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Economic Linkage and the Contagion Effect of Earnings Quality on Market Risk

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A B S T R A C T

Objective: This study investigates the economic linkage and contagion effect of earnings quality on market risk at the Tehran Stock Exchange over the years 2010 to 2019, focusing on a screened statistical population consisting of 650 (year-company) data points. Given the concept of information transfer and previous studies related to earnings quality, it is hypothesized that higher earnings quality among industry peers (comprising a subset of closely related companies based on industry classification at the stock exchange) reduces a company's systematic risk.

Methodology: This research employs three different metrics for measuring earnings quality and uses multivariate regression for hypothesis testing and model estimation.

Findings: The results indicate that the estimated coefficients for earnings quality of the company (-0.011825) and related companies (-0.025110) are inversely related.

Conclusion: The results suggest that higher earnings quality among economically linked companies leads to a reduction in a company's systematic risk.

Keywords: *economically related companies (industry peers); contagion effect; earnings quality; market risk.*

1 Introduction

Previous research (Lambert et al., 2007) has shown that investors are influenced by the quality (accuracy) of valuable information in assessing market risk. Earlier studies focused on the impact of a company's information quality on its market systematic risk. The definition provided by Lambert and colleagues (2007) of company value-related information is not limited to information found in the financial reports of the company itself but also includes information from other companies (Lambert et al., 2007). As the informational quality of economically related companies increases, investors receive more reliable messages about future cash flows (Pandit et al., 2011).

According to Lambert et al. (2007), these more accurate messages ultimately lead to a company's value being less sensitive to market-level news (Lambert et al., 2007). Thus, theoretically, it is expected that higher informational quality of related companies would reduce a company's systematic risk. High information accuracy, therefore, impacts capital costs through systematic risk. However, previous studies (Cohen & Frazzini, 2008) show scenarios where investors pay little attention to the information of related companies and make limited use of it. Due to this attention constraint, shareholders may not be able to efficiently analyze information from related companies and adjust stock prices accordingly. Therefore, whether the cost of capital and market risk of the company reflect the effects of other related companies' earnings quality remains an unanswered question.

Some capital market research, in addition to examining companies' responses to their information, also investigates the responsiveness of returns to information released by other companies. Information transfer occurs when an informational event of one company impacts the stock prices of other companies. For example, information from a company in a specific industry can either improve (worsen) conditions in that industry or increase (decrease) that company's market share relative to competitors. Findings from some studies show that when one of the industry companies announces earnings, the prices of other companies that have not yet announced earnings show a significant reaction to the change in the earnings of the announcing company. Moreover, it can be said that the last company to announce its earnings for a specific period experiences the least reaction in price because it is expected that earnings announced by other industry companies would have already conveyed specific industry information to the market (Izadinia & Hajiannejad, 2014; Rasoulkhani & Bozorg Asl, 2020).

The theoretical foundations related to "information transfer" indicate that companies' economic information significantly affects investors' valuation of the company. Information transfer occurs when an informational event for one company affects the stock prices of other companies (Baginski, 1987; Bowen et al., 1983; Firth, 1996; Foster, 1981; Laux et al., 1998; Olsen & Dietrich, 1985). For instance, studies (Foster, 1981; Pandit et al., 2011) show that a company's earnings announcement significantly impacts the stock prices of other industry peers and non-announcing suppliers, consistent with the occurrence of information transfer. Similarly, several studies (Beatty et al., 2013; Durnev & Mangen, 2009; Gleason et al., 2008) examine the contagion effects of industry peers' income revisions. These studies are also consistent with the idea that information from related companies is useful in evaluating company value. The mentioned studies generally examine the stock price reactions of non-reporting companies to the information of reporting companies. Additionally, previous studies (Ayers & Freeman, 1997; Elgers et al., 2008; Hui et al., 2016) show that the earnings of each company and related companies significantly predict future company earnings and stock returns. All findings are consistent with using information from related companies for evaluating company value for investors. Several recent studies examine whether information quality affects a company's systematic risk. Ng (2011) suggests using a time-series regression of company excess returns from risk factors that higher information quality reduces market systematic risk and liquidity risk (Ng, 2011). Bhattacharya et al. (2012) use path analysis to examine the effects of information quality on the implicit cost of equity and found that high-quality information reduces equity costs through a pathway mediated by market systematic risk (Bhattacharya et al., 2012). The findings in Ng (2011) and Bhattacharya et al. (2012) are robust relative to several alternative information quality metrics, including the quality of accruals, non-routine accruals, and earnings accuracy (Bhattacharya et al., 2012; Ng, 2011). Specifically, using a matched sample, Ogneva et al. (2007) suggest that companies with internal control weaknesses reporting for the first time under Section 404 are not positively associated with alternative measures of implicit equity value (Ogneva et al., 2007). In summary, most empirical evidence generally aligns with a negative association between a company's information quality and its systematic risk.

Theories in financial economics examine the external effects of financial information quality as a justification for financial reporting regulations. If the external effects are positive (for example, if the company's risk and the cost of equity can be reduced with the earnings quality of related companies), companies are willing to receive high-quality financial reports from other companies but not provide high-quality information for evaluating investors of other companies. Theories suggest that the deficiencies resulting from positive external effects can be reduced by: a) drafting appropriate regulations that mandate a minimum quality of financial reporting. b) Providing subsidies to reduce the cost of high-quality financial reporting. However, if the external effects are negative (for example, if the company's risk and

IJIMOB
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the cost of equity can be increased with the earnings quality of related companies), companies will compete with each other in increasing the quality of financial reporting and will bring their financial reporting quality to the highest socially desirable level. c) High-quality accounting standards not only increase the information quality of the company but also that of related companies (Ma, 2017).

In the context of securities, Lambert et al. (2007) predict that higher accuracy of publicly available value-related signals leads to lower market systematic risk (Lambert et al., 2007). As discussed above, previous studies (Foster, 1981) show that the financial information of other public companies is useful for assessing company value and predicted cash flows for investors. Therefore, with the improvement in the quality (or accuracy) of companies' financial information, it is expected that the market risk for the company's investors will also decrease. To this end and in summary, the hypothesis for testing has been proposed:

Higher earnings quality of companies that have an economic linkage leads to a reduction in each company's systematic risk.

This research is innovative in that it seeks to answer the question of whether the earnings of each company also affect the market risk of economically related companies. According to previous research findings, the earnings quality of each company affects that company's market risk. In other words, does earnings quality have a contagious feature or not?

To answer this question, innovative composite metrics are used to measure the research hypothesis. These metrics and indices aim to assess the contagion effect of financial information quality (specifically earnings quality) of economically related companies and will add a new perspective to the body of accounting knowledge about the impactful dimensions of companies' earnings quality. Another innovative aspect of this research is the study of external (lateral) effects of high-quality financial reporting. Based on theories of accounting and financial economics, external effects can be used as a justifying factor and influence in the regulation and setting of accounting standards. Answering the question of whether the earnings quality of companies has a contagious feature can help standard-setters and researchers better understand the external effects of earnings quality and its impact on setting laws and standards.

The findings from this research can definitely interest and attract the attention of a wide range of groups, including various accounting standard-setting bodies, other legislative bodies like securities exchanges and their regulatory agencies, company managers, and other users of financial statements and accounting information, and generally stakeholders of business entities and citizens of civil society. In this research, earnings quality is considered using various metrics related to the industry of interest.

2 Methods and Materials

This study is situated within the quantitative research domain and is framed within the positivist paradigm. In this paradigm, research aims to scientifically explain phenomena with the ultimate goal of developing general laws through discovering the necessary conditions for each phenomenon. Additionally, the current study adopts an exploratory approach and uses statistical analysis methods to uncover relationships and the effects of variables on each other. In this approach, the researcher aims to formulate more precise questions that subsequent research can address. The statistical population examined in this study comprises companies listed on the Tehran Stock Exchange during the period from 2010 to 2019, selected through systematic elimination. Initially, all companies listed on the Tehran Stock Exchange were selected, and ultimately, 65 companies were chosen for examination.

Due to the calculation of the standard deviation of total sales divided by the average total assets over the past five years, we faced a limited number of sample companies, which ultimately led to the selection of 65 companies for the study period.

To test this hypothesis, the research model from Ma (2017) is employed, which defines and measures variables as follows (Ma, 2017):

$RetRfit = \alpha 0 + \beta 1\ MktRf\ it + \beta 2\ EQit + \beta 3\ MktRf\ it*EQit + \beta 4\ Control\ Variablesit$

$RetRfit = \alpha 0 + \beta 1\ MktRfit + \beta 2\ Related\ Firm\ EQit + \beta 3\ MktRf\ it*Related\ Firm\ EQit + \beta 4\ Control\ Variablesit$

$RetRfit = \alpha 0 + \beta 1\ MktRfit + \beta 2\ EQit + \beta 3\ MktRf\ itEQit + \beta 4\ Related\ Firm\ EQit + \beta 5\ MktRfitRelated\ Firm\ EQit + \beta 6\ Control\ Variablesit$

Market Risk (RetRf): The average annual return of the company minus the risk-free rate.

Market Risk Factor (MktRf): The average annual return of the company.

Earnings Quality (EQ): Earnings quality is defined using three different metrics as follows:

Based on the modified Jones model (Dechow et al., 1995):

IJIMOB
E-ISSN: 3041-8992

TACCit/TAit =α0 (1/TAit)+β1 ((ΔREVit - ΔRECit)/TAit))+β2(PPEit/TAit) +εit

Based on the model by Kothari et al. (2006) (Kothari et al., 2006):

TAit/Ait-1 =α0 (1/Ait-1)+β1 ((ΔREVit -ΔRECit)/Ait-1))+β2(PPEit/Ait-1)+β3 ROAit+εit

Based on the model by Roychowdhury (2006) (Roychowdhury, 2006):

CFOit/Ait-1 = α0 +α1 (1/Ait-1)+β1 (Saleit/Ait-1) +β2(ΔSaleit /Ait-1) + εit

In these equations:

TACCit: Total accruals of company i in year t.

TAit: Total assets of the sample company during the period under review.

Ait-1: Assets of the sample company at the beginning of the period.

ΔREVit: Change in sales revenue of the sample company during the period under review.

ΔRECit: Change in receivables of the sample company during the period under review.

PPEit: Gross amount of property, plant, and equipment of the sample company during the period under review.

ROAit: Return on assets of the sample company during the period under review.

CFOit: Operating cash flow of the sample company during the period under review.

Saleit: Sales revenue of the sample company during the period under review.

ΔSaleit: Change in sales revenue of the sample company during the period under review.

Ait-1: Total assets of the sample company at the beginning of the period.

Earnings Quality of Related Firms (Related Firm EQ): Refers to the weighted average earnings quality of economically related firms during the fiscal year, estimated annually per industry using the above-mentioned earnings quality metrics. Economically related firms are defined as industry peers, comprising a subset of closely related companies based on the industry classification of the securities exchange, such as automotive and parts manufacturing, sugar production, chemical products, pharmaceuticals, etc.

Control variables in the study are as follows:

Current Ratio: Current assets divided by current liabilities.

Sales Variability: Standard deviation of total sales divided by the average total assets over the past five years.

Company Size: Natural logarithm of the company's market value.

Tobin's Q: Market value of equity plus book value of liabilities divided by the total book value of assets.

Financial Leverage: Total liabilities divided by total assets.

3 Findings and Results

Given that economic variables may have non-stationary time series, it is necessary to verify their stationarity before using them in models to ensure the variables are either stationary or non-stationary. To evaluate the reliability of the variables and ensure the absence of a spurious root, the Levin, Lin, and Chu unit root test was used.

For exploratory factor analysis, the principal component analysis method and Varimax rotation were used, identifying 5 dimensions as the model's dimensions along with their subcomponents. These 5 dimensions explain 90.33% of the total variance. The selection criteria for subcomponents, as indicators for factors, were having an eigenvalue greater than one and also a factor loading of 0.70 or higher, provided it appeared less in other factors, ultimately selecting 37 subcomponents. Each of these indicators, related factors, and their factor loadings are displayed in Table 1.

Table 1

Stationarity Test Results for Research Variables

Variable	Levin, Lin, & Chu Statistic	Significance Level
Market Risk	-24.61	0.000
Market Risk Factor	-25.00	0.000
Earnings Quality	-39.93	0.000
Earnings Quality of Related Firms	-14.08	0.000
Current Ratio	-13.38	0.000
Financial Leverage	-9.14	0.000
Tobin's Q	-9.67	0.000
Company Size	-19.38	0.000

IJIMOB
E-ISSN: 3041-8992

Sales Variability	-9.62	0.000

The results from Table 1 show that the significance level for all variables using the Levin, Lin, and Chu method is less than 0.05, thus the null hypothesis of having a unit root is rejected. Accordingly, the variables at the level examined are stationary.

The next phase of statistical analysis and data analysis involves calculating descriptive indices. Thus, for entering the data analysis phase, descriptive statistics of the data, including central indices, dispersion, and deviation from symmetry, were calculated, along with the Jarque-Bera test, which examines the normal distribution of residuals. The results are presented in Table 2.

Table 2

Descriptive Statistics for Research Variables

Variable	Mean	Median	Maximum	Minimum	Skewness	Jarque-Bera	Significance Level
Market Risk	3.265804	2.438147	27.43575	-6.99115	1.188993	336.2418	0.000000
Market Risk Factor	3.477704	2.641239	27.61575	-6.79115	1.183471	332.8783	0.000000
Earnings Quality (First Measure)	0.140000	0.077126	1.694298	-2.88718	0.059020	2109.209	0.000000
Earnings Quality (Second Measure)	-0.06769	-0.09629	1.831528	-1.00133	1.094229	551.4512	0.000000
Earnings Quality (Third Measure)	-0.14923	-0.07189	1.884863	-1.63891	-0.31773	468.1012	0.000000
Earnings Quality	-0.02564	-0.03723	0.573163	-0.46876	1.067070	378.3241	0.000000
Earnings Quality of Related Firms	-0.00556	-0.03332	1.842678	-0.23409	5.804341	83249.30	0.000000
Current Ratio	1.542257	1.285753	9.956380	0.316585	3.366053	8178.694	0.000000
Financial Leverage	0.558372	0.606720	0.899737	0.003354	-0.72965	59.27988	0.000000
Tobin's Q	13.83379	13.80841	17.63475	9.463131	0.223584	45.03839	0.000000
Company Size	28.11719	27.96830	33.84537	24.13719	0.413250	18.55242	0.000094
Sales Variability	8.784157	3.854225	82.76142	0.012911	2.770700	3042.919	0.000000

Table 2 shows the descriptive statistics of the research data; for example, the average market risk is 3.265, indicating that most data related to this variable are concentrated around this point. The median of the market risk variable is 2.438, indicating that half of the data are less than this amount and the other half are more. The skewness of the frequency curve of the said variable is 1.188, meaning the variable has a right skewness deviating from the center of symmetry. The results from the Jarque-Bera test, based on the normality of the research variables, show that since the significance level of all variables is less than 0.05, the null hypothesis based on the normality of the variables is rejected, meaning the data distribution is not normal. In this research, regarding the normality of model variables, the central limit theorem is used, and accordingly, at least one sample size of 30 is necessary to claim that the statistic is normally distributed. Therefore, given that the sample size in the current study includes 65 companies for 10 years, the research variables will approximately have a normal distribution. The test results and assumptions of the regression models are presented in Table 3.

Table 3

Model Selection Test Results for Testing Research Hypotheses

Research Models	Test	Statistic	Value	Significance	Test Result
Model 1	Breusch-Pagan	F-Limer	2.967	0.000	Panel data
	Hausman	Chi-square	189.89	0.000	Fixed effects
	Breusch-Godfrey	F	2.267	0.065	No autocorrelation
	ARCH	F	12.31	0.000	Heteroscedasticity
Model 2	Breusch-Pagan	F-Limer	2.957	0.000	Panel data
	Hausman	Chi-square	189.26	0.000	Fixed effects
	Breusch-Godfrey	F	2.341	0.064	No autocorrelation
	ARCH	F	12.26	0.000	Heteroscedasticity
Model 3	Breusch-Pagan	F-Limer	2.961	0.000	Panel data
	Hausman	Chi-square	189.52	0.000	Fixed effects

IJIMOB
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	Breusch-Godfrey	F	2.163	0.066	No autocorrelation
	ARCH	F	12.25	0.000	Heteroscedasticity

According to Table 3, based on the F-statistic of the Breusch-Pagan test and the significance of its statistic, which is less than the 5% error level, the models should be tested using the panel method. According to the Chi-square statistic of the Hausman test and the significance of its statistic, which is less than the 5% error level, the models should be tested using the fixed effects method. Also, according to the F-statistic of the ARCH test and the significance of its statistic, which is less than the 5% error level, there is heteroscedasticity of error variances, and the generalized least squares method is used to test the models. Since the significance level of the Breusch-Godfrey test is higher than the 5% error level, there is no problem of autocorrelation between the errors.

The objective of the research in the models is to examine the economic relationship and the contagion effect of earnings quality on market risk in companies listed on the Tehran Stock Exchange. After defining the model and selecting the best method, the estimation results for the selected companies are presented as follows:

Table 4

Model Results (Dependent Variable: Market Risk)

Variable	Coefficients		t-Statistic	Significance
Model 1				
Constant	-0.870313		-20.99534	0.0000
Market Risk Factor	0.999504		3468.855	0.0000
Earnings Quality	-0.017216		-4.103933	0.0000
Earnings Quality * Market Risk	-0.016697		-12.75416	0.0000
Model 2				
Constant	-0.866520		-20.87714	0.0000
Market Risk Factor	0.999479		3471.351	0.0000
Related Firm Earnings Quality	-0.014006		-5.115412	0.0000
Related EQ * Market Risk	0.012216		4.753307	0.0000
Model 3				
Constant	-0.871459		-20.84489	0.0000
Market Risk Factor	0.999519		3449.999	0.0000
Earnings Quality	-0.011825		-6.155648	0.0000
EQ * Market Risk	0.014140		7.145022	0.0000
Related Firm Earnings Quality	-0.025110		-2.451430	0.0081
Related EQ * Market Risk	-0.011778		-8.902494	0.0000
Model	R-squared	Adjusted R-squared	Durbin-Watson	F(p-value)
First	0.499	0.419	2.197	18.809 (0.000)
Second	0.517	0.465	2.196	18.763 (0.000)
Third	0.556	0.492	2.097	7.566(0.000)

Table 5

Control Variables Analysis Across Regression Models

Control Variables	Model 1 t-Statistic	Model 1 Significance	Model 2 t-Statistic	Model 2 Significance	Model 3 t-Statistic	Model 3 Significance
Current Ratio	0.377	0.705	0.312	0.755	0.323	0.746
Financial Leverage	-1.682	0.0931	-1.738	0.0827	-1.687	0.0920
Tobin's Q	-6.539	0.000	-6.330	0.000	-6.445	0.000
Company Size	13.419	0.000	13.441	0.000	13.394	0.000
Sales Variability	-0.187	0.851	-0.162	0.870	-0.180	0.856

The adjusted R-squared value indicates the percentage of variance in the dependent variable explained by the independent and control variables. In the current models, Model 3 with a value of 0.492 shows the highest and Model 1 with a value of 0.419 the lowest numerical value of adjusted R-squared. In other words, the market risk variable

IJIMOB
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is explained by the independent and control variables. The Durbin-Watson statistic for all models falls within the range of 1.5 to 2.5, not rejecting the hypothesis of no autocorrelation between errors and thus allowing for simple and multiple regression. Furthermore, the estimated p-value for the F-statistic for all models is less than 0.05, confirming the significance of the overall regression and demonstrating that the set of independent and control variables are capable of coherent reporting.

4 Discussion and Conclusion

The hypothesis of this research was formulated to answer whether there is an economic relationship and a contagion effect of earnings quality on market risk among companies listed on the Tehran Stock Exchange. For the hypothesis testing, the null hypothesis was set as there being no significant impact of the earnings quality of economically related companies on market risk. The alternative hypothesis (H1) was considered for significant impact. To verify the hypothesis, the coefficient of the variable and the interactive effect of market risk and the earnings quality of economically related companies were analyzed. According to Table 5, the significance levels of the main variables are less than 5%, thus providing no grounds to support the null hypothesis, and therefore, the alternative hypothesis (H1) is accepted. Furthermore, the estimated coefficients for earnings quality (-0.011825) and earnings quality of related companies (-0.025110) indicate an inverse relationship. Hence, it can be concluded that higher earnings quality among economically linked companies leads to a reduction in a company's systematic risk. Among the control variables, only Tobin's Q and company size were impactful, while other variables showed no significant effect or relation.

When there is a high correlation of profits, the earnings of related companies become more relevant for investors in assessing the value of a company. Comparing the results of the first and second models shows that the impact of a company's earnings quality on market risk is more positive for companies that have a higher correlation of earnings with related companies. The third model considers the role of a company's relative performance. Unusual performance (relative to the industry) tends to average returns and has less stability. When a company exhibits unusually high or low performance, there is increased uncertainty about the company's future performance. Thus, investors may rely more on information from related companies to evaluate the continuity of a company's earnings and predict future earnings. Therefore, when a company has unusual performance, the impact of the earnings quality of related companies is expected to be more pronounced.

Ma (2017) identifies economically related companies as market peers, which include all companies in the market. According to this definition, all companies can have economic relations with each other, but the extent of these economic relations varies. Some economic relationships are important and very close, such as companies within the same industrial group having closer connections than companies across different industries (Ma, 2017). For example, major customers and suppliers of companies have closer economic relations with the company. It is expected that information transfer and the influence of their information on each other would be more significant in companies with closer economic relations compared to other companies. Thus, this research sought to answer whether higher earnings quality of economically related companies reduces a company's systematic market risk, and 65 samples were selected over the years 2010 to 2019 (650 year-company). Statistical results and analysis of the research models showed that higher earnings quality among companies with economic ties leads to a reduction in a company's systematic risk.

The regressions demonstrate that the earnings quality of each company and its related companies reduces the market risk factor. These results indicate that the earnings quality of economically related companies reduces the company's excessive return reaction to the market factor. These findings contribute to the financial literature by providing the first evidence of the long-term external effects of financial information quality in the Tehran Stock Exchange market. The research results show that high-quality rules and regulations impact the company in two ways. One aspect is the direct effect where high-quality regulations and standards enhance the informational quality of the company. The other aspect is the indirect effect where improving the informational quality of other companies due to high-quality rules and regulations can also improve the informational quality of a particular company and, in connection with the topic of this research, improving the informational quality of economically related companies can lead to a reduction in systematic risk and thereby indirectly reduce the capital cost of the company. From this perspective, informational quality has the potential to be contagious.

The findings of this research align with studies (Beatty et al., 2013; Durnev & Mangen, 2009; Gleason et al., 2008; Ma, 2017; Peterson et al., 2015) that have shown that information from companies related to each other is useful

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in evaluating company value. It also aligns with research (Agustia et al., 2020; Ding et al., 2021; Elgers et al., 2008; Hatefi Madjumerd et al., 2020; Hui et al., 2016; Rasoulkhani & Bozorg Asl, 2020) showing that both company earnings and earnings of related companies significantly predict the company's future earnings and stock returns. Demonstrating these relationships can impact control mechanisms in the conflict of interests between majority and minority shareholders. It also constitutes a step, albeit small, towards elucidating the findings of previous researchers and enriching the literature related to this area.

This research has significant implications for regulators, investors, and researchers. First, it demonstrates that financial reporting regulations may alter not only the quality of company information but also the quality of information of related companies. This provides a more comprehensive understanding of the economic consequences of existing regulations. Secondly, the findings support the logic of regulations based on positive aspects, suggesting that improvements can be made through regulations that enforce high-quality financial reporting. Thirdly, this research paves the way for future studies to investigate other long-term economic consequences of the informational quality of related companies.

Proving these relationships can act as control mechanisms in the conflict of interests between majority and minority shareholders. It also represents a step, albeit small, towards elucidating the findings of previous researchers and enriching the literature related to this area. Given the results of the research, it is recommended that market participants in stock analysis consider the risk factor and, by disclosing information related to it, lead to market transparency and create information symmetry, which informs investors about the presence or absence of risk. Moreover, financial reporting regulations may not only change the quality of company information but also the quality of information of related companies. Therefore, it is suggested that standard-setters enact regulations that enforce high-quality financial reporting, thereby enhancing this quality.

For future research, it is suggested to examine the impact of variables such as managerial characteristics, types of control mechanisms, and management accounting systems. Additionally, the impact of effective risk management on modern financial performance indices such as economic value added, cash value added, and market value added should be explored. It should be noted that the current research faces specific limitations. For instance, the low quality of companies' financial reports means that, in some cases, despite the presence of legal auditors, standards and regulations are not properly followed. The inefficiency of the Tehran Stock Exchange is another intervening factor that can affect the results of the research and is beyond the researcher's control. Finally, given that information is the main and fundamental pillar for any research, the lack of necessary data in some cases meant that not all companies listed on the Tehran Stock Exchange were examined.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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