

Research Manuscript

The Impact of Regulatory and Environmental Factors on Enterprise Risk Management and Its Financial Consequences

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Received: 27/01/2025

Accepted: 05/07/2025

Abstract:

Economic institutions operating in capital markets face a variety of risks that, if not effectively managed, can lead to financial instability or bankruptcy. This study explores how regulatory and environmental factors influence enterprise risk management (**ERM**) and its resulting financial outcomes. The objective is to identify key elements that enhance **ERM** effectiveness and assess their impact on financial performance indicators such as financial ratios, market share, and corporate social responsibility. Using a descriptive-survey methodology, the study gathers quantitative data from financial managers and accounting heads in Iranian capital market companies. A structured questionnaire consisting of 54 items on a 5-point Likert scale was developed and validated through expert review and exploratory factor analysis. Random sampling and Cochran's formula determined a sufficient sample size of 384, though 475 questionnaires were distributed and 405 valid responses were analyzed. Beyond its descriptive focus, the research adopts a descriptive-correlational approach to examine relationships among risk-related variables. Structural equation modeling (**SEM**) was used to test hypotheses and

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evaluate the simultaneous effects of various components—such as information environment quality, competitive strategy, corporate governance, internal control, and management structure—on financial performance outcomes. The results show that these regulatory and environmental factors significantly contribute to strengthening **ERM** practices, leading to greater financial stability and operational efficiency. The study provides practical insights for investors, managers, and policymakers, demonstrating how external influences can shape robust risk management frameworks and improve financial performance. It also enriches the risk management literature by emphasizing the complex, multidimensional nature of enterprise risks.

Keywords: Environmental factors, financial implications, regularity factors, enterprise risk management.

Mathematics Subject Classification (2010): G3, G32, G34.

1. Introduction

Due to the global financial crisis, businesses in today's society place a greater focus on risk management than they did in prior decades in an effort to prevent the negative consequences of crises, overcome them, and preserve the company's financial stability, so that they can effectively manage risk by promptly identifying the problem and offering the required remedies. Thus, it can be concluded that controlling and managing risk are crucial to businesses. Hence, it is imperative to first identify the factors influencing risk management, followed by an analysis of the potential outcomes that risk management may have for the organization. Risk management is a systematic process of identifying, analyzing, and evaluating potential risks that may threaten an organization's objectives. It involves developing and implementing strategies to mitigate or eliminate these risks, with the goal of ensuring the organization's long-term sustainability. Given the role of risk management in enhancing the enterprise's value and performance, among other positive outcomes, it is necessary to carry out research that deals with a comprehensive investigation of the effective factors and consequences of risk management.

The authors' review indicates that no studies have been conducted to look into how environmental and regulatory factors impact company management and its financial implications, so conducting this research will reduce the research gap in this field and greatly contribute to the expansion of the research literature in this field. Consequently, research into how environmental and regulatory factors affect enterprise risk management and its financial implications is required. Environmental factors, in this study, are defined as the set of external conditions, events, and forces that influence an organization's performance and success. These factors can include economic, social, technological, legal, political, and environmental elements. In this research, environmental factors are operationalized using two functions: Information Environment Quality and Competitive Strategy. The Information Environment Quality function refers to the quality of the information environment in which the organization operates, encompassing elements such as access to information, data quality, and information technology. The Competitive Strategy function refers to the organization's competitive strategy, which is directly linked to its external environment and includes factors such as the behavior of competitors, changes in regulations, technological advancements, and shifts in customer preferences. In essence, environmental factors, in this study, are considered as the set of conditions that affect an organization's ability to gather, process, and utilize information, as well as its ability to compete in the market. Regulatory factors are the rules, laws, and standards that are imposed on organizations by governments and other regulatory bodies. Due to compliance, cost, strategy, and risk, this issue is of great importance. These regulations can significantly impact

an organization's operations, costs, and overall strategy. They cover a wide range of areas, including but not limited to:

- Industry-specific regulations: These are rules that are specific to a particular industry, such as banking, healthcare, or manufacturing. For example, banks must comply with regulations regarding capital requirements, consumer protection, and anti-money laundering.
- Environmental regulations: These rules are designed to protect the environment and public health. They may include regulations on pollution, waste disposal, and resource conservation.
- Labor regulations: These rules govern employment practices, such as minimum wage, working hours, and health and safety standards.
- Consumer protection regulations: These rules are designed to protect consumers from unfair business practices. They may include regulations on product safety, labeling, and advertising.

Businesses today work in a dynamic and complex environment. In this context, organizations place a high value on risk management as a means of accomplishing their goals and mitigating the negative consequences of volatility. Integrated risk management is a comprehensive, integrated, and independent activity that aids in the company's achievement of its main objective, which is to maximize shareholder wealth. Risk management can be considered a process in which both types of financial and non-financial risks such as operational risks and strategic risks are managed in an integrated manner (Al-Amri and Davydov, 2016). To achieve a competitive advantage and ensure the organization's success, precisely determining the level of risk is essential. Thus, many researchers have focused on how to effectively execute the organizational risk management system (Zhu et al., 2023). The execution of enterprise risk management is expected to assist companies in managing risks within defined tolerances, while also enhancing performance and raising the value of the firm (Adam et al., 2023). The performance of organizations can be achieved through the implementation of risk management. Developing and designing risk management systems can effectively reduce direct and indirect costs, financial expenses, income variations, and negative changes in financial markets (Florio Leoni, 2017). The fundamental purpose of risk management is to maximize shareholder value (COSO, 2004; Lajili Zeghal, 2005; Beasley et al., 2008; Pagach Warr, 2011; Hoyt Liebenberg, 2011). In general, globalization's rapid changes and the legal pressure placed on businesses to manage risks are what led to the emergence and popularity of risk management, and its importance has grown significantly in recent years because of the rise in financial scandals

and corporate frauds, the complexity of risks, and pressure from regulatory organizations (Kashif Shad et al., 2019). Kuo et al. showed that companies with more effective risk management are more inclined to take part in social responsibility activities. Malik et al. (2020) investigated the impact of enterprise risk management on company performance, with the mediating role of the board-level risk committee as an important governance mechanism. The findings indicated that the effectiveness of organizational risk management has a substantial effect on the company's performance. Furthermore, the strong governance facilitated by the risk committee of the board of directors complements this relationship and increases the intensity of the connection between organizational risk management and company performance. A study by Kashif Shad et al. (2019) investigated the integration of sustainable reporting in organizational risk management and its relationship with business performance. The results of their research indicate that the proper adoption of organizational risk management has a significant effect on the company's performance, and sustainable reporting can also affect company performance through enterprise risk management. No research was found that could simultaneously measure the impact of regulatory and environmental factors on risk management and comprehensively examine the financial implications of risk management. According to the above, the hypotheses are formulated as follows:

- The first hypothesis: The environmental causes of risk control have a significant effect on the competitive outcomes of capital market companies.
- The second hypothesis: The regulatory causes of risk control have a significant effect on the competitive outcomes of capital market companies.

Previous research has extensively explored the intricate relationship between environmental factors and organizational performance. For instance, Barney (1991) highlighted the importance of environmental uncertainty in shaping organizational strategy and performance. Porter (2018), in his seminal work, emphasized the role of industry structure and competitive forces in influencing firm-level outcomes. However, while these studies provide valuable insights into the environmental contingencies of organizations, they often focus on a limited set of environmental factors and overlook the complex interplay between environmental, regulatory, and organizational factors. Moreover, Peteraf (1993), in her resource-based view, underscored the importance of firm-specific resources and capabilities in achieving a sustained competitive advantage. Nevertheless, the literature has yet to fully explore the mediating role of organizational resources and capabilities in the relationship between environmental factors and risk management. This study aims to address these gaps by providing a more holistic understanding of the complex

factors influencing risk management and by examining the mediating role of organizational performance measures.

This study offers a novel contribution to the existing body of knowledge on enterprise risk management by adopting a comprehensive and holistic approach. Unlike previous studies which have often examined isolated factors, this research integrates a multifaceted perspective, considering the interconnectedness of environmental, regulatory, and organizational factors. By incorporating functions such as Information Environment Quality, Competitive Strategy, Regulatory causes, Management structure, Corporate Governance, and Internal control, the study provides a more nuanced understanding of the intricate interplay between these variables and their impact on risk management.

Methodologically, this research introduces a novel approach by employing advanced structural equation modeling techniques to analyze the complex relationships among the variables. This methodological innovation allows for a more precise estimation of the direct and indirect effects, as well as the identification of potential moderating and mediating variables. Consequently, this study offers a more robust and nuanced understanding of the mechanisms underlying the relationship between environmental factors and risk management. The findings of this research have significant theoretical and practical implications. First, the study extends the existing literature on risk management by providing empirical evidence for the complex interplay between environmental, regulatory, and organizational factors. Second, the findings offer valuable insights for managers and policymakers seeking to enhance their organizations' risk management capabilities. By identifying the key drivers of risk, this research provides a foundation for developing effective risk mitigation strategies.

Numerous case studies further illustrate the significance of regulatory and environmental factors in shaping financial outcomes. For instance, the implementation of the Sarbanes-Oxley Act (SOX) in the United States following major corporate scandals led to increased compliance costs but also enhanced investor confidence and reduced information asymmetry (Iliev, 2010). Similarly, the European Union's Emissions Trading System (EU ETS) has imposed environmental regulations that have reshaped the financial strategies of manufacturing firms, with measurable impacts on profitability and innovation investments (Martin et al., 2012). These examples highlight how regulatory and environmental dynamics can simultaneously pose risks and create opportunities for firms, thus emphasizing the need for a structured risk management approach. Despite the growing body of literature on enterprise risk management, few studies have systematically examined how these external factors interact to influence internal risk governance structures and, ultimately, firm performance. This study fills this gap by investigating both

the direct and mediated effects of regulatory and environmental drivers on ERM, using robust empirical methods. By addressing this overlooked intersection, the research contributes novel insights into how organizations can enhance resilience and strategic alignment in an increasingly uncertain global environment. This study contributes to the existing literature on enterprise risk management (ERM) in several meaningful ways. First, it provides a comprehensive and integrative framework that examines the combined effect of environmental and regulatory factors on risk management practices, an area that has been largely overlooked in previous research. While prior studies have explored environmental uncertainty (Barney, 1991; Porter, 2018) or regulatory compliance (Beasley et al., 2008; COSO, 2004) in isolation, this research integrates these dimensions to present a holistic perspective on the external forces shaping ERM. Second, the study introduces Information Environment Quality and Competitive Strategy as operational dimensions of environmental factors, thereby expanding the understanding of how the quality and accessibility of external information, as well as competitive pressures, influence risk management decision-making. This conceptualization adds granularity to existing models that often treat environmental variables as abstract or generic constructs. Third, the study addresses the mediating role of organizational capabilities and governance mechanisms in the relationship between external pressures and ERM outcomes. By examining how internal structures—such as corporate governance, internal control systems, and risk committees—moderate or mediate these effects, this research fills a critical gap in the resource-based and contingency perspectives (Peteraf, 1993; Kashif Shad et al., 2019). Fourth, methodologically, this paper adopts an advanced structural equation modeling (SEM) approach, enabling the precise estimation of both direct and indirect relationships, as well as potential mediators and moderators. This rigorous empirical framework enhances the robustness of the findings and allows for testing more complex theoretical propositions. Lastly, the research has strong practical implications for corporate leaders, risk managers, and policymakers. By identifying the key environmental and regulatory drivers of risk management and their financial consequences, the study offers actionable insights for designing more adaptive, proactive, and performance-enhancing ERM systems. In a global business environment marked by volatility, regulatory flux, and information asymmetry, this research provides a timely and policy-relevant contribution.

2. Methodology

This research employs a descriptive-survey methodology to gather data on the perceptions and attitudes of financial managers and accounting heads in Iranian

capital market companies regarding risk management practices. By administering a structured questionnaire, the study aims to collect quantitative data on various aspects of risk management, including risk identification, assessment, and mitigation strategies.

In addition to its descriptive nature, this research also adopts a descriptive-correlation approach to investigate the relationships between different variables related to risk management. By analyzing the correlations between variables such as organizational size, industry sector, and risk management practices, the study seeks to identify potential patterns and associations.

The statistical population for this research consists of all financial managers and accounting heads working in Iranian capital market companies. To ensure a representative sample, a random sampling technique was employed. Using Cochran's formula, the required sample size was calculated based on the estimated population size and desired margin of error. A total of 384 questionnaires were distributed to randomly selected individuals within the target population. To enhance the response rate and ensure data quality, 475 questionnaires were initially distributed, exceeding the calculated sample size. Ultimately, 405 completed questionnaires were received and analyzed.

The research instrument used in this study was a self-administered questionnaire consisting of 54 items. Each item was measured using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree," allowing respondents to express their opinions on a continuum.

The statistical population for this study comprises financial managers and accounting heads employed in Iranian capital market companies. This specific population was chosen due to their direct involvement in risk management decision-making within these organizations. Financial managers are responsible for overseeing the overall financial health of the company, including risk mitigation strategies, while accounting heads play a crucial role in financial reporting and ensuring compliance with regulatory requirements. By focusing on these key stakeholders, the study aims to gain deep insights into the risk management practices from the perspective of those who are most directly affected by them.

To ensure the representativeness of the sample, all Iranian capital market companies were considered as potential sources of data. However, due to the large number of companies and practical constraints, a random sampling technique was employed to select a subset of companies for participation. Cochran's formula was utilized to determine the required sample size, considering factors such as the desired level of precision and the estimated population size. This approach allowed for a statistically sound sample that could be generalized to the larger population of financial managers and accounting heads in Iranian capital market companies.

To determine the appropriate sample size, Cochran's formula was employed. This formula is commonly used in survey research to calculate the minimum sample size required to achieve a specified level of precision, given a certain level of confidence. In our study, we aimed for a 95% confidence level and a margin of error of 5%. To apply Cochran's formula, we estimated the population proportion (p) of financial managers and accounting heads who would agree with a particular statement. In the absence of prior research, we conservatively assumed a value of 0.5 for p , as this maximizes the sample size and ensures that our results are generalizable.

Using the following formula:

$$n = (z^2 \times p \times (1 - p)) / E^2$$

Where:

- n = sample size
- Z = the Z-score associated with the desired confidence level (1.96 for 95% confidence)
- p = estimated population proportion
- $q = 1 - p$
- E = margin of error

Therefore, a sample size of 384 was determined to be sufficient to achieve the desired level of precision and confidence. To enhance the credibility of the study and account for potential non-response, 475 questionnaires were initially distributed. However, after accounting for incomplete or unusable questionnaires, the final sample size for analysis was 405. While the actual sample size slightly exceeded the calculated value, this provided a safety margin and ensured that the study had adequate power to detect significant relationships.

The margin of error of 5% indicates that we can be 95% confident that the results obtained from the sample are within ± 5 percentage points of the true population value. This means that if we were to repeat the study multiple times, 95% of the time the results would fall within this range.

A total of 475 questionnaires were distributed among the target population of financial managers and accounting heads in Iranian capital market companies. To maximize the response rate, multiple follow-up attempts were made, including email reminders and phone calls. Out of the distributed questionnaires, 405 were successfully returned, resulting in a response rate of 85.3%. This relatively high

response rate suggests strong engagement from the respondents and the relevance of the research topic.

Questionnaires were considered unusable if they were incomplete, contained inconsistent responses, or were clearly not completed by the intended respondent. A total of 70 questionnaires were discarded due to these reasons. To ensure data quality, all completed questionnaires were carefully reviewed for any ambiguities or inconsistencies before data analysis.

To ensure the accuracy and reliability of the data collected, a rigorous process was undertaken in the development and validation of the questionnaire. The questionnaire was meticulously designed to measure the constructs of interest related to risk management practices among financial managers and accounting heads in Iranian capital market companies. Each item was carefully crafted to align with the research objectives, and a 5-point Likert scale was employed to capture respondents' attitudes and perceptions.

Prior to data collection, a pilot study was conducted with a small group of individuals similar to the target population to assess the clarity, comprehensiveness, and relevance of the questionnaire items. Feedback from the pilot study was used to refine the questionnaire and ensure that it was easily understandable and responded to the research questions effectively.

To establish the content validity of the questionnaire, a panel of experts in finance, accounting, and risk management reviewed the items to ensure that they adequately represented the constructs being measured. Additionally, exploratory factor analysis (EFA) was conducted to examine the underlying factor structure of the questionnaire and identify any items that did not load strongly onto the expected factors. This analysis provided evidence for the construct validity of the measurement instrument.

To assess the reliability of the questionnaire, Cronbach's alpha was calculated for each scale. The obtained alpha coefficients were above the recommended threshold of 0.7, indicating a high degree of internal consistency among the items within each scale. Furthermore, a test-retest reliability analysis was conducted by administering the questionnaire to a subsample of respondents at two different time points. The high correlation between the two sets of scores provided further evidence of the questionnaire's reliability.

3. Research findings

This section discusses and explains the variables. Additionally, for the description of demographic variables, three factors (Independent causes, Environmental causes, and Regulatory causes) are involved, which are categorized below.

3.1 Independent causes

- The function of financial ratios:

Financial ratios are numerical values obtained from a company's financial statements to gain significant information. Simply relying on a company's financial statements and figures is not enough to accurately evaluate its financial position. Establishing a meaningful relationship between the concepts and items of these statements and contrasting them provides a more thorough and precise understanding of analyzing the current state of the company and predicting its future. Financial ratios examine the items in the financial statements and convert them from Rial-based concepts to comparable ratios. These ratios form a meaningful correlation between the influential factors in financial statements, providing users with the ability to analyze the information in the financial reports. Financial ratios have been highlighted as essential tools for fundamental analysis in previous discussions. The importance of financial ratios is particularly pronounced in financial management and in the assessment of earnings response coefficients. An essential aspect to consider when evaluating financial ratios is that each ratio can function as a signal when considered in conjunction with other ratios. Depending solely on one financial ratio for decision-making is not recommended. The financial status and operational results of the company within a defined fiscal period are summarized in reports that focus on financial ratios.

In this context, key financial ratios transform raw numbers from financial statements into meaningful insights, helping to evaluate the overall financial performance of a company and the effectiveness of its risk management practices. Below are the most important financial ratios to consider, along with their rationale and explanation:

1) Profitability Ratios:

- Return on Assets (ROA): ROA measures how efficiently a company uses its assets to generate profit. Effective risk management can improve asset utilization and reduce losses, leading to a higher ROA. It links risk management outcomes with overall profitability by showing the operational effectiveness of the company's resources.
- Return on Equity (ROE): ROE indicates the return generated on shareholders' investments. Enhanced risk management can stabilize earnings and improve returns for investors. It demonstrates how well a company converts equity into profits, reflecting the impact of risk management on shareholder value.

2) Liquidity Ratios:

- Current Ratio: This ratio compares current assets to current liabilities, indicating the company's ability to cover short-term obligations. In a dynamic environment influenced by regulatory and environmental factors, maintaining liquidity is crucial to manage unexpected risks and financial shocks.
- Quick Ratio: The quick ratio provides a stricter assessment of liquidity by excluding inventory from current assets. It offers insight into the firm's immediate liquidity, ensuring that the company can meet short-term liabilities even in adverse conditions.

3) Leverage Ratios:

- Debt-to-Equity Ratio: This ratio measures the balance between the debt a company uses and its shareholder equity. A balanced capital structure is vital for managing financial risk. Effective risk management should aim to prevent over-leveraging, which can exacerbate financial distress during turbulent times.

4) Efficiency Ratios:

- Asset Turnover Ratio: This ratio evaluates how effectively a company uses its assets to generate revenue. Improved efficiency through effective risk management practices can lead to higher revenue generation relative to asset investment, thereby improving this ratio.

- Market share function:

It is said that the market share is the key that represents the competitiveness of the market, that is, to analyze the extent to which a company can enhance its revenue through successful sales strategies, and how it can assist managers in evaluating primary and targeted consumer demand within the competitive landscape. Generally, increasing sales demand (overall market growth) tends to be more cost-effective and lucrative compared to capturing a portion of competitors' market share, as the latter can lead to significant long-term challenges that necessitate a certain level of compatibility. Similarly, within a company's product line, the market share trends of individual products are regarded as the main indicators. Although market share is probably the most important marketing unit that matters, it is generally not considered a different method than estimating market share not only at a particular time but at any time. These differences arise from the varying perspectives used

to observe these stocks. Also, studies have demonstrated that market share is a top priority for competing companies.

- The function of social responsibility:

Corporate social responsibility is one of the business ethics that address the role of companies in society, which is a set of duties and obligations that the company must perform in order to preserve, care for, and assist the society in which it operates. Corporate social responsibility encompasses the company's duty to the community, individuals, and the environments in which it operates, surpassing mere financial and economic concerns. Corporate social responsibility is defined in a clearer definition as follows: Corporate social responsibility is the set of activities that promote profit and social benefit, exceeding the organization's self-interest and what the law requires.

3.2 Environmental causes

- Information environment quality function:

The behavior of market participants in the market environment is influenced by the flow of information, with environmental changes offering opportunities for market participants to acquire varying shares of information turnover. Creating accounting information systems aims to provide an environment that offers the accuracy of information and minimizes the risk of errors in it. While accounting and auditing standards, as two institutional mechanisms, contribute to information symmetry between managers and owners, they do not entirely close the information gap that exists between them. Thus, a transparent information environment can aid in improving the credibility of financial reporting, closing the information gap, and recognizing the role of accounting information in the valuation and financing of a company.

- The function of competitive strategy:

Competitive strategy is an approach in which organizations take specific actions to outperform their competitors and achieve a competitive advantage in the market. These strategies, with a combination of different decisions and actions, create unique features and benefits for the organization and bring about changes in the path and business strategy.

3.3 Regulatory causes

- The function of the management structure:

The practice by which organizational activities are separated, arranged,

and coordinated is known as organizational structure. Organizations create structures to coordinate the activities of agents and control the work of members. Organizational structure outlines formal coordination mechanisms, who reports to whom, how tasks are assigned, and patterns of organizational interaction that must be adhered to. The organizational structure determines formal relationships, indicates the levels that exist in the administrative hierarchy, and controls the span of managers. Also, the organizational structure encompasses the design of systems by which all units are integrated, thereby ensuring guaranteed communication within the organization.

- The function of corporate governance:

Corporate governance refers to the way a company is run and serves as a method through which companies are steered and managed. This concept means conducting business in accordance with the preferences of the stakeholders, which is really accomplished for the benefit of the stakeholders in the company by the board of directors and relevant committees. In general, this idea is about balancing between social and economic objectives, as well as between individual and personal goals. The concept of corporate governance determines the ways to make effective strategic decisions and gives the ultimate authority and full responsibility to the board of directors. The need to create added value for the stakeholders is crucial in today's market-driven economy.

- Internal control function:

In general, the internal control structure of an organization, also known as the internal control system, includes policies, systems, and methods that are created to provide relative certainty for achieving organizational objectives. Relative certainty means that no internal control structure is ideal, and the expenses associated with internal control in a business enterprise should not outweigh the expected benefits. Briefly, internal control consists of all actions that are designed and implemented by management and other employees so that management and the business enterprise have reasonable certainty that everything is working as it should. Although internal controls are necessary to achieve the goals of the business, they are unable to turn a weak and inadequate management into a strong and adequate administration. Also, internal control cannot change uncontrollable events or phenomena such as government policies or plans, the actions of competitors, and economic conditions. As a result, internal control cannot guarantee the success of an economic entity or even continuity of activity.

4. Modeling

To conduct this research, financial and non-financial data of companies have been collected from valid sources and their annual financial reports. The gathered data is then analyzed thoroughly and comprehensively to determine the effect of each of the independent variables on the dependent variable. The research steps are briefly as follows:

- Collecting data: The required data is gathered from annual financial reports of companies, databases of the Tehran Stock Exchange, and other valid sources.
- Data preprocessing: The collected data has been checked and cleaned to remove any defects or anomalies.
- Data analysis: The relationships between the variables were investigated through the analysis of the data using multivariate regression methods and econometric models.
- Model estimation: Mathematical models were estimated based on the cleaned data using EViews version 10 software.
- Testing hypotheses: The research hypotheses were tested using the estimated models, and the results were analyzed and interpreted.

The results of this research indicate that the independent, environmental, and regulatory variables all have a significant impact on the financial performance of companies. These findings can assist managers and investors in enhancing decision-making within financial management and investment through a deeper understanding of these factors. Hence, the current study plays an important role in improving the financial and economic decision-making process by providing a comprehensive and precise framework for evaluating the financial performance of companies listed on the Tehran Stock Exchange. This research can lay the groundwork for future studies in financial management, econometrics, and economic analysis.

The investigation falls under the category of applied research in the domain of positive research, utilizing multivariate regression and econometric models for its analysis. Statistical analyses were carried out using EViews version 17 and 13 software. The statistical population of this research includes listed firms on the Tehran Stock Exchange.

The time frame for this research spans 15 years, starting from the beginning of 1386 and concluding at the end of 1401. The statistical sample for the research consists of companies that satisfy the following conditions:

- Companies must possess all the required information from 1386 to 1401.
- The companies must have been listed on the stock exchange before 1390, and their symbol must not have been removed from the trading board of the stock exchange until the end of 1401.
- The fiscal year for companies must end in Esfand, the last month of the Iranian calendar.
- They must not have any ties to financial companies such as investment firms, holding corporations, or mediation agencies.

These restrictions led to the selection of 129 companies listed on the Tehran Stock Exchange as the research sample. In the following, we discuss the mathematical model for testing the research hypotheses.

Competitive Implications of Risk Control (CIRC):

The final dependent variable, which is evaluated according to the impact of each variable, follows the subsequent process:

$$CIRC = \beta_0 + \beta_1 INDC_{i,t} + \beta_2 ENVC_{i,t} + \beta_3 REGC_{i,t}$$

Where $INDC_{i,t}$, $ENVC_{i,t}$, and $REGC_{i,t}$ represent the independent, environmental, and regulatory causes for company i in the t -th financial year, respectively.

4.1 Model of Independent Causes

In this model, independent causes consist of 3 independent variables that affect the financial performance of companies. The modeling of these causes is as follows:

$$INDC_{i,t} = \beta_0 + \beta_1 FR_{i,t-1} + \beta_2 MI_{i,t} + \beta_3 SR_{i,t}$$

Where the basis of financial ratios (FR) is considered by taking into account the one-year midterm effectiveness compared to a previous period. Additionally, the market share function (MI) and social responsibility function (SR) are factors that impact risk management in the same period t .

4.2 Model of Environmental Causes

Environmental factors include two distinct variables: the Information Environment Quality (IE) function and the Competitive Strategy (CS) function, which influence the competitive outcomes of enterprises' risk management, modeled as:

$$ENVC_{i,t} = \beta_0 + \beta_1 IE_{i,t} + \beta_2 CS_{i,t}$$

4.3 Regulatory Causes Model

As previously indicated, the regulatory causes comprise the variables of the management structure function (MS), the corporate governance function (CG), and the internal control function (IC). Their impact is modeled as:

$$REGC_{i,t} = \beta_0 + \beta_1 MS_{i,t} + \beta_2 CG_{i,t} + \beta_3 IC_{i,t}$$

4.4 The Method of Measuring the Risk Management Index

Risk management is introduced as a dependent variable in this research, serving as a metric for evaluating the outcomes of Gordon et al.'s (2009) research model. These factors have been recognized for their potential to fulfill the goals of companies.

$$ERMI = \beta_0 + \beta_1 EU + \beta_2 CI + \beta_3 FS + \beta_4 FC + \beta_5 MBD + \varepsilon$$

Where:

- ERMI: Risk management indicators
- EU: Environmental uncertainty
- CI: Industry competition
- FS: Firm size
- FC: Firm complexity
- MBD: Board of directors monitoring

ε represents the error component in this model, indicating the deviation from one of the best models proposed by Gordon et al. (2009). The lower the error component, the higher the effectiveness of the company's risk management. Therefore, $-|\varepsilon|$ is defined as the risk management score.

ERMI: Risk Management Indicators

The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004) proposed four key indicators for organizational risk management and internal control:

$$ERMI = \sum_{k=1}^2 \text{Strategy} + \sum_{k=1}^2 \text{Operation} + \sum_{k=1}^2 \text{Reporting} + \sum_{k=1}^2 \text{Compliance}$$

• **Strategy:**

Competitive strategies help companies maintain their market position, reduce risk,

and increase value. A company surpassing the industry average in sales is a sign of competitive success (Porter, 2008; Gordon et al., 2009).

- **Efficiency:**

Efficiency measures the relationship between inputs and outputs. Inputs include human resources, capital, raw materials, equipment, time, and information. Outputs include final products, revenue, profit, and value added. Higher efficiency improves company value and reduces risk.

- **Reporting:**

Reliable financial reporting reduces risk. Weak reporting, as evidenced by earnings management or fraud, increases company risk (Cohen et al., 2009; Johnson et al., 2002). The modified Jones model (1991) was used to measure discretionary and non-discretionary accruals.

- **Compliance:**

Higher compliance with laws and auditing standards reduces risk and increases value (O’Keefe et al., 1994; Gordon et al., 2009).

4.5 Descriptive Statistics

As indicated in Table 1, descriptive statistics of the tested variables, including central tendency and dispersion indicators, are presented. The mean and median values of the market share function are 4.04 and 4.19, respectively—higher than the other subscales. This suggests that regulatory and environmental risk controls contribute to greater market share and investor confidence. Similarly, the competitive strategy function subscale shows higher values (mean = 4.11, median = 4.39), indicating its significance in risk control.

4.6 Stationarity of Research Variables

Stationarity means that the mean, variance, and autocorrelation coefficient of a variable remain constant over time. ADF-Fisher, IPS, LLC, and PP-Fisher tests were used, and results are reported in Tables 2 and 3. The variables related to competitive outcomes, market share, social responsibility, management structure, and corporate governance are stationary. Others became stationary after first differencing, implying all variables are I(1).

4.7 Estimation of Final Models with FMOLS Method

The FMOLS method requires co-integration among variables. Kao’s (1999) test confirmed the co-integration relationship (Table 5). The final model was estimated using FMOLS, with results shown in Table 4.

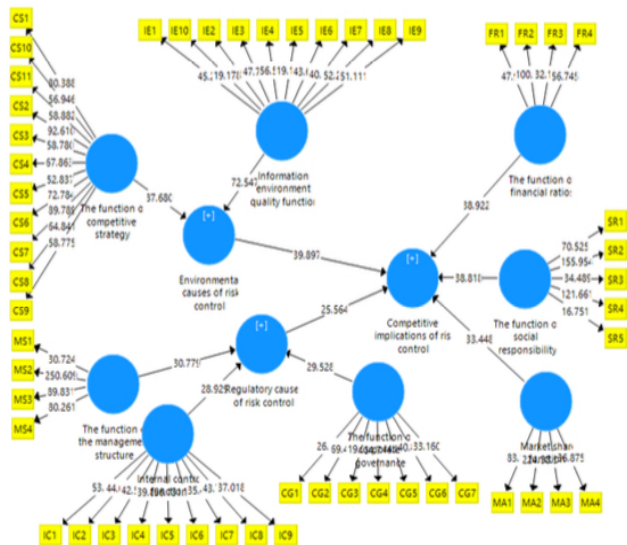


Figure 1: Structural model of the research hypothesis with significant coefficients

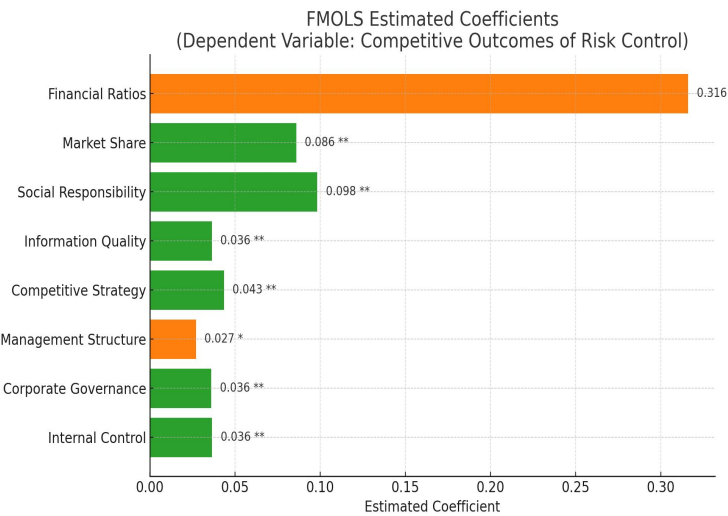


Figure 2: FMOLS Estimated Coefficients

To enhance interpretability, FMOLS results are visualized in Figure 2. The highest positive effects are from social responsibility and market share functions. Corporate governance and information environment quality also contribute significantly. Although the management structure coefficient is smaller, it remains statistically significant, confirming its non-negligible effect.

According to the structural model and Figure 1, the standardized coefficients (path coefficients) show that both environmental and regulatory causes have a positive and significant impact on competitive outcomes, as their coefficients exceed 1.96 in t-statistics.

5. Tables

Table 1: Descriptive statistics related to research variables

Variable	Symbol	Mean	Median	Min	Max	Std. Dev.
Financial ratios	FR	3.94	4.15	2.25	5.00	1.20
Market share function	MA	4.04	4.19	2.50	5.00	0.71
Social responsibility	SR	4.02	4.11	1.18	5.00	0.56
Environment quality	IE	3.71	3.96	1.23	5.00	0.49
Competitive strategy	CS	4.11	4.39	1.00	5.00	0.85
Management structure	MS	4.05	4.14	1.83	5.00	1.05
Corporate governance	CG	3.64	3.88	1.36	5.00	0.84
Internal control	IC	4.04	4.12	1.36	5.00	0.94

6. Conclusion

The research findings indicate that regulatory and environmental factors are effective in risk management, resulting in increased stakeholder trust, profitability, and social responsibility. It was revealed that as the quality of the information environment improves, the financial ratios of economic institutions also improve. Additionally, competitive strategies of enterprises enhance financial ratios, as managers establish effective strategies tailored to the capital market environment.

Furthermore, the results showed that a principled management structure and strong corporate governance lead to improved financial ratios through more accurate and robust oversight of company activities. This supervision and strategic direction are reflected in the financial performance metrics. Moreover, internal

Table 2: Results of unit root tests of research variables

Variable	Test	Test Statistic (p-value)
Competitive implications of risk control	Levin, Lin and Chu (LLC)	-3.278 (0.0002)*
	Im, Pesaran and Shin	-2.458 (0.0158)**
	ADF - Fisher Chi-square	43.377 (0.0354)*
	PP - Fisher Chi-square	27.943 (0.0041)*
Financial ratios	Levin, Lin and Chu (LLC)	-4.234 (0.000)*
	Im, Pesaran and Shin	-0.9263 (0.1771)
	ADF - Fisher Chi-square	48.627 (0.0779)*
	PP - Fisher Chi-square	45.444 (0.1345)*
Difference of financial ratios	Levin, Lin and Chu (LLC)	-9.432 (0.000)*
	Im, Pesaran and Shin	-4.905 (0.000)*
	ADF - Fisher Chi-square	93.898 (0.000)*
	PP - Fisher Chi-square	103.16 (0.000)*
Market share function	Levin, Lin and Chu (LLC)	-2.872 (0.0020)*
	Im, Pesaran and Shin	-2.0002 (0.0227)*
	ADF - Fisher Chi-square	55.466 (0.0201)*
	PP - Fisher Chi-square	59.127 (0.0089)*
Social responsibility	Levin, Lin and Chu (LLC)	-8.276 (0.0000)*
	Im, Pesaran and Shin	-3.172 (0.0008)*
	ADF - Fisher Chi-square	72.417 (0.0003)*
	PP - Fisher Chi-square	64.626 (0.0024)*
Information environment quality	Levin, Lin and Chu (LLC)	-1.956 (0.0252)**
	Im, Pesaran and Shin	-0.4943 (0.3105)
	ADF - Fisher Chi-square	32.956 (0.4201)
	PP - Fisher Chi-square	59.323 (0.0023)*
Difference of environment quality	Levin, Lin and Chu (LLC)	2.972 (0.0015)*
	Im, Pesaran and Shin	2.048 (0.0203)**
	ADF - Fisher Chi-square	51.553 (0.0157)**
	PP - Fisher Chi-square	118.44 (0.0000)*
Competitive strategy	Levin, Lin and Chu (LLC)	3.290 (0.9995)
	Im, Pesaran and Shin	6.913 (1.000)
	ADF - Fisher Chi-square	28.824 (0.7965)
	PP - Fisher Chi-square	40.888 (0.2644)
Difference of Competitive strategy	Levin, Lin and Chu (LLC)	-9.402 (0.0000)*
	Im, Pesaran and Shin	-3.731 (0.0001)*
	ADF - Fisher Chi-square	76.054 (0.0001)
	PP - Fisher Chi-square	95.910 (0.0000)*
Management structure	Levin, Lin and Chu (LLC)	-16.120 (0.0000)*
	Im, Pesaran and Shin	-6.684 (0.0000)*
	ADF - Fisher Chi-square	55.721 (0.0190)**
	PP - Fisher Chi-square	62.262 (0.0042)*
Corporate governance	Levin, Lin and Chu (LLC)	-3.814 (0.0001)*
	Im, Pesaran and Shin	-1.958 (0.0251)**
	ADF - Fisher Chi-square	54.317 (0.0256)**
	PP - Fisher Chi-square	64.719 (0.0023)*
Internal control	Levin, Lin and Chu (LLC)	-2.349 (0.0094)*
	Im, Pesaran and Shin	-0.8442 (0.1993)
	ADF - Fisher Chi-square	42.162 (0.2218)
	PP - Fisher Chi-square	46.667 (0.1098)
Difference of Internal control	Levin, Lin and Chu (LLC)	-7.481 (0.0000)*
	Im, Pesaran and Shin	-3.944 (0.0000)*
	ADF - Fisher Chi-square	85.262 (0.0000)*
	PP - Fisher Chi-square	121.66 (0.0000)*

*Significance at the 1% level, **Significance at the 5% level. Source: calculations using EViews 17 software.

Table 3: Results of unit root tests of research variables

Hypothesis	Levin, Lin and Chu (LLC) (common root)	Cross-sectional unit root tests		
		Im, Pesaran and Shin W-stat	ADF-Fisher Chi-square	PP-Fisher Chi-square
Competitive implications of risk control	-3.278 (0.0002)*	-2.458 (0.0158)**	43.377 (0.0354)*	27.943 (0.0041)*
Function of financial ratios	-4.234 (0.000)*	-0.926 (0.1771)*	48.627 (0.0779)*	45.444 (0.1345)*
Difference in financial ratios	-9.432 (0.000)*	-4.905 (0.000)*	93.898 (0.000)*	103.16 (0.000)*
Market share function	-2.872 (0.0020)*	-2.000 (0.0227)*	55.466 (0.0201)*	59.127 (0.0089)*
Function of social responsibility	-8.276 (0.0000)*	-3.172 (0.0008)*	72.417 (0.0003)*	64.626 (0.0024)*
Information environment quality	-1.956 (0.0252)**	-0.494 (0.3105)*	32.956 (0.4201)*	59.323 (0.0023)*
Difference in information environment	2.972 (0.0015)*	2.048 (0.0203)**	51.553 (0.0157)**	118.44 (0.0000)*
Function of competitive strategy	3.290 (0.9995)*	6.913 (1.000)*	28.824 (0.7965)*	40.888 (0.2644)*
Difference in competitive strategy	-9.402 (0.0000)*	-3.731 (0.0001)*	76.054 (0.0001)	95.910 (0.0000)*
Function of management structure	-16.12 (0.0000)*	-6.684 (0.0000)*	55.721 (0.0190)**	62.262 (0.0042)*
Function of corporate governance	-3.814 (0.0001)*	-1.958 (0.0251)**	54.317 (0.0256)**	64.719 (0.0023)*
Internal control function	-2.349 (0.0094)*	-0.844 (0.1993)	42.162 (0.2218)	46.667 (0.1098)
Difference in internal control function	-7.481 (0.0000)*	-3.944 (0.0000)*	85.262 (0.0000)*	121.66 (0.0000)*

Table 4: Regression results for competitive outcomes of risk control

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Financial ratios	0.316	0.0159	1.987	0.042**
Market share function	0.0859	0.0127	6.766	0.0000*
Social responsibility	0.0983	0.0043	22.408	0.0000*
Information environment quality	0.0364	0.0046	7.795	0.0000*
Competitive strategy	0.0435	0.0055	7.920	0.0000*
Management structure	0.0270	0.0109	2.463	0.0159
Corporate governance	0.0360	0.0005	64.859	0.0000*
Internal control	0.0365	0.0070	4.620	0.0000*

Table 5: Results of Kao cointegration test

Model	ADF Statistic	Probability (p-value)	Null Hypothesis	Result
Competitive outcomes of risk control, function of financial ratios, function of market share, function of social responsibility, function of information environment quality, function of competitive strategy, function of management structure, function of corporate governance, and function of internal control	-7.137	0.0000	Absence of cointegration relationship	Existence of cointegration relationship

Table 6: Results related to the research hypothesis test

Description	Path Coefficient (β)	T-Value	Test Result
The environmental causes of risk control have a significant impact on the competitive outcomes of capital market companies.	0.40	39.89	Proving a theory
The regulatory causes of risk control have a significant impact on the competitive outcomes of capital market companies.	0.33	25.56	Proving a theory

controls enhance the integration of financial information and improve financial ratios.

The regulatory and environmental factors identified in this research create an environment in which corporate risk management becomes more effective, resulting in improved financial ratios, increased market share, and heightened social responsibility. The findings recommend that investors, analysts, and policymakers place greater emphasis on these factors due to their impact on risk management and overall company success.

Companies are therefore advised to pay special attention to regulatory and environmental factors in their strategic and operational decisions. As organizations are increasingly exposed to dynamic internal and external changes, they face threats and opportunities that necessitate the adaptation of business strategies. An organization's ability to respond to such rapid environmental changes and seize emerging opportunities is critical to its survival and success in today's volatile conditions.

Understanding and addressing these challenges require the implementation of enterprise risk management (ERM), which provides a holistic framework for managing risks and maximizing opportunities. In this regard, this study presented a corporate risk management model and its influence on profitability indicators.

As discussed, the risk management techniques introduced by COSO (2004) were evaluated to develop an enterprise-wide approach to risk management. It was determined that there is no significant difference in risk management practices between firms with high and low profitability characteristics. To address this limitation, Gordon et al. (2009) emphasized the importance of controlling key factors affecting risk management. Their analysis of data from 129 companies

(sampled from 2007 to 2022) led to the development of an optimal risk management model.

Based on the research hypotheses, the relationship between risk management and explanatory causes—independent, environmental, and regulatory—was examined. The results of all three hypotheses indicate a significant relationship between a company's risk management and these categories of factors.

Iranian companies and businesses appear to operate in a unique economic and social environment. The increasingly complex operational context exposes these firms to various risks that were less prominent in the past. Unfortunately, the concept of corporate risk management has not been widely implemented in Iranian organizations. Only a few companies utilize this approach, often not under a unified ERM framework but rather as individual, isolated strategies.

The results of this study are consistent with findings from Florio and Leoni (2017), Edmonds et al., and others. The research underscores the importance of going beyond mere implementation of risk management when seeking to improve profitability and guide investment decisions. It is suggested that company managers prioritize the establishment of foundational structures for strategic planning and form a dedicated risk committee, which is a key component of effective corporate governance.

Risk management is proposed as a tool to address external market risks beyond managerial control, aiming to reduce profit volatility. Greater stability in profitability lowers the likelihood of financial distress and improves access to lower-cost capital, enabling companies to act effectively in favorable conditions.

It is recommended that companies prioritize risk management by implementing the following actions:

- Devolve risk management responsibilities to a formal committee.
- Submit at least one official annual report to the board of directors detailing the company's key risks.
- Encourage the board to demand greater executive involvement in risk monitoring.
- Develop and disseminate formal guidelines and criteria for risk assessment.

Acknowledgement

We express our sincere gratitude to Allameh Tabataba'i University for providing the necessary resources during the preparation of this paper. We are also deeply thankful to the Center of Excellence in Financial Mathematics of Iran for their support.

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Supplementary material

Table 7: Distribution of respondents' marriage frequency

Variable		Abundance	Abundance Percentage	Cumulative Frequency Percentage
Marital Status	Single	93	22.96	22.96
	Married	312	77.04	100
	Total	405	100	–
Age	35 years and less	32	7.9	7.9
	36 to 45 years	108	26.67	34.57
	46 to 55 years	153	37.77	72.35
	More than 55 years	112	27.65	100
	Total	405	100	–
Gender	Man	291	71.85	71.85
	Female	114	28.15	100
	Total	405	100	–
Work Experience	10 years and less	67	16.54	16.54
	11 to 20 years	150	37.04	100
	21 years and older	150	37.04	100
	Total	405	100	–

Table 8: test K. M. He and Bartlett

Test results	Sample adequacy coefficient	0.448
	The chi-square amplification factor	1103.124
	D. F	512
	Significance level	0.001

Table 9: Table of indicators of model suitability

Index name	Standard value of the index	Index value in the desired model	Conclusion
The ratio of chi-square to D.F	< 3	1.3	Perfect fit for the model
P-value	More than 0.05	1.0	Perfect fit for the model
JFI (Goodness-of-Fit Index)	More than 0.9	0.97	Perfect fit for the model
AJFI (Adjusted JFI)	More than 0.9	0.94	Perfect fit for the model
NFI (Normed Fit Index)	More than 0.9	0.92	Perfect fit for the model
CFI (Comparative Fit Index)	More than 0.9	0.91	Perfect fit for the model

Table 10: Load factor coefficients tables

Factor	Criteria	Symbol	Operational burden
Environmental and regulatory	Information environment quality function	IE	0.934
	The function of competitive strategy	CS	0.925
	The function of the management structure		
	The function of corporate governance	MS	0.759
	Internal control function	CG	0.805
	Information environment quality function	IC	0.786
Factor	Criteria	Symbol	Operational burden
Competitive implications of risk control	The function of financial ratios	FR	0.803
	Market share function	MA	0.774
	The function of social responsibility	FR	0.856

Table 11: Table of results of Cronbach's alpha criterion and combined reliability of hidden research variables

Local variables	Cronbach's alpha coefficient (Alpha<0.7)	Combined reliability coefficient (CR>0.7)
The function of financial ratios	0.868	0.910
Market share function	0.904	0.933
The function of social responsibility	0.900	0.928
Information environment quality function	0.917	0.930
The function of competitive strategy	0.965	0.970
The function of the management structure	0.915	0.942
The function of corporate governance	0.897	0.919
Internal control function	0.904	0.933

Table 12: Convergent validity results of hidden research variables table

Business life cycle	Average extracted variance (AV>0.5)
The function of financial ratios	0.717
Market share function	0.778
The function of social responsibility	0.721
Information environment quality function	0.574
The function of competitive strategy	0.744
The function of the management structure	0.803
The function of corporate governance	0.620
Internal control function	0.648

Table 13: Fornell and Larcker matrix to check divergent validity

	Financial Ratios	Market Share	Social Responsibility	Info. Quality	Competitive Strategy	Management Structure	Corporate Governance	Internal Control
The function of financial ratios	0.848							
Market share function	0.408	0.882						
The function of social responsibility	0.546	0.516	0.849					
Information environment quality function	0.513	0.490	0.664	0.758				
The function of competitive strategy	0.439	0.650	0.478	0.735	0.862			
The function of the management structure	0.370	0.327	0.391	0.561	0.560	0.860		
The function of corporate governance	0.511	0.630	0.420	0.370	0.520	0.451	0.788	
Internal control function	0.359	0.554	0.647	0.600	0.475	0.396	0.444	0.805

Table 14: Values of determination coefficient (R^2) and prediction power coefficient (Q^2)

Variables	Q^2	R^2
Competitive implications of risk control	0.652	0.977
Environmental causes of risk control	0.821	0.955
Regulatory causes of risk control	0.580	0.953

Table 15: The degree of Communalities and (R^2)

Local variables	Communality	R^2
The function of financial ratios	0.519	-
Market share function	0.618	-
The function of social responsibility	0.585	-
Information environment quality function	0.482	-
The function of competitive strategy	0.678	-
The function of the management structure	0.657	-
The function of corporate governance	0.492	-
Environmental causes of risk control	0.459	0.955

Table 16: Results of fitting the overall model

Communality	R^2	GOF
0.51	0.96	0.69