

Identifying and Evaluating Factors Affecting Financial Risk in Companies Admitted to the Tehran Stock Exchange

Mehdi Ahmadpour ^a, Reza Aghajani Nashtaei ^{b,*}, Mohsen Khodadadi ^c

^a Department of Management, Rasht Branch, Islamic Azad University, Rasht, Iran

^b Department of Business Management, Rasht Branch, Islamic Azad University, Rasht, Iran

^c Department of Accounting, Roudsar and Amlash Branch, Islamic Azad University, Roudsar, Iran

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Abstract

Financial risk affects not only the growth and development of a company but also the economic development of the whole society. This research has been carried out to identify and investigate factors affecting financial risk in Tehran Stock Exchange companies. The statistical population of this research is all the companies admitted to the Tehran Stock Exchange, which have been active on the stock exchange from April 2012 to March 2021. This research is conceptual in terms of its purpose and descriptive and correlational research in terms of the data collection method. In this research, the required data has been extracted from the RAHAVARD software, the financial statements of the companies, and the Kodal website. IBM SPSS Statistics, Excel, and Stata16 software were used for data analysis. The research results showed that liquidity risk, investment risk, activity risk, leverage risk, and valuation risk have a significant effect on the financial risk of Tehran Stock Exchange companies. In other words, financial risk is under the influence of liquidity, investment, activity, leverage, and valuation risks. Therefore, by using the results of this research, the managers of the companies can control the factors affecting the financial risk to prevent unfavorable results of the financial risk and thus improve their financial performance.

Keywords: Liquidity risk, investment risk, activity risk, leverage risk, valuation risk.

Introduction

Recent changes and developments have had a tremendous impact on corporate risk management in organizations (Spanó and Zagaria, 2022; Nocco and Stulz, 2006). Driving forces such as globalization, deregulation and consolidation have changed the risk management industry and increased its importance (Manjengwa et al., 2023; Cepeda Pico, 2023; Chiu, 2023; Liebenberg and Hewitt, 2003). In today's complex business world, the lack of inadequacy of risk management has a major impact on company performance. Scandals such as Taycom or Enron show the need for effective risk management (Fabuzzi and Peterson, 2009). Risk management research focuses on methods and methods of risk management (Ali et al., 2023; Zhuang et al., 2023). However, talking

* Corresponding author E-mail: mashtaei@gmail.com

about losses is not enough in today's complex world. The current state of risk management research encourages a comprehensive and integrated approach that deals with and measures the probability of all unexpected events (Choudhary et al., 2023; Hampton, 2014; McShane et al., 2011; Olson and Wu, 2008).

The performance of the global economy has been affected by crises such as the unexpected Covid-19 pandemic that hit the world in 2019 and led to economic stagnation (Wolff and Mykhnenko, 2023; Liu et al., 2023; Wang et al., 2023). The previous global economic crisis was the financial crisis of 2008-2009, which was attributed to excessive risk-taking by financial institutions (Ngene and Tah, 2023; Silipo et al., 2023). The crisis led to the loss of investors' confidence in the ability of state-owned companies to effectively manage risks (Brunner Kirchmair and Wiener, 2019).

Financial risk is a combination of different methods, models, and approaches to reduce the probability of threats and the number of losses (Toma et al., 2023; Matillaevich, 2016). Financial analysis is a useful tool that helps companies identify financial risks in advance, take appropriate actions to minimize losses, and support better decision-making. (Ergu et al., 2014). Accurate understanding as well as a good assessment of financial risk can have many positive consequences, such as reducing the inability to pay debts, reducing the bankruptcy rate, and reducing financial issues. Therefore, to maintain the safety and sustainable development of companies, it is very important to create a financial risk assessment model, early diagnosis of financial crises, and take appropriate measures (Padash and Ghatari, 2020; Fu, 2015).

In many business downturns, in addition to company management, the financial institution must also be responsible for irresponsible lending (Roy and Bandpadai, 2021).

Bansal et al. (1992) and Holton (2004) described risk as the unexpected change or unpredictability of returns. Aref and Shaukat (2015) and Fali et al. (2020) describe financial risk as the probability of bankruptcy of a company, that is when the company has used debt to meet financial obligations but does not have enough cash balance. This risk is usually influenced by factors beyond the company's control (Oliver, 2001; Harvey, 2008).

Dey et al. (2018) investigated how financial risk disclosure affects the performance of manufacturing firms in Bangladesh, and Asia. They developed indicators of financial risk disclosure through content analysis of companies' annual reports. This study used regression analysis to examine the relationship between financial risk disclosure and firm characteristics. Their study found no common practice among companies to disclose their financial risks in their reporting process.

Isiaka (2018) assessed how liquidity risk affects the performance of listed insurance companies in Nigeria. Liquidity risk was an independent variable with the criterion of the loss ratio, insurance premium growth, and financial leverage. For company performance, Return on Assets (ROA) was used as a measure.

This study used multiple regression techniques. The findings showed that leverage has a significant negative effect on asset returns. This study instead used return on equity (ROE) as a measure of performance and the current ratio as a measure of liquidity risk.

In this article, the question is raised: what are the factors affecting financial risk in Tehran stock exchange companies? The innovation of this article includes two dimensions: First of all, no research has been done in the country to comprehensively identify the factors affecting the financial risk of companies, second, research that examines the impact of other risks (such as leverage risk, liquidity risk, investment risk, and activity risk) as factors affecting financial risk has not been done.

Theoretical Foundations and Research Background

Despite the importance of financial risk, the sources of financial risk are different. By analyzing the existing literature, four main sources of risk are identified that are distinct from each other. Strategic risks describe the uncertainty of a company's business strategy that does not achieve the expected equity value and may be harmful to that company (Lam, 2017).

While strategic risks are caused by wrong decisions of senior management (Mohammed and Sykes, 2012), operational risks are created by various sources. According to the Basel Committee on Banking Supervision (Wang and Chen, 2023), operational risk is "the risk of direct or indirect loss arising from inadequate or failed internal processes, people and systems, or from external events" (Stover et al., 2023). Therefore, operational risks are not taken to earn more profit but appear automatically when doing business. This research focuses on financial risks that arise "through the myriad transactions with financial nature" (Horcher, 2011). Companies have to make their financial decisions in dealing with investment opportunities, spending money, and increasing it (Francke and Carrete, 2023; Barily et al., 2014). All decisions and actions may have an unexpected (and undesirable) outcome that must be dealt with in financial risk management.

Risks that do not originate directly from the market are liquidity risk and credit risk. They are also called financial risks in a broader sense (Wei et al., 2023). All of the risks listed here may affect reputational risk. This category of risk describes the uncertainty that a company's reputation (often referred to as trust or equity) will be lost or damaged due to any event (Atkins et al., 2006).

Risk identification and assessment is the first and most important step in the financial risk management process (Hernández et al., 2023; Varouqa, 2023). Management literature offers a wide range of methods for solving these tasks, which are often used in combination. On the one hand, qualitative approaches such as workshops, risk assessment, scenario analysis, employee questionnaires (Khaskheli et al., 2023), checklists, brainstorming, Delphi method, Synectic, Fault Tree Analysis (FTA) (Yazdi et al., 2023), Failure Mode, and Effects Analysis (FMEA) (Liu et al., 2023), risk and performance studies, accident investigation, analysis of political, economic, social, technological, environmental, legal or strengths, weaknesses, opportunities, threats (Chuwa and Perfect-Mrema, 2023); on the other hand, quantitative tools attempt to identify risks by analyzing past or present data (Lan et al., 2023), including correlation analysis, trend analysis, or complex mathematical models. Monte Carlo analysis and early warning systems (for more information on all these tools (Chapman, 2011; Muller, 2011; Martinelli and Milosevic, 2016; Pritchard, 2015; McNeill et al., 2015; Sharma et al., 2015; Chen et al., 2016).

The result of this process should be a risk management hierarchy that defines the high-priority risks that should be managed first and the less important ones in a lower order (Bogodistov and Wohlgemuth, 2017).

Research Background

Fadaei et al. (2021) conducted research entitled "Financial risk management in the automotive industry with the approach of fuzzy network analysis". The results of the research showed that among the 13 identified variables affecting financial risk in the automotive industry, the liquidity risk criterion is the most effective among financial risks and is ranked first and has the highest priority. And the sub-criterion of forecasting market demand, structural changes in the economy, and the complex competition of domestic markets are respectively among the highest priorities and have an impact on the entire system.

Shekarkhah et al. (2021) conducted research titled “Identifying and determining the capability of continuous monitoring of financial and non-financial risks of the pharmaceutical industry in internal audit”. In this research, with a comprehensive approach, 5 dimensions of risk (financial, strategic, operational, reporting, and legal and compliance) including 25 components were identified and then their importance and ability to be continuously monitored were evaluated. For this purpose, the views of 22 financial and non-financial experts in the pharmaceutical industry, including CEOs, board members, managers, and senior experts; and current and former senior managers of the Ministry of Health, were used using the fuzzy Delphi method. The results of the collected data analysis show that from the identified risks, 15 risks (capital supply and cash flow, product portfolio, legal and regulatory changes, sales, purchases, economic indicators, technology change, production, governance, competitors, credit, human resources, reputation, resource allocation and budgeting, and inventory management) are important; and 9 risks (inventory management, capital supply and cash flow, sales, product portfolio, credit, resource allocation and budgeting, purchasing, asset protection, and production) have continuous monitoring capability. In addition, 8 risks (capital supply and cash flow, product portfolio, sales, purchase, production, credit, resource allocation and budgeting, and inventory management) are important and can be continuously monitored.

Farhadi and Fuladi (2021) conducted research entitled “Investigating the impact of growth opportunities and stock liquidity on the relationship between the quality of the corporate governance system and the risk of financial distress”. The results of the research showed that the improvement of the corporate governance system index increases the risk of financial helplessness in companies, as well as increases the growth opportunities of companies, strengthening the relationship between the quality of the corporate governance system and financial helplessness. In addition, the liquidity of companies' shares strengthens the relationship between the quality of corporate governance and financial distress.

Niazi and Hosseini (2021) conducted research entitled “The relationship between systematic risk and financial leverage concerning the role of asset quality in banks admitted to the Iranian capital market”. The results showed that there is a significant and negative relationship between this systematic risk and financial leverage. Also, another result indicates that asset quality affects this relationship and weakens the relationship between systematic risk and financial leverage.

Abtahi and Ali Askari (2021) conducted research entitled “The evaluation of financial risks in construction projects”. The results indicated that the emergence of financial risks in construction projects can include price inflation, costs due to increased work, costs due to unauthorized delays, and other factors.

Habibi Dehri et al. (2021) conducted research entitled “Identifying and ranking types of financial risk in banking without Islamic usury”. The results showed that the identified risks from the most important to the least important are: "Credit risk", "Liquidity risk", "Exchange rate risk", "Capital adequacy risk", "Operational risk", "financial statement risk", "performance risk", "price risk", "Rental rate risk", "Interest rate risk", "Direct investment risk", "Hedging risk" and "benchmark risk". Also, the results showed that the degree of importance of common risks between Islamic and non-Islamic banking is higher than the degree of importance of specific risks of Islamic banking.

Chiefs and Baniyan (2020) conducted research titled the factors influencing Islamic financial risk management. The findings of this research show that variables such as the fourth period of financing expansion 19.986, size 19.9207, total loans to total assets 19.056, management efficiency 18.9437, capital ratio 18.4701, foreign fictitious value 18.3817 and ... indicate high interaction and strong systemic connection with other variables.

Liu and Lee (2022) conducted research entitled "A Review of Systematic Financial Risk Research Based on Knowledge Maps". The research results showed that the systematic research of financial risk is in a period of intense development, and more attention is paid to "risk measurement" and "precaution-oriented". Internal research focuses on financial risks and financial supervision, among which are Internet financing, supply-side reforms, and the real economy, and systemic financial risks.

Ayton et al. (2022) conducted research entitled "Corporate social performance and financial risk: more empirical evidence using higher frequency data". The research results showed that the company's social performance harms specific risks. However, the effect of CSP on systematic risk is not statistically significant.

Quan et al. (2022) conducted a study entitled "Evaluation of customer financial risk perception and attitude in the hotel industry: investigating the role of protective measures against COVID-19." The results of the research showed a significant contribution of protective measures against COVID-19 in the perception of financial risk and customer attitude. It also showed a positive and significant relationship between customer satisfaction and behavioral intention. However, financial risk perception and customer attitude did not influence satisfaction, but they did influence behavioral intention. Also, the results showed that protective measures are an important aspect in encouraging people to visit hotels safely and continuously.

Bai et al. (2022) conducted research entitled "Data-based financial and operational risk management: empirical evidence from the global shipping industry". The results showed that financial hedges can effectively reduce the banker's fuel price risk, but cannot reduce the freight rate risk. Meanwhile, companies can use operational risk management strategies to effectively mitigate both risks.

Uquillas and Tonato (2022) conducted research entitled "Inter-Portfolio Credit Risk Contagion Including Macroeconomic and Financial Factors: A Case Study for Ecuador". The results showed that shocks in exogenous variables are often transmitted immediately across all portfolios, although it takes up to six months to affect these variables but not cumulatively. A one-unit shock in consumer arrears immediately causes an increase in microcredit arrears, and this effect is maintained until one month later and stabilizes and disappears in the tenth month. Moreover, a one-unit shock in microcredit arrears causes an increase in consumer arrears only in the medium term, after seven months.

Rabbani and Gerbel (2021) conducted research entitled "Can portfolio risk be described with financial risk tolerance measurement estimates?" Based on the findings of the research, no clear pattern of portfolio selection was observed for those who overestimated their financial risk tolerance.

Research Methodology

The current research, for the reason that it develops financial risk assessment, is conceptual in terms of its purpose, and in terms of the type of data collection and data analysis, it is descriptive and correlational research.

The statistical population of this research is all companies admitted to the Tehran Stock Exchange, which has been active on the stock exchange from April 2012 to March 2020. In this research, the systematic elimination method was used to select the statistical sample. The statistical sample includes all companies that have the following set of characteristics (Shirinpour et al., 2022).

- 1- Have been admitted to the stock exchange before April 2012 and their symbol has not stopped until the end of 2020.
- 2- To ensure comparability, their financial period should end at the end of March.
- 3- Do not stop the activity or change the financial year during the period under review.
- 4- The information required by the companies is available during the period under review.
- 5- The financial statements of the company must be audited and related to non-consolidated companies.
- 6- Have not been removed during the research period.

In this research, data were available for 30 companies, so it was analyzed. Considering that the information and data collected from the audited documents of the financial statements of the companies were obtained and formulas used in the scientific community were used in their conversion, it can be claimed that the measurement method has validity and reliability. Also, since the formulas used in the calculation of the investigated indicators are considered international standard tools and are by the documents available in the literature and are based on theoretical foundations which are specific for the measurement of those traits, on this basis, it can be claimed that the measurement method has validity.

$$Tr_{i,t} = \alpha + \beta_1 Lr_{i,t} + \beta_2 Fr_{i,t} + \beta_3 Ar_{i,t} + \beta_4 Pr_{i,t} + \beta_5 Vr_{i,t} + Size + \varepsilon$$

Tr: Financial risk (dependent variable),

Lr: Liquidity risk (independent variable),

Fr: Investment risk (independent variable),

Ar: Activity risk (independent variable),

Pr: Leverage risk (independent variable),

Vr: Valuation risk (independent variable),

Size: (control variable): Natural logarithm of net sales: in this research, company size is used from the logarithm of sales of statistical sample companies:

$Size = \ln(\text{net sales})$,

$i = 1, \dots, 30$,

$t = 1, \dots, 9$

Research Variables and How to Calculate

Independent Variables and How to Measure Them

In studies of the correlation type, instead of the independent variable, the term predictor variable is used (Khaki, 2011). In this research, audit quality is measured based on the following regression model:

a. Liquidity Risk

Which is measured through the following regression equation:

$$Lr_{i,t} = \alpha + \beta_1 Lf_{i,t} + \beta_2 Cf_{i,t} + \beta_3 If_{i,t} + \varepsilon$$

Lr: liquidity risk

Lf: liquidity ratio

Cf: current ratio

If: immediate risk

b. Investment Risk

Which is measured through the following regression equation:

$$Fr_{i,t} = \alpha + \beta_1 Sf_{i,t} + \beta_2 Bf_{i,t} + \beta_3 Df_{i,t} + \beta_4 If_{i,t} + \beta_5 Rf_{i,t} + \varepsilon$$

Sf: Return on equity

Bf: Gross profit margin ratio

Df: Operating profit margin ratio

If: Net profit margin ratio

Rf: Rate of return on assets

c. Activity Risk

Which is measured through the following regression equation:

$$Ar_{i,t} = \alpha + \beta_1 Ef_{i,t} + \beta_2 Ff_{i,t} + \beta_3 Gf_{i,t} + \varepsilon$$

Ef: Inventory turnover ratio

Ff: Asset turnover ratio

Gf: Assets turnover ratio

d. Leverage Risk

Which is measured through the following regression equation:

$$Pr_{i,t} = \alpha + \beta_1 Hf_{i,t} + \beta_2 Jf_{i,t} + \beta_3 Kf_{i,t} + \beta_4 Mf_{i,t} + \varepsilon$$

Hf: Sum of liabilities to sum of assets

Jf: Sum of liabilities to equity (special value)

Kf: Debt ratio

Mf: Debt to equity ratio

e. Valuation Risk

Which is measured through the following regression equation:

$$Pr_{i,t} = \alpha + \beta_1 Nf_{i,t} + \beta_2 Qf_{i,t} + \varepsilon$$

Nf: Firm value

Qf: book value

Control Variable

The control variable of the research includes the following variables: Size of the company: It represents an index that indicates whether companies are small or large; to measure this index, criteria such as the number of shares, the number of sales, or the value of assets can be used. In this research, the company size is the logarithm of the sales of statistical sample companies. $Size = \ln(\text{net sales})$

Method of Data Analysis

In this research, first, a statistical sample was selected from among the statistical population of companies admitted to the Tehran Stock Exchange market, based on the conditions and characteristics mentioned in the population and statistical sample section and then IBM SPSS Statistics, Excel and stata16 software were used for calculations related to hypotheses and their testing.

Research Findings

Table 1 shows the descriptive statistics of all the variables of this research. The number of valid and correct observations for each variable is 9 years. The desired data is related to 30 companies admitted to the Tehran Stock Exchange, which includes the period from 2012 to 2020.

Table 1. Descriptive statistics.

Variable	Symbol	Minimum	Maximum	Mean	Standard deviation
Liquidity risk	<i>Lr</i>	41.1-	52.2	96.1	21.0
Investment risk	<i>Fr</i>	21.0	76.2	72.0	36.0
Activity risk	<i>Ar</i>	88.0	21.4	17.1	51.0
Leverage risk	<i>Pr</i>	54.11	74.15	95.12	57.0
Valuation risk	<i>Vr</i>	13.0-	59.0	18.0	21.0
financial risk	<i>Tr</i>	15.0-	62.0	193.0	23.0

Normality Test

To test the normality of error sentences, different tests can be used. One of these tests is the Shapiro-Wilk test, which was also used in this research.

H₀: The model variables are normal

H₁: The model variables are not normal

Table 2. Normality test.

Variable	Shapiro Wilk	Significance level
The error sentence of the first model	42.1	076.0

The normality test of the variables indicates the type of statistics used. The normality test determines the distribution and dispersion of the data. As can be seen in Table 2, the significant result of this test for all data is above 5%, indicating that those data are normal. The normality of the data determines the distribution and dispersion of the data.

Collinearity Test

When there is a perfect linear relationship between the explanatory variables of a regression model, the estimates of the regression model cannot be calculated uniquely. Collinearity means that 2 variables have a very close linear combination with each other. This means that there is a high correlation between the independent variables and the model may not have high validity despite the high R². In other words, although the model looks good, it does not have significant independent variables. If collinearity is confirmed, there is a set of problems in determining the accuracy of the regression equation.

Variance Inflation Factor (VIF) index to check collinearity: VIF is used to detect the presence of collinearity. If the VIF index of an independent variable is greater than 5, it is likely to be linear with other variables. In this case, it should be further investigated. Otherwise, there is no collinearity problem between the independent variables. The test of collinearity (VIF) of the variables of the current research is given in the following table:

Table 3. Collinearity test.

Variable	Symbol	First model	Second model
Liquidity risk	<i>Lr</i>	63.1	59.1
Investment risk	<i>Fr</i>	36.1	52.1
Activity risk	<i>Ar</i>	97.1	34.1
Leverage risk	<i>Pr</i>	16.1	28.1
Valuation risk	<i>Vr</i>	97.1	57.1
Financial risk	<i>Tr</i>	19.1	26.1

Collinear values indicate the possibility of internal correlation between variables. Collinearity values greater than 5 indicate the probability of collinearity between independent variables, and values greater than 10 indicate great difficulty in using regression in the current situation. In addition, all collinearity values are less than 5, which indicates the absence of collinearity between independent variables.

Limer's F Test

Limer's F test was performed to determine the use of a fixed effects model against pooled data, and this test indicates the fixed effects model (panel) or pooled model (money). If the significance level of this test is lower than 5%, it indicates that the fixed effects model (panel) is used, and if it is higher than 5%, the consolidated model (money) is used, and the following table shows its results.

H_0 : The model is integrated

H_1 : The effects model is fixed

Table 4. Limer's F test.

Model	Effects test	Statistics	Significance level	Test result
1	F	96.27	0.000	Fixed effects

The results of this test show that the significance level of the models is below 5%. Therefore, hypothesis H_0 (integrated model) is not confirmed.

Hausman Test

The Hausman test is used to determine the use of a fixed effect model against random effects. The Hausman test is based on the presence or absence of a relationship between the estimated regression error and the independent variables of the model. If this relationship exists, the fixed effect model can be used, and if this relationship does not exist, the random effect model can be used.

H_0 : The model is with random effects.

H_1 : The model is fixed effects.

Table 5. Hausman test.

Model	Test summary	chi2 statistic	Significance	Test result
1	Random course	82.17	0.000	Fixed effects model

As the above table shows, the significance value for research hypotheses is less than 5%. In this way, the hypothesis of a fixed effects model is confirmed. This shows that there is no relationship between the estimated regression error and the independent variables. According to the obtained results, the panel data method is used to test the hypotheses.

The Test of Heterogeneity of Variances and Autocorrelation

One of the assumptions of the regression equation is the constancy of the variance of the errors, which is also considered the assumption of the equality of variances. If the errors do not have a constant variance, it can be said that there is variance inhomogeneity. Another assumption of the linear regression model is the zero covariance between the error components over time (or cross-sectionally for the data types). If the variance of error sentences is not constant, it can be said that there is a problem of heterogeneity of variance.

In this research, the modified Wald test was used to check the heterogeneity of variance, and the Waldridge test was used to measure autocorrelation.

H_0 : Autocorrelation and heterogeneous model variables do not have variance.

H_1 : The variables of the model have autocorrelation and heterogeneity of variance.

Table 6. Test of autocorrelation and heterogeneity of variance.

Model	Self-correlation test			Test of heterogeneity of variances		
	Self-relationship	Significance level	F	Heterogeneity	Significance level	F
1	Non	0.098	1.02	Non	0.83	0.27

Examining the results of the heterogeneity of variances, the test showed a significant level of more than 5%. In this way, the null hypothesis is not rejected. This indicates that the research variables have homogeneity of variance and lack of autocorrelation.

Research Model Test

Test of the First Hypothesis

H_0 : Liquidity risk does not have a significant effect on financial risk in companies listed on the Tehran Stock Exchange.

H_1 : Liquidity risk has a significant effect on financial risk in companies listed on the Tehran Stock Exchange.

The results of Table 7-4 show that the model is optimal for hypothesis testing. The F statistic (81.54) and the significance level (0.000) confirm that the model is significant for testing the hypothesis. Also, the results of the Waldridge test show the absence of autocorrelation between the disturbance sentences.

The adjusted coefficient of determination is calculated as 0.34. The liquidity risk variable is considered an independent variable, financial risk is a dependent variable and the company size variable is a control variable in this research. The liquidity risk variable has a positive and direct effect on the financial risk varies according to the significance level (0.02) in the table below. Considering that liquidity risk affects financial risk, therefore, the first hypothesis of the research is confirmed.

Second Hypothesis Test

H_0 : Investment risk has no significant effect on financial risk in companies listed on the Tehran Stock Exchange.

H_1 : Investment risk has a significant effect on financial risk in companies admitted to the Tehran Stock Exchange.

The results of Table 7-4 show that the model is optimal for hypothesis testing. The F statistic (81.54) with a significance level of (0.000) confirms the significance of the model for hypothesis testing. Also, the results of the Waldridge test indicate the absence of autocorrelation between the disturbance sentences. The adjusted coefficient of determination is 0.34. The investment risk variable is an independent variable, financial risk is the dependent variable, and the company size variable is the control variable in this research. The investment risk variable has a positive and direct effect on the financial risk variable according to the significance level (0.000) in the table below. Since investment risk has a significant effect on financial risk, the second research hypothesis is confirmed.

Test of the Third Hypothesis

H_0 : Activity risk has no significant effect on financial risk in Tehran Stock Exchange-listed companies.

H_1 : Activity risk has a significant effect on financial risk in Tehran Stock Exchange-listed companies.

The results of Table 7-4 show that the model is optimal for testing the hypothesis. The F statistic (81.54) and the significance level (0.000) confirm the significance of the model for testing the hypothesis. Also, the results of the Waldridge test indicate the absence of autocorrelation between the disturbance sentences. The adjusted coefficient of determination is 0.34. Activity risk variable is considered as an independent variable, financial risk as a dependent variable, and company size variable as a control variable in the research. The activity risk variable has a positive and direct effect on the financial risk varies according to the significance level (0.018) in the table below. Considering that activity risk has a significant effect on financial risk, the third hypothesis of the research is confirmed.

Testing the Fourth Hypothesis

H_0 : Leverage risk does not have a significant effect on financial risk in companies listed on the Tehran Stock Exchange.

H_1 : Leverage risk has a significant effect on financial risk in companies listed on the Tehran Stock Exchange.

The results of Table 7-4 show that the model is optimal for hypothesis testing. The F statistic (81.54) and significance level (0.000) confirm the significance of the model for hypothesis testing. Also, the results of the Waldridge test indicate the absence of autocorrelation between the disturbance sentences. The adjusted coefficient of determination is 0.34. Leverage risk as an independent variable, financial risk as a dependent variable, and company size variable as a control variable is known in the research. The leverage risk variable has a positive and direct effect on the financial risk variable according to the significance level (0.000) in the table below. Considering that leverage risk has a significant effect on financial risk, the fourth hypothesis of the research is confirmed.

Testing the Fifth Hypothesis

H_0 : Valuation risk does not have a significant effect on financial risk in companies listed on the Tehran Stock Exchange.

H_1 : Valuation risk has a significant effect on financial risk in Tehran Stock Exchange-listed companies.

The results of Table 7-4 show that the model is optimal for hypothesis testing. The F statistic (81.54) and significance level (0.000) confirm the significance of the model for hypothesis testing. Also, the results of the Waldridge test indicate the absence of autocorrelation between the disturbance sentences. The valuation risk variable is considered an independent variable, financial risk is a dependent variable, and the company size variable is a control variable in the research. The valuation risk variable has a positive and direct effect on the financial risk variable according to the significance level (0.007) in the table below. Considering that there is a significant effect between valuation risk and financial risk, the fifth hypothesis of the research is confirmed.

Table 7. Research model test.

$Tr_{i,t} = \alpha + \beta_1 Lr_{i,t} + \beta_2 Fr_{i,t} + \beta_3 Ar_{i,t} + \beta_4 Pr_{i,t} + \beta_5 Vr_{i,t} + Size + \varepsilon$				
Variable	Symbol	Coefficient	t statistic	The significance level
Liquidity risk	Lr	0.39	58.2	02.0
Investment risk	Fr	17.0	14.3	000.0
Activity risk	Ar	11.0	69.2-	018.0
Leverage risk	Pr	163.0	11.3	000.0
Valuation risk	Vr	15.0	87.2	007.0
Size of the company	$Size$	196.0	18.3	000.0
Width from the origin	${}_0\beta$	15.0-	14.1-	163.0
The adjusted coefficient of determination		34.0	Statistics f	54.81
			The significance level	000.0

Discussion and Conclusions

With the expansion of financial markets and the increase of their role in the real economy, not only monetary and financial markets, but also the real economic sector, have been connected to each other. The yield in some markets is strongly influenced by the financial market and some industries do not react to changes in the financial markets. These differences can be due to various factors. Identifying these factors can inform managers in the financial markets about the factors that cause fluctuations and financial crises. According to the research results, it was determined that leverage risk has an effect on financial risk. A higher level of financial leverage leads to a higher level of financial risk because the difference between the coefficient of variation of EPS and EBIT is large. Therefore, firms should be willing to earn additional EBIT to compensate for the additional risk involved in financial decisions.

Therefore, a higher level of financial leverage facilitates shareholders to obtain a higher return on equity with a higher risk of loss. Conversely, total assets are negatively related to financial risk, which is consistent with Yun and Jang's findings in the United States. More importantly, financial risk increases when the size of the company is smaller. Therefore, a small company with higher financial leverage has a higher financial risk. Hence, this small company can reduce financial risk by lowering the level of financial leverage. Finally, financial leverage can be considered as a determinant of financial risk. Onsongo et al. (2022) also point out in their research that in order for

companies to generate more income, they should manage their financial risks according to the ratios. Operational risk as represented by the cost-to-income ratio indicates that a higher cost-to-income ratio indicates that companies are not efficient at controlling costs. Therefore, they needed to implement cost reduction plans to manage costs. An increase in the cost-to-income ratio is an immediate indicator for companies of emerging cash flow problems. They concluded that liquidity approximated by the current ratio has negatively affected the performance of commercial and service companies listed on the Kenya Stock Exchange. The negative coefficients of liquidity risk showed that these companies were facing high liquidity problems and that their current liabilities were more than their current assets. Therefore, they came to the conclusion that these companies were not able to pay all their obligations when due. This negatively affects the performance of the company. Based on their results, credit risk, liquidity, and operational risk have a significant impact on financial risk and companies should pay attention to them.

Song et al. (2021), in research that examined financial risk indicators, pointed out that network connectivity in financial markets plays an important role in determining the quantity of systemic risk. In their research, they analyzed financial returns in three regional stock markets: The United States, Europe, and Asia, along with their representative risk indices: The United States VIX, Europe V2TX, and Asia VHSI in order to gain a better understanding of finding out how the connection of financial networks affects the global market. They created networks of stocks over time in which network links were determined by the statistical results of experiments to determine whether one stock's return was due to the effect of another stock. Also, to describe the network characteristics of financial networks and market connection characteristics over time, network statistics were calculated. Such as the degree of each network, proximity, and clustering coefficient. Finally, using network statistics and risk indicators, intra-regional and extra-regional Granger causality tests were performed to better interpret such communication effects on stock markets. In particular, they focus on three sub-periods in the last decade, when three separate financial events caused panic in stock markets. Their results showed that the internal network statistics of the US and Asian markets were the Granger cause of the changes in the risk index related to their region. They also showed that the network statistics of each region were the Granger cause of changes in the risk index of that region.

Using more than 1,300 stocks from US, Asian, and European financial markets, they provide strong evidence that dynamic network statistics associated with financial markets can be the main driver of common financial risks indices such as VIX, V2TX, and VHSI. However, each indicator alone cannot measure a company's overall financial risk or level of financial disorder. In this study, we measured the financial strength of real sector companies listed on Bursa Istanbul (BIST) by generating a composite index that combines several different corporate financial ratios. First, he conducted a multiple discriminant analysis of the variables used in Altman's Z-score (1968) (Almamy et al., 2016), which is the most common composite index used to measure the financial risk of companies in the scientific literature. Then, it introduced a new index called the Multivariate Company Assessment (MFA) score, which uses ratios that best describe the characteristics of the listed companies. The appropriate version of Altman's z-score and our new index has a predictive power of about 90%. In addition, the MFA score reflects the impact of macroeconomic developments on companies' balance sheets and thus serves as an early warning of financial problems for Turkish companies (Himounet, 2022).

Alexander et al. (2020) also concluded in their research on financial risk and policymaking in high-volume financial markets that understanding uncertainty is critical for financial risk analysis because it affects not only the financial markets but also the economy as a whole. They analyzed the impact of uncertainty on stock markets around the world and focused on two averages of

uncertainty. Alexander et al. (2020) studied twelve stock markets in the United States, Canada, the Eurozone (zone), Germany, France, the United Kingdom, the Netherlands, Japan, Hong Kong, India, South Korea, and Australia for the period from January 2000 to March 2019. In addition to analyzing each stock market individually, they evaluated these stock markets together using panel regressions adjusted for heterogeneity, autocorrelation, and cross-sectional dependence and conducted their analysis for three distinct sub-periods: pre-crisis period January 2000 - June 2007, crisis period July 2007 - June 2009 and post-crisis period July 2009 - March 2019. Their research results show clear evidence of a simultaneous negative relationship between implied volatility and excess market returns in all research models. It was also found that high levels of EPU effectively predict high stock market returns and the trading strategy based on EPU is better than the trading strategy based on implied volatility. Elliott et al. (2021), in line with the financial risk assessment of banks, point out that banks will have more financial connections when they face more similar risks. They presented a model of limited liability, real investment, and financial networks and characterized efficient social networks. In these networks, which minimize systemic risk, banks are less exposed to their counterparties. In the absence of limited liability, banks have no incentive to deviate from the socially efficient network. However, limited liability leads banks to deviate from social efficiency and engage in systemic risk shifting. Banks increase their equity value by exposure to their close financial counterparties. Then, banks fail at the same time as their counterparties, increasing their expected equity value but also increasing systemic risk. Their model only predicts a correlation between banks' "actual and financial exposures" and does not differentiate whether banks adjust their actual financial disclosures in light of financial risk exposure or in response to current legal requirements. In fact, we considered both options. If we modify the model so that banks can only engage in unilateral deviations to change the correlation of their actual exposure to their counterparties, the social efficiency outcome will be stable when banks value them to maximize.

In general, it can be concluded that financial risk is influenced by many other risks, such as liquidity risk, investment risk, activity risk, leverage risk, and valuation risk, and the managers of the companies accepted on the Tehran Stock Exchange can prevent the unfavorable results of financial risk and control the factors affecting financial risk and thus improve their financial performance by using the results of this research.

For future research studies, further considerations can be made on how financial risk affects other non-financial performance measures when evaluating the effectiveness of a firm's performance, management, and operations.

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