.20	0.17	-0.069	2.83

Table 2) Frequency distribution of bankruptcy risk variables and family ownership

Description	Value	Frequency	Frequency percentage
There is a high risk of bankruptcy	1	152	12.26
There is no risk of bankruptcy	0	1088	87.74
Family Companies	1	188	15.16
Non-family Companies	0	1052	84.84
total	-	1240	100

Table 3). Levin, Lin $ Chu Unit root test of Variables

Variable	Mean	Maximum	Results
SLCCC	-8.53892	0.0000	Stationary
ERM	-16.8280	0.0000	Stationary
SIZE	-12.3134	0.0000	Stationary
ROA	-9.52959	0.0000	Stationary
LEV	-13.0833	0.0000	Stationary
INST	-5.16742	0.0000	Stationary
growth	-2.57699	0.0000	Stationary
CASH	-17.7677	0.0000	Stationary
IND	-4.23755	0.0000	Stationary

Table 4). The results of the test of research hypotheses

$$RISK_{it} = \beta_0 + \beta_1 SLCCC_{it} + \beta_2 ERM_{it} + \beta_3 (SLCCC_{it} \times ERM_{it}) + \beta_4 SIZE_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 INST_{it} + \beta_8 growth_{it} + \beta_9 Family_{it} + \beta_{10} Cash_{it} + \beta_{11} Board\ ind_{it} + \varepsilon_{it}$$

Variable	Coefficient	S. D	z statistic	Sig.
SLCCC	-0.58	0.28	-2.04	0.040
ERM	-0.11	0.13	-0.81	0.41
SLCCC ×ERM	-0.62	0.18	-3.31	0.0009
SIZE	-0.12	0.054	-2.19	0.027
ROA	-9.69	0.95	10.15	0.0000
LEV	2.44	0.46	5.29	0.0000
INST	-0.002	0.002	-0.84	0.39
growth	0.74	0.15	4.69	0.0000
Family	-0.017	0.006	-2.70	0.006
CASH	0.47	0.65	0.71	0.47
IND	-0.63	0.34	-1.82	0.064
C	-0.14	0.86	-0.16	0.86
LR statistics			441.077	
LR significance level			0.0000	
McFadden coefficient			0.47	

The results of table (4) show that the speed of adjustment of working capital with a negative coefficient (-0.58) and a significance level of less than 5 percent. (0.040) has the opposite effect on the company's bankruptcy risk, and the first hypothesis of the research is confirmed at the 5% error level. Also The interaction of risk management and the speed of adjustment of working capital with a negative coefficient (-0.62) and a significance level below 5% (0.0009) It has an inverse effect on the risk of bankruptcy and since the absolute value of the adjustment coefficient of risk management (0.62) is more than the absolute value of the coefficient The speed of adjustment of working capital is (0.58), so risk management has an inverse relationship between the speed of adjustment of working capital and risk Intensifies bankruptcy.

The control variables are company size, return on assets, financial leverage, sales growth, and family ownership with the level A significance level of less than 5% has a significant effect on the dependent variable of the research, as well as the independence of managers with a significance level of less than 10%. It affects the dependent variable of the research. McFadden's coefficient is equal to 47%, which shows that 47% of the variable changes Dependent are most likely a number between zero and one. The LR statistic is equal to 441.07 and its significance level is less than 5%, therefore it can be said that the fitted model has sufficient validity.

Table 5). The accuracy percentages of the prediction of the research model

Name of the test	The value of the test statistic	Total forecast
The accuracy percentage of the prediction of the research model	-	92.34
research Suitability of the model	7.500	0.48

Among the criteria of goodness of fit, which is also only used for logistic regression models, the percentage of prediction accuracy and optimal fit? It is a regression model. According to the results of table (5), it can be seen that the accuracy percentage of the model prediction in the research model is more than 50 Percentage (92.34) which shows the desirability and correctness of the model. Also, the significance level of the Hosmer-Lemshow test for the research model

they are more than 5 percent (0.48) and indicate the optimal fit of the regression model.

5. Conclusion and suggestions

In today's challenging economic conditions in the world and inside the country, considering various risks and increasing environmental pressure in affairs and the management of companies has caused companies to face increasing financial crises that sometimes if this factor is not properly managed and eliminated, will increase the risk of bankruptcy and default of companies. Therefore, due to the high cost of financing and the risk of discussion regarding it, it is very important to pay attention to working capital and liquidity conversion cycle. Within mind obtaining optimal working capital, as a rule, companies continually seek to achieve this amount of optimal working capital and avoid excessive and excesses in this prevention factor will be implemented. Working capital is vital for the survival of the company. In this case, while working capital management is considered as a competitive advantage for a unit, it affects financial performance, profitability and liquidity. In real world, working capital management is providing the short-term capital required to finance activities it is an investment and an important part of a company's balance sheet items in various industries. Better management of working capital leads to high financial performance and it will reduce the company's financial crises. In fact, the optimal liquidity conversion cycle shows financial power in short-term payments and dealing with crises, as well as the criteria for analysts' evaluation of the company's financial strength in paying their obligations. In Iran, because companies do not have strong financial capacity for long-term capital markets, Therefore, the production of internal resources is very important in the continuation and survival of companies. According to the results, the speed of achievement to determined optimum working capital will reduced the risk of company bankruptcy. In fact, when the company can soon move closely with optimal working capital level along its short-term needs can earn better financial outcome in payments and company affairs, and to incapacity manner which finally, lead to the risk of bankruptcy, will not be caught. The results obtained are in accordance with past finding of research results of Fernandez and Sanchez (2023). Who stated that achieving optimal working capital will prevent the company from facing a financial crisis? Factor risk management, in fact, all companies should consider it in order to identify and eliminate possible risks facing the company. Internal risks is the main cause of the bankruptcy of large and contending companies in the world, which is not tolerated by any group and team with any kind of facilities and abilities, unless they operate from the beginning with written plans and the creation of risk committees and charters and written plans to avoid these risks, took action, which is known as comprehensive risk management. According to the obtained results, it was observed that management interaction the risk of the company can reduce the risk of bankruptcy with the speed of obtaining optimal working capital. In fact, when companies operate in line with optimal liquidity conversion cycle and reduce the risks facing the company with predetermine plans, thus to an excellent level Financial performance will be achieved, so that the company will not face severe financial crisis. By considering the limits and constraint imposed to our capital market, it is suggested that the managers as soon as possible engage in determined the optimal working capital level of the company so that they can go through financial crises with ease. Meanwhile, by having determinate program to managing Risk and providing meetings and the formation of a risk committee and having written plans can solve the problems of companies. Because Many problems are faced by companies at the level of various industries, small and large, it is suggested that future researchers with follow the separation of various industries and compare the results with the obtained results. In addition, due to being high the costs of financing through debt, the use of commercial credits are of great importance for the short-term financing of companies achieving optimal working capital, so it is also suggested that researchers

investigate the effects of working capital management strategies on the speed of achieving optimal commercial credit.

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