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Sales growth and risk taking of companies: Evidence from Tehran Stock Exchange

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Abstract
This study's main objective is to examine the impact of industry sales growth on the risk taking of companies listed on Tehran Stock Exchange (TSE). This research is classified as an applied research in terms of objective and a correlational study in terms of methodology and nature, using regression analysis to obtain model coefficients. The statistical population includes all companies listed on Tehran Stock Exchange, and the statistical sample consists of 127 companies selected by systematic elimination method listed over the years 2018 to 2022. The hypotheses were tested by the Estimated Generalized Least Squares (EGLS) method with a random effects pattern. According to the results, industry sales growth has a significant negative effect on the risk taking of the companies listed on Tehran Stock Exchange.
Keywords: Sales growth, Risk taking, Return on assets, Tehran Stock Exchange.

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1. Introduction

Playing a crucial role in maintaining the competitive advantage of companies, risk taking guides them towards greater economic growth. In a competitive situation, companies pursue various strategies to enhance their market share so as to create barriers to entry for others. Each strategy necessitates accepting a different level of risk, having a distinct impact on the company's specific risk. Studies carried out on financial literature also indicate that stock returns of companies are under the influence of their specific risks. Risk refers to an integral part of all business activities, and effective risk management not only helps companies prevent financial problems and carry out capital budgeting but also improves the decision-making process. In fact, one of the manager's primary responsibilities is dealing with specific risk (Malekian et al., 2016). Based on the previous studies, entrepreneurs' willingness to risk taking in pursuit of profitable opportunities is considered a fundamental element in the long-term economic growth of countries. In this regard, a bunch of previous studies have demonstrated that risk taking (choosing projects with high uncertainty regarding their expected future capital expenditures), averagely enhance the company's value (Golmohammadi et al., 2021). Choosing risk is one of the key decisions related to corporate investment policies. To maximize company value and shareholder wealth, companies have to participate in capital investment projects with a positive expected net present value. Risk taking plays a significant role in enhancing corporate innovation enthusiasm and expediting capital accumulation (John et al., 2008). Sustainable economic growth depends on companies' inclination to take risks in pursuing profitable investment opportunities (Hilary & Hui, 2009).

Corporate risk taking is affected by various factors, the first of which is individual managerial characteristics like gender (Faccio et al., 2016), religion (Jiang et al., 2015), and excessive trust (Adam et al., 2015), as well as personal risk-taking preferences of managers and exposure to life-threatening events in early life (Bernile et al., 2017). The second factor is the impact of corporate-level characteristics. Managers may opt for risk aversion to pursue their private interests, while suitable governance mechanisms may strengthen managerial risk taking. Based on the studies, various corporate governance factors – like corporate governance reforms, ownership diversity among large shareholders, government and foreign ownership, CEO ownership, ownership structure, creditor rights, and board characteristics, are related to corporate risk taking (Dong et al., 2014; Koirala et al., 2020).

In order to understand how companies, decline their risk taking in response to high industry growth rates, their long-term investments, current operations, and financial choices should be checked. High industry growth rates significantly decline long-term capital expenditures as well as R&D investments, reduce cash asset turnover, and extend the operating cycle, besides leading companies to hold more cash. Hence, the question that this research is aimed at answering is whether industry sales growth affects the risk taking of companies listed on Tehran Stock Exchange or not.

2. Theoretical Foundations and Research Background

Risk has been referred to as an unforeseen and involuntary event in the future. Thus, risk management is aimed at identifying the nature of these events and the probability of their occurrence, besides the way to control them (Ghatrehnabi, 2007). Economic literature fundamentally defines risk as variability, with an emphasis that greater variability in the economy also encompasses greater risk. March and Shapira (1987) studied managers' perspectives on risk, stating that what managers consider as risk is not the variability of outcomes but rather danger. In other words, how much loss we face if things go wrong?

According to the structure-behavior-performance paradigm, industry structure determines the competitive prospects in an industry, which, in turn influencing a company's behavior and strategic choices, and ultimately determining its performance. During periods of relatively high or low growth, the profit opportunities of companies and their survival threats are determined by internal industry structure, relative prices, and differences in task division within the industry chain. Industry growth, the number of companies, scale, and market forces in an industry interact with each other, resulting in changes in companies' industry structure, strategic choices, and performance. Corporate risk taking refers to a crucial orientation for investment decision-making clearly influenced by industry growth. The prospect theory and behavioral theory extend individual decision-making about corporate behaviors. Corporate risk management policies result from the comparison of companies' expectations or different objectives, which can be significant from this perspective (Kong et al., 2022).

Studies also reveal that companies in rapidly growing industries supported by industrial policies may find it easier to receive central transfer payments, in turn contributing to local economic vitality (Stiglitz, 2017). Companies operating in industries supported by industrial policies may become "favorites" of local governments providing financial support such as subsidies and loans. Hence, these companies are particularly resource-rich. Companies operating in rapidly growing industries are more likely to avoid risks and benefit from industrial equity profits instead.

Kong et al. (2022) examined the role and unique mechanisms of industry growth in the companies' risk-taking policies, finding out that industry growth is negatively correlated with companies' risk-taking, just in line with the prospect theory, which suggests that high industry growth provides companies with an external competitive advantage, leading them to avoid companies' risk-taking. This correlation is stronger for market leaders, industries incentivized by industrial policies, and those industries receiving more government support. Generally, their results indicated the negative impact of industry growth on companies' risk-taking.

Lopez and Merono (2011) analyzed the effect of sales growth on company performance besides the mediating role of risk-taking and technological innovation. Totally 310 small and medium-sized Spanish companies were studied using partial least squares structural equation modeling. According to the findings, company performance is influenced by professionalization, risk-taking, and technological innovation; not only direct and positive effects, but also important indirect ones strengthening the positive effects of professionalization on company performance.

Mohammadi et al. (2016) examined the effect of sales growth on corporate social responsibility investment in companies listed on Tehran Stock Exchange. The geographical scope of this research includes companies listed on Tehran Stock Exchange, and the temporal scope covers the period of 2006-015. Based on systematic sampling, 130 companies were chosen as the sample. As the results indicated, sales growth significantly affects corporate social responsibility investment in companies listed on Tehran Stock Exchange.

3. Hypothesis

H1. There is a significant negative relationship between industry sales growth and companies' risk-taking.

4. Methodology

This is an applied research in terms of nature and a descriptive-correlational study in terms of data collection method, aiming at determining the existence, extent, and type of relationship between the variables under investigation. The research's statistical population includes all

active companies listed on Tehran Stock Exchange over the five-year period of 2018 - 2022. Based on the following criteria, the research sample was determined equal to 127 companies:
Companies with available data for the research period;
Companies with fiscal year ending at the end of each year without any change in their fiscal year in the studied period;
Companies not in intermediary financial industries such as leasing and banking; and
Companies not having a suspension of stock trading for more than three months in the studied period.
It is worth noting that the selected companies come from four automotive, cement, basic metals, and pharmaceuticals industries.
The required data for testing the research variables were extracted from the Codal website and companies' financial statements. Additionally, Eviews software was employed for data analysis.

4.1. Research Variables and Model

The following regression model was used in order to test the research hypothesis:

$$RISK_{it} = \beta_0 + \beta_1 Ind\_Growth_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 Lev_{it} + \beta_5 Age_{it} + \varepsilon_{it}$$

Where:

Dependent Variable

Risk-Taking ($RISK_{it}$)
Companies' risk-taking is calculated as follows, according to the studies by John et al. (2008) and Faccio et al. (2011):

$$Risk = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}(adj\_ROA - \frac{1}{T}\sum adj\_ROA)^2}\ ,\ T = 5,$$

$$adj\_ROA = \frac{EBITi,t}{ASSETSi,t} - \frac{1}{Nd,t}\sum_{k=1}^{Nd,t}\frac{EBITk,d,t}{ASSETSk,d,t}$$

In fact, risk-taking is measured as the standard deviation (SD) of pre-tax and interest profit divided by ROA over 5 years.

Independent Variable

Industry Growth
Industry growth will be calculated based on the average growth rate of sales in each industry.

Control Variables

Return on Assets (ROA): The return on assets is equal to the result of dividing net profit by the total assets.
Company Size (SIZE): It is calculated by the natural logarithm of the market value of shareholders' equity.
Financial Leverage (Lev): It is equal to the sum of debts divided by the sum of assets.
Company Age (Age): Measured by the logarithm of the company's age.

5. Result

5.1. Descriptive Statistics

Table 1. Descriptive Statistics Results of Variables

Variable	Mean	Median	Max	Min
RISK	0.037	0.010	1.993	-0.550
Ind_Growth	0.596	0.585	0.743	0.548
ROA	0.116	0.093	0.603	-0.370
SIZE	14.291	14.105	19.940	11.022
LEV	0.559	0.574	1.279	0.037
AGE	6.006	5.996	12.970	2.197

Mean is the main central indicator, representing the balance point and the center of gravity of data distribution besides being a suitable indicator for showing the data centrality. For instance, the mean of the risk-taking variable (RISK) is calculated 0.037, indicating that most of the data is concentrated around this point. Median is another central indicator. As observed, the median of this variable is equal to 0.010, indicating that half of the data is less than 0.010 and the other half is greater than this value. Similarly, this variable's maximum and minimum values are 1.993 and -0.550, respectively.

5.2. Stationarity Test

Table 2. Results of Stationarity Test

Variable	Test statistic value	Prob.
RISK	14.928	0.001
Ind_Growth	9.616	0.001
ROA	18.403	0.001
SIZE	18.997	0.001
LEV	18.849	0.001
AGE	26.661	0.001

Based on Table 2, since the significance level of the test for all variables is less than 0.05, the null hypothesis regarding the presence of a unit root is rejected for all research variables. Consequently, the confidence level of 95% will be confirmed for all variables.

5.3. F-Limer and Hausman Tests

Since the employed data is a combination of year - company data and combined data is analyzed in both panel and pooled forms, the F-Limer test is used to choose between panel and pooled methods for estimating the model.

Table 3. Results of F-Limer Test for the Research Model

Model	Chi-Square Statistic	d.f	Prob.
First	1.975	126	0.001

Given the Table 3, since that the significance level of the F-Limer test is less than 0.05, the panel method is preferred over the pooled method. However, it should be determined whether the fixed effects model or the random effects model is more appropriate for the data. To do this, the Hausman test is employed.

Table 4. Results of the Hausman Test for the Research Model

Model	Chi-Square Statistic	d.f	Prob.
First	3.766	5	0.583

Based on the Table above, since the significance level of the Hausman test for the model is greater than 0.05, using random effects model is more advantageous than the fixed effects model.

5.4. Heteroscedasticity Test of Residual Variances

The homoscedasticity assumption is another one of the important assumptions of the regression model. If this assumption is not met, the least squares (LS) estimates do not have the efficiency property (minimum variance). The likelihood ratio (LR) test has been used to test this assumption.

Table 5. Results of the Heteroscedasticity Test

Model	Chi-Square Statistic	d.f	Prob.
First	554.61	126	0.001

According to the results of the LR test, since the significance level of testing the model is less than 0.05, the assumption of homoscedasticity is rejected at the 0.05 significance level for all research models. Thus, there is a problem of heteroscedasticity of residual variances in the research model, and consequently, the EGLS method is employed for estimation in the research model.

5.5. Testing the Research Hypothesis

As mentioned, given the heteroscedasticity of the model's residual variances, the EGLS method will be used for estimation, and considering the F-Limer and Hausman tests, the random effects model will be employed. Table 6 presents the results of the research model fitting.

Table 6. Results of Research Hypothesis Test

Variables	Coefficient	Standard Error	T Statistic	Prob.
C	0.304	0.436	0.698	0.485
Ind-Growth	-0.055	0.026	-2.101	0.036
ROA	1.302	0.109	11.991	0.001
SIZE	0.063	0.021	3.029	0.003
LEV	0.033	0.087	0.378	0.706
AGE	-0.449	0.144	-3.115	0.002
Durbin-Watson Statistic			2.123	
Adjusted R-squared			0.385	
F-Statistic			4.028	
Prob (F-Statistic)			0.001	

Considering Table 6, the entire research model is significant due to the significance level of the F statistic (0.001) which is less than 0.05. The coefficient of determination value indicates that 38% of the variation in the risk-taking variable is explained by the independent and control variables. Moreover, based on the Table, since the significance level of the coefficient of the independent variable (Ind-growth) is 0.036 (less than the significance level of 0.05), this variable in regre3ssion model has a significant relationship with the dependent variable, risk-

taking. Furthermore, since this variable has a negative coefficient, industry sales growth has a significant negative effect on risk-taking. Therefore, the first hypothesis of the research is confirmed.

6. Conclusion

The results are of paramount importance in the process of any research, and the research conclusions may provide a basis for addressing the existing problems and offering strategies to solve the issue for which the research has been designed. This study was carried out to investigate the impact of industry sales growth on the risk-taking of companies listed on Tehran Stock Exchange. To investigate this issue, the question was posed: Does the industry sales growth affect the risk-taking of companies listed on Tehran Stock Exchange? To answer the research question, 127 companies were selected from all the companies listed on Tehran Stock Exchange during the financial period of 2018-2022. The research hypothesis was tested through using a multiple regression model. According to the Table, since the significance level of the coefficient of industry sales growth is less than 0.05 and negative, industry sales growth factor has a significant negative effect on risk-taking. The first hypothesis of the research is thus confirmed.

This hypothesis' findings are in line with the results of Mohammadi et al. (2016), Garcia et al. (2021), and Kong et al. (2022). Moreover, it should be mentioned that the financial market and industries atmosphere significantly affects the risk-taking of companies in that industry, as well as that industry's growth. Thus, in the event of conducting the research in other markets or industries, the research results may vary. The collection of 2022 data for some variables can be mentioned as one of the research limitations, since some companies' financial statements for 2022 had not yet been published at the time of conducting the research and the researcher had to wait for their publication.

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