



Identification and Ranking of Risk Control Factors in the Financing of the Steel Industry: A Case Study of Esfarayen Steel Company

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Abstract

Nowadays, financing is one of the fundamental challenges facing economic enterprises, influencing all organizational activities related to product manufacturing and service provision. Given the importance of the steel industry as the second-largest non-oil export sector in the country – alongside the threats and opportunities in global trade – assessing an organization's ability to manage risks in this field is of undeniable significance. Effective financing methods play a crucial role in sustaining operations, executing profitable projects, and ensuring companies' survival in today's competitive landscape. This study aims to identify and rank risk control factors in financing the steel industry, with a focus on Esfarayen Steel Company. The research follows a descriptive, survey-based, and applied methodology. Experts and specialists in the steel sector were consulted to identify key risk control factors, and their rankings were determined using the Delphi method and pairwise comparisons. Data analysis was conducted using SPSS (version 23) and Expert Choice (version 11). The results indicate that exchange rate risk is the most critical factor, followed by sanctions, export reduction, interest rate fluctuations, market recession, economic instability, and bankruptcy risk. Sharia compliance risk was ranked the lowest. The study suggests risk mitigation as the most effective approach for managing exchange rate risk and provides further recommendations for addressing other financial risks.

Keywords: Risk control factors, steel industry, financing, risk management, Esfarayen Steel Company

Paper Type: Original Research

1. Introduction

In today's industrial and commercial landscape, identifying opportunities and threats, as well as evaluating companies' ability to navigate uncertainties and risks, is essential. Assessing risk control factors in corporate financing plays a crucial role in ensuring financial stability and sustainable growth. Risk assessment is a fundamental stage in risk management, and given the numerous financial risks involved – along with the necessity of optimizing resource allocation – its significance cannot be overlooked. Neglecting or improperly implementing this process may result in severe financial consequences. Identifying and ranking risk control factors in financing helps determine the relative importance of each risk based on relevant indicators, allowing companies to develop appropriate responses. Effective risk management not only enhances financial stability but also supports investors in making informed decisions when selecting investment options. Risk is defined as a measurable uncertainty about the future. If uncertainty cannot be quantified, it is classified as pure uncertainty rather than risk. By quantifying uncertainty in the form of risk, companies can manage and control it effectively. Esfarayen Industrial Complex strategically manages its capital to ensure financial stability while maximizing stakeholder returns through an optimized balance of debt and equity. One of the most significant financial risks the company faces is exchange rate fluctuation, which is particularly critical due to its international operations. The company aims to minimize losses from currency fluctuations while maximizing potential gains. Given that a major portion of its exports is directed to Turkey and raw materials are procured through barter transactions, part of the exchange rate volatility is mitigated. Additionally, the company reduces its exposure by structuring some domestic sales contracts in foreign currencies. Manufacturing companies utilize various financing methods, generally categorized into internal (corporate) financing and external financing. In light of previous studies and the necessity of this research, the fundamental question this study seeks to address is: What are the key factors influencing financial uncertainty and risk control

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in corporate financing? Experts argue that one of the primary challenges faced by steel producers – due to the substantial investment required in this industry – is inadequate financial resources. While major global steel producers allocate significant investments to this sector, domestic manufacturers struggle with financing constraints (Chilan, 2011). Given these financial challenges in the steel industry, this study aims to explore the factors influencing financing in large steel companies (such as Esfarayen Steel) and how financial risk impacts their financial performance. Financing affects various aspects of a company's operations and growth, making it a key factor in determining profitability and overall performance. Companies require financing to purchase new assets, expand production capacity, hire new employees, and procure raw materials. These financial resources are essential for sustaining operations and ensuring long-term growth (Tian & Lin, 2019). Financial resources can impact a company's financial performance in both the short and long term. The long-term impact arises from investments in projects with a positive net present value (NPV), ultimately affecting stock prices, returns, and overall financial performance while maximizing shareholder value. If a company secures appropriate funding and allocates it efficiently, its net profit increases, thereby enhancing its overall value. The short-term impact, however, relates to the leakage of internal company information into the capital market. Any financial or operational information perceived as significant by shareholders and market analysts can trigger reactions in the financial market (Wetzel & Hoffmann, 2019). A constant concern for organizations is ensuring they have sufficient capital to navigate economic fluctuations and address financial challenges. This issue is not only critical for individual companies but also for maintaining the stability of the broader economic system. The failure of a company and disruptions in financial markets can pose significant risks to a country's economy.

2. Literature Review

Fadaei, Alirezaei, Hashemzadeh, & Fathi (2021) used a questionnaire as the research tool, gathering insights from industry experts and specialists in the automotive sector. The study focused on the Tehran Stock Exchange-listed automotive industry (Iran Khodro and Saipa). The results indicated that liquidity risk had the highest impact, while investment risk had the least impact. Among sub-criteria, changes in customer preferences had the most significant influence, whereas market estimation was identified as the most affected sub-criterion. Liquidity risk ranked first among the four main risk criteria and held the highest priority. Arian Jam (2019) examined the factors influencing liquidity risk by analyzing financial statements of steel companies listed on the Tehran Stock Exchange from 2012 to 2018. Sarhangi Joshaqani (2017) conducted a study based on expert opinions to identify and control financial risk in Mikashist Stone Manufacturing Companies. The research employed the Delphi method and pairwise comparisons for ranking risks. The findings revealed that exchange rate risk held the highest priority. Seirafianpour & Mousavi (2015) first reviewed various financing methods and then explored associated risks and risk control mechanisms. The study highlighted the role of risk management in financing projects and, after analyzing multiple information sources and expert opinions in infrastructure projects, proposed a structured classification of risks and challenges in project financing methods. Sharafi, Fathi Hafshjani, & Ahmadi (2023) identified the key factors affecting project financing risk by extracting relevant variables based on specific models. The research sample reached theoretical saturation through expert interviews with professionals in the mining industry. The study identified factors impacting project financing risk, including financing methods, social risk, contractor risk, construction risk, political risk, design risk, legal risk, financial risk, management risk, customer risk, and subcontracting agreements. Li et al. (2019) examined the impact of financing methods on stock prices in steel companies and concluded that equity issuance leads to stock price declines, whereas risk-free debt does not reduce stock prices. Zhang et al. (2018) investigated the impact of external financing methods on the returns and stock prices of steel manufacturing companies. The study first assessed the effects of capital increases and long-term loans on stock prices and returns. It then compared the annual returns of companies using two external financing sources with industry averages. The findings indicated that stock issuance had a greater impact on stock prices than long-term loans, and capital increases had a more substantial effect on stock returns compared to bank borrowing. Waruto (2015) examined liquidity, credit, and market risk simultaneously, considering the Basel Committee's statement. The study, using data from Bank of America, found that capital requirements should exceed those recommended by the Basel Committee. The researcher concluded that banks lacked sufficient capital to withstand financial crises, as market risk led to depositor distrust, resulting in liquidity risk. Additionally, economic conditions-imposed credit risk on banks. Guohua & Wensing (2020) analyzed financial risk in the iron and steel industry using a factor analysis model. The study explored financial risks in China's iron and steel sector, developing a financial risk assessment model based on theories of financing, investment, and operations. The model included five dimensions: debt repayment, profitability, operational capability, growth potential, and cash flow. Using factor analysis, the authors identified unbalanced capital structures, inefficient cost management, and poor cash flow conditions as key contributors to financial risk in the sampled companies. The study's findings aim to support financial management in China's iron and steel companies. Yong Guo & Xuan Yin (2021) investigated financial risks in Baoshan

Iron & Steel. Through risk analysis and evaluation of debt scale, financial leverage, and debt repayment, the study proposed strategies for effectively mitigating financial risks. Recommendations included optimizing debt scale, improving financial risk monitoring mechanisms, and implementing preventive measures to ensure the sustainable development of Baosteel.

3. Methodology

Research methods serve as guides for scientific inquiries aimed at uncovering truths. To discover facts and unveil unknowns, specific methods and skills are essential. These principles and skills, developed through the thinking and experiences of predecessors, are now utilized as guidelines. Researchers, while being experts, apply them as scientific methodologies with conviction, leading to valuable outcomes. Choosing a research method depends on the objectives, nature of the research topic, and available resources. Therefore, one can decide on the research approach only when the nature of the subject, objectives, and scope are clearly defined. This study aims to identify and rank the risk control factors affecting the financing of the steel industry, with a case study on Esfarayen Steel Company. In this chapter, we will first discuss the research methodology, followed by aspects such as the research population, sample, sampling method, sample size, data collection methods and tools, determining the validity and reliability of the research instrument, research variables, and the statistical methods used for data analysis. In this research, after extracting the required data through expert questionnaires and pairwise comparisons, SPSS software will be used to obtain the mean and standard deviation of the experts' opinions in the first questionnaire. Expert Choice software will then be employed to rank the identified factors. Data analysis is a multi-stage process in which data collected from statistical samples using various tools are summarized, categorized, and processed to facilitate the execution of different analyses and the examination of relationships between variables. This process aims to test hypotheses and derive meaningful conclusions. The primary goal of any research is to answer the questions designed to understand external realities. Analyzing collected data is considered the most crucial step in the research process, as raw data are processed using statistical techniques to be transformed into information accessible to researchers and stakeholders. This involves classifying, organizing, and processing data to provide understandable and interpretable results, enabling the study of relationships among various variables related to the research problem. In similar studies, such as the research on identifying and prioritizing risk control methods for financial supply in manufacturing companies, SPSS and Expert Choice software were utilized to analyze expert opinions and rank factors effectively. Therefore, employing SPSS and Expert Choice in this study is consistent with established research methodologies and is expected to yield valuable insights into the factors influencing financial risk management in the steel industry.

3.1 Data Analysis

In this section, the Delphi technique is initially employed to identify the risk control factors affecting the financing of the steel industry (a case study of Esfarayen Steel Company). Subsequently, the Analytic Hierarchy Process (AHP) is utilized to rank the identified factors.

3.1.1 Identification

By applying the Delphi method, as detailed in Chapter 3, and after calculating the average importance of each factor, the following criteria were identified:

Table1. Criteria identified from the Delphi technique

Primary Dimensions	Row	Sub-Dimensions of Risks
Bankruptcy Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer
Shariat Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer
Exchange Rate Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer
Market Recession and Revenue Decline Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer
Additional Sanctions and Export Reduction Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer
Elections and Economic Environment Changes Risk	1	Risk Avoidance
	2	Risk Reduction
	3	Risk Acceptance
	4	Risk Transfer

3.1.2 Prioritization of key criteria based on the objective

In this section, the obtained results for comparing the main criteria (primary market risk, secondary market risk, and non-financial risk) and the calculated priority for them relative to the defined objective are presented.

Table2. Geometric mean of pairwise matrices among the main criteria

Elections and Economic Environment Changes Risk	Additional Sanctions and Export Reduction Risk	Market Recession and Revenue Decline Risk	Exchange Rate Risk	Interest rate risk	Shariat Risk	Bankruptcy Risk
0.9278	0.2272	0.0622	0.1903	0.2406	1/2906	1
0.8067	0.2032	0.4746	0.2023	0.2367	1	0.7160
0.0296	0.6222	1.4261	0.3781	1	2/129	3/9.23
2/3.90	1/13.1	2/0.371	1	2/6.432	2/3.28	0/12.3
1/3.92	0.448	1	0.2477	0.7012	2/1.70	1/7773
3/36.2	1	1/8300	0.8849	1/6.67	2/91.40	2/3937
1	0.2976	0.7638	0.2299	1/8882	1/1671	1/0.768

the final weights of the main criteria are obtained using the results from the Expert Choice software. The ranking of the criteria is calculated based on the highest to lowest obtained weights, which is presented in the table below. Additionally, the inconsistency ratio is 0.04. Since this value is less than 0.1, the level of inconsistency is considered acceptable.

Table3. Prioritization of Key Criteria

Priority	Criteria	Weight
First	Exchange Rate Risk	0.3162
Second	Additional Sanctions and Export Reduction Risk	0.2381
Third	Interest Rate Risk	0.1415
Fourth	Market Recession and Revenue Decline Risk	0.1008
Fifth	Elections and Economic Environment Changes	0.0957
Sixth	Bankruptcy Risk	0.0578
Seventh	Sharia Compliance Risk	0.0499

According to the prioritization results from Table 3, the highest priority is assigned to the exchange rate risk with a value of 0.3162, while the lowest priority is assigned to the Sharia risk with a value of 0.0499.

3.1.3 The prioritization of sub-criteria based on the main criteria

Table4. Prioritization of sub-criteria for exchange rate risk

Risk Transfer	Risk Acceptance	Risk Reduction	Risk Avoidance	
1/0.877	1/1.889	0.9027	1	Risk Avoidance
2/6574	3/7119	1	1/0.494	Risk Reduction
0.7020	1	0.2694	0.0921	Risk Acceptance
1	1/2.296	0.2762	0.7297	Risk Transfer

the final weights of the sub-criteria for exchange rate risk are derived using the results from Table 4. The prioritization of the sub-criteria is presented in Table 5. Additionally, the inconsistency rate is 0.02, and since this value is less than 0.1, the level of inconsistency is considered acceptable.

Table5. Prioritization of Exchange Rate Risk Sub-Criteria

Priority	Criteria	Weight
First	Risk Reduction	0.4087
Second	Risk Avoidance	0.2892
Third	Risk Transfer	0.1684
Fourth	Risk Acceptance	0.1337

Table6. Geometric Mean of the Pairwise Comparison Matrices among the Sub-Criteria of Imposing Additional Sanctions and Reducing Exports

Risk Transfer	Risk Acceptance	Risk Reduction	Risk Avoidance	
1/6843	1/3048	0.3601	1	Risk Avoidance
1/0134	3/7807	1	2/7770	Risk Reduction
0.6929	1	0.2645	0.7663	Risk Acceptance
1	1/4.432	0.9867	1/4.609	Risk Transfer

the final weights of the sub-criteria for imposing additional sanctions and reducing exports have been obtained using the results from Table 6. The prioritization order of the sub-criteria is presented in Table 7. Additionally, the inconsistency rate is 0.03. Since this value is less than 0.1, the level of inconsistency is acceptable.

Table7. Prioritization of Sub-Criteria for Imposing Additional Sanctions and Reducing Exports

Priority	Criteria	Weight
First	Risk Reduction	0.5140
Second	Risk Transfer	0.2775
Third	Risk Avoidance	0.1688
Fourth	Risk Acceptance	0.1397

According to Table 7 and the obtained results, the highest priority belongs to the sub-criterion of Risk Reduction, while the sub-criterion of Risk Acceptance has the lowest priority.

3/1/4 Prioritization of Interest Rate Risk Sub-Criteria

Table8. Geometric Mean of Pairwise Matrices Among the Sub-Criteria of Interest Rate Risk

	Risk Transfer	Risk Acceptance	Risk Reduction	Risk Avoidance	
	2/7472	1/3048	1/1162	1	Risk Avoidance
	1/4986	3/7807	1	0/8958	Risk Reduction
	0/7302	1	0/6754	0/2771	Risk Acceptance
	1	1/4432	0/6672	0/3640	Risk Transfer

the final weights of the interest rate risk sub-criteria have been obtained using the results from Table 8. The prioritization order of the sub-criteria is presented in Table 9. Additionally, the inconsistency rate is 0.02. Since this value is less than 0.1, the level of inconsistency is acceptable.

Table9. Prioritization of Sub-Criteria for Interest Rate Risk

Priority	Criteria	Weight
First	Risk Reduction	0.4140
Second	Risk Transfer	0.2775
Third	Risk Avoidance	0.1688
Fourth	Risk Acceptance	0.1397

4. Findings

Given that the aim of this research was to identify and rank the risk control factors in financing the steel industry (a case study of Esfarayen Steel Company), after collecting the distributed questionnaires and analyzing the data, the priority of the criteria was determined as follows:

Table . Priority criteria

Priority	Criteria
First	Exchange rate risk
Second	Imposition of additional sanctions and reduced exports
Third	Interest rate risk
Fourth	Market recession risk and reduced income
Fifth	Elections and changes in the economic environment
Sixth	Bankruptcy risk
Seventh	Shariah compliance risk

5. Conclusions

Given the importance of the research topic and the findings obtained, the following recommendations are proposed:

- Develop a comprehensive plan to control exchange rate risk by implementing risk mitigation strategies such as increasing domestic investments.
- Formulate a structured approach to manage the risk of additional sanctions and reduced exports by adopting risk reduction strategies that decrease dependency on foreign markets.
- Establish a detailed plan to control interest rate risk through risk avoidance strategies, including securing short-term loans and exploring alternative financing methods, such as participating in the securities market and attracting foreign investors.
- Create a comprehensive plan to manage market recession risk and revenue decline by employing risk transfer strategies, such as identifying economic partners that can support the company.
- Develop a structured approach to address risks associated with elections and changes in the economic environment by implementing risk reduction strategies that balance domestic and foreign markets.

- Formulate a comprehensive plan to control bankruptcy risk by adopting risk avoidance strategies, such as obtaining lighter loans with lower interest rates.
- Establish a detailed plan to manage Sharia compliance risk by implementing risk reduction strategies, such as decreasing reliance on bank loans and creating a diversified financing portfolio.

Research Limitations:

- The findings of this research are based on a cross-sectional study, which makes it challenging to draw causal inferences.
- Collecting data over a time series could yield more robust results.
- Suggestions for Future Research:
- Future studies could examine other populations, such as considering customers as the statistical population.
- Investigate and consider experts and university professors in fields related to financial risk variables and methods of controlling these risks to bridge gaps between the current situation and desired outcomes.
- Exploring the interrelationships among identified risk factors and their synergistic or antagonistic effects can lead to a better understanding of how to control these risks, potentially resulting in more comprehensive risk management strategies.
- Comparing risk control factors in the steel industry across different countries can help identify successful patterns and effective experiences in this field. Such research could be conducted comparatively between countries with advanced steel industries and developing nations.
- Utilizing hybrid models that encompass both quantitative and qualitative approaches for identifying and ranking risks can enhance the accuracy and comprehensiveness of the research.

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