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Research on Early Warning and Prevention of Enterprise Financial Risks

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Abstract. Faced with the complex changes in the global economic situation, the sustainable development of enterprises is facing severe challenges of financial risks. This study focuses on exploring the early warning mechanism and prevention strategies for financial risks. The purpose is to establish an efficient early warning mechanism to assist enterprises in accurately identifying and resolving financial crises. The research methods include literature analysis and case-based research. After reviewing relevant research on corporate financial crises worldwide, the main risk characteristics and their causes can be summarized. On this basis, by establishing an evaluation system and prediction model, it was found that using evaluation indicators that include dimensions such as debt paying ability, operating conditions, and income levels, and using multivariate statistical methods such as Z-score and Logistic, can effectively predict corporate financial crises; And targeted prevention strategies in the financing, investment, operating, and income-distribution aspects can help enterprises avoid or mitigate financial risks.

Keywords: Enterprise financial risks, Early warning system, Prevention strategies, Financial risk theories

1. Introduction

In the modern economic landscape, enterprise financial risks refer to the possibility of financial losses due to uncertainties in financing, investment, operating, and income-distribution activities. With the increasing complexity of the global financial market, enterprises are facing more diverse and unpredictable financial risks.

Compared to China, the overseas academic community has explored more deeply the field of risk measurement and early warning and has developed a systematic theoretical system, with typical representatives being Altman Built-in 1968 Z Value rating model. This model has been widely used in predicting the financial distress of enterprises in Western economies. Domestic research, while drawing on overseas experience, also focuses on the characteristics of Chinese enterprises in different industries.

The key significance of this study lies in establishing a scientific, financial risk warning and prevention system, which can not only consolidate the foundation of financial stability for enterprises, but also ensure the achievement of business strategic goals, and promote the healthy development of the economy. This paper specifically explores the theories of financial risks, the

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current risk situation of enterprises, the construction of early warning index systems and models, and corresponding prevention strategies. The research uses literature analysis to summarize existing theories and case-based research to verify the effectiveness of the constructed systems and models. The significance of this research is that it provides practical guidance for enterprises to deal with financial risks and supplements the theoretical research in this field, providing a reference for future scholars.

2. Financial risk theories

2.1. Definition

Enterprise financial risks cover four main aspects: financing risks, which refer to the risks of inability to repay debts or excessive financing costs due to unreasonable financing structures [1]. For example, if a real estate enterprise excessively relies on bank loans for financing during a period of tight monetary policy, it may face huge debt repayment pressure and high-interest costs. Investment risks include the risks of investment project failures, market value fluctuations of investment assets, etc. For instance, an enterprise investing in a new energy project may face the risk of technological obsolescence, leading to project failure. Michalski pointed out that operating risks mainly come from inventory management, accounts receivable management, and cost control in the production and operation process [2]. If the inventory control of manufacturing enterprises is inadequate, it is easy to cause goods to pile up, funds to be occupied, and storage costs to rise. Income-distribution risks are related to the impact of unreasonable profit distribution on enterprise development and shareholder interests. If a start-up enterprise distributes too much profit in the early stage, it may lack sufficient funds for R&D and expansion.

2.2. Early warning principles

Establishing a financial warning mechanism requires following a specific logical framework. It needs to be based on the integrity of enterprise financial information, ensuring that all aspects of financial activities are monitored [3]. This means that not only financial statements but also non-financial information, such as market share and customer satisfaction, should be considered in some cases. Simultaneously, the system must remain flexible, evolving alongside shifts within the organization's operational landscape while promptly modifying both alert parameters and analytical frameworks. This responsiveness ensures continuous alignment with fluctuating business conditions. For example, in the context of the development of the digital economy, enterprises need to add indicators related to digital asset management and cybersecurity risks to their early warning systems.

2.3. Theoretical basis

Risk theory and internal control theory are important theoretical bases. Rausand introduced that risk theory helps to identify, measure, and evaluate financial risks [4]. It classifies risks into different types, such as systematic risks and unsystematic risks, and provides methods for risk assessment, like value-at-risk (VaR) calculation. While internal control theory provides a framework for enterprises to establish internal control mechanisms to prevent and control financial risks, including the establishment of internal control systems in financial management processes such as authorization, approval, and accounting. For example, an enterprise can establish a strict authorization system for financial expenditures to prevent unauthorized expenditures and reduce financial risks.

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3. Current risk situation

3.1. Manifestations

Financial risks vary across business operations. In financing, over-leveraging often leads to debt repayment difficulties, especially for SMEs relying heavily on loans [5]. For example, in the real estate sector, high-debt enterprises may struggle during economic slowdowns. In investment, project failures due to poor market forecasts or technological changes are common; think of traditional energy companies investing in outdated technologies.

Operational risks surface as inventory overstocking, like in the fashion industry with inaccurate sales predictions, or high bad debts from weak accounts receivable management. In income distribution, excessive dividends can starve growth-stage firms of funds for R&D, while insufficient payouts may dissatisfy shareholders of mature companies.

3.2. Causes

The financial situation of enterprises is influenced by macroeconomic factors such as economic downturn, interest rate hikes, and fluctuations in the foreign exchange market. Industries face risks from policy shifts and technological disruptions. Internally, weak financial management, flawed governance structures, and low risk awareness are major culprits. Family-owned businesses with centralized decision-making often lack proper risk assessment in financial matters.

4. Early warning index system

4.1. Selection principles

De Leon pointed out that the selection of early warning indicators follows scientific, comprehensive, and operable principles [6]. Scientific principles require that indicators can accurately reflect the financial status and risk levels of enterprises. For example, a company's long-term debt-paying ability can be accurately measured by its asset-liability ratio, while the comprehensive principle requires indicators to cover multiple dimensions such as financing, investment, operation, and distribution. So, in addition to solvency indicators, operating efficiency indicators (such as inventory turnover rate) and profitability indicators (such as return on equity) should also be included. Operable principles require that indicators are easy to obtain and calculate, and can be used for regular monitoring. Most financial indicators can be obtained from enterprise financial statements, which are convenient for enterprises to monitor regularly.

4.2. Indicators

The solvency of a company is measured by its asset liability ratio, current ratio, and interest coverage ratio. The ability to pay debt can be reflected in the ratio of total assets to total liabilities [7]. The level of short-term debt repayment of enterprises can be measured by the current ratio, which mainly reflects the ability of current assets to repay current liabilities. The degree of interest expense protection is reflected by the interest coverage rate, which displays the coverage of operating income over interest expenses. The operational efficiency indicators cover inventory, accounts receivable, and total asset turnover, with inventory turnover speed directly reflecting inventory management performance. The collection efficiency of accounts receivable is reflected through the turnover rate, which can also measure its management level. The overall operational

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performance of the enterprise is evaluated by the total asset turnover rate. In profitability indicators, return on assets (ROA) reflects the performance of a company in generating revenue using total assets, return on equity (ROE) reflects the level of investor returns, and net profit margin reveals the profitability of its main business.

4.3. Weight determination

The determination of indicator weights can be achieved through methods such as the Analytic Hierarchy Process (AHP) and Entropy Method. Song & Kang introduced the idea that AHP determines weights by constructing a hierarchy and pairwise comparisons [8]. First, determine the target layer (financial risk early warning), the criterion layer (solvency, operating capacity, profitability, etc.), and the indicator layer (specific indicators such as debt - to - asset ratio). Then, pairwise comparisons between different layers are conducted to construct a judgment matrix, and the weights are calculated through matrix operations. The entropy method determines weights based on the amount of information reflected by indicators. Indicators with more information (greater discrimination) are given higher weights. This method can avoid the subjectivity of AHP to a certain extent, ensuring the scientific and reasonable weight allocation of the early warning index system.

5. Early warning model

5.1. Model selection

Z-score gives Logistic. The selection of models is based on their effectiveness. Altman's research has shown that by integrating multiple financial indicators, the Z-score model can effectively evaluate the financial risks of enterprises and predict the probability of them falling into difficulties [9]. Z-score calculation formula consists of five variables, expressed as $Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5$. In this model, X1 Representing the ratio of current assets to total assets, X2 Represents the proportion of undistributed profits to total assets, X3 To determine the ratio of pre tax profit to total assets, X4 It is the ratio of the market value of equity to the book value of liabilities, X5 This reflects the relationship between operating income and total assets. This model has been widely used in Western enterprises and has a good predictive effect. The Logistic model predicts the probability of financial risks by establishing a regression model. It uses a logistic function to convert the linear combination of independent variables (financial indicators) into a probability value between 0 and 1, which is convenient for enterprises to judge the possibility of financial risks. Practice has proven that this type of model is effective, but it needs to be flexibly applied in conjunction with industry and enterprise characteristics.

5.2. Construction steps

The construction of the model includes data handling, such as data cleaning, normalization, and parameter estimation [10]. Data cleaning is to remove abnormal data, such as data with extreme values caused by accounting errors. Normalization is to convert different indicators into the same scale, usually using methods such as min-max normalization or Z-score normalization, so as to eliminate the impact of different dimensions of indicators on the model. Parameter estimation uses statistical methods to determine the model parameters. For the Z-score model, the parameters are relatively fixed, but for the Logistic model, maximum-likelihood estimation typically serves as the preferred method for calculating regression coefficients, guaranteeing both precision and dependability in the resulting model.

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5.3. Case analysis

Verify the model with real enterprise cases. Take a Chinese vehicle manufacturing enterprise, BYD, as an example. In order to identify and avoid potential financial crises in the enterprise in a timely manner, the system first integrates the financial information of the enterprise in the past five years, covering the balance sheet, income statement, and cash flow statement. Subsequently, by calculating key financial indicators and importing these data, the Z-score Model and Logistic analysis of the model are performed. Z-score evaluation results of the model indicate that the enterprise's Z-score The continuous decline in the past two years suggests that financial risks are on the rise. The Logistic model also predicts that the probability of the enterprise facing financial risks in the next year is 30%. Then, these prediction results will be compared with the actual financial situation of the enterprise. It was found that the enterprise has indeed faced problems such as increased accounts receivable and inventory backlog in the past two years, and financial risk has increased. This verifies the effectiveness and applicability of the model.

6. Prevention strategies

6.1. Financing

Optimize the financing structure, reduce excessive dependence on debt financing, and appropriately increase equity financing [11]. For example, enterprises can introduce strategic investors through equity financing to expand capital sources and reduce financial leverage. At the same time, choose financing channels wisely and comprehensively consider the costs and risks of bank loans, bond issuance, and other channels. SMEs enterprises can also use supply chain finance and other means to effectively reduce financing expenses and control risks. At the same time, enterprises need to ensure that the financing period matches the asset type, with long-term assets corresponding to long-term funds and short-term assets matching short-term funds, to prevent hidden dangers caused by mismatched terms.

6.2. Investment

Make smart investment decisions, conduct in-depth market research and feasibility analysis before investment, and choose investment projects with stable returns. For example, when evaluating investment projects, enterprises can use quantitative tools such as net present value (NPV) and internal rate of return (IRR) for analysis [12]. During the investment process, strengthen project management and monitor investment progress and returns in a timely manner. If an investment project is found to be deviating from the expected goals, take corrective measures in a timely manner, such as adjusting the project plan or even terminating the project. In addition, enterprises should also diversify their investments to reduce the impact of a single project failure on the overall financial situation, that is, do not put all eggs in one basket.

6.3. Operating

Improve the management level of inventory and accounts receivable by adopting strategies such as Just in Time (JIT) to optimize inventory, thereby reducing backlog and accelerating turnover speed [13]. For accounts receivable, establish effective credit management systems, including customer credit evaluation, credit limit setting, and timely collection. Enterprises can also use factoring and other methods to transfer accounts receivable risks. In addition, it strengthens cost control, reduces

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unnecessary operating expenses, and improves enterprise profitability. For example, by optimizing the production process and reducing production waste, enterprises can reduce production costs.

6.4. Income - distribution

Tailor income-distribution policies to the enterprise stage. In the growth stage, enterprises can appropriately reduce dividend distribution and increase retained earnings for development. For example, high-tech enterprises in the growth stage often need a lot of funds for R&D and market expansion, so they can choose to distribute fewer dividends or not distribute dividends temporarily. In the mature stage, reasonable dividend distribution can be carried out to meet shareholder interests. At this time, enterprises have relatively stable cash flows and can distribute dividends in the form of cash dividends or stock dividends. In addition, enterprises can also consider share-repurchase policies to enhance shareholder value.

7. Conclusion

This paper mainly explores the early warning and prevention of enterprise financial risks. Through research, it is found that establishing a scientific early warning index system and selecting appropriate early warning models (e.g., Z-score, Logistic) can effectively predict enterprise financial risks. The early warning index system should cover solvency, operating capacity, profitability, and other aspects, and the weights of indicators should be determined scientifically. Targeted prevention strategies in financing, investment, operating, and income-distribution aspects can help enterprises avoid or mitigate financial risks, ensuring the healthy development of enterprises. These findings provide practical tools for enterprises to safeguard financial stability and contribute to theoretical advancements in risk management. For example, enterprises can use the early warning system to detect financial risks in advance and take preventive strategies to avoid bankruptcy.

This paper has certain limitations. In the research process, the sample size of case analysis may be insufficient, and the research on some emerging industries' financial risks is not in-depth. For example, the financial risk characteristics of blockchain-related enterprises are not fully studied. In subsequent research, the sample coverage can be expanded to include cross-analysis of enterprises from multiple industries and cutting-edge research methods such as big data mining can be introduced to enhance the accuracy and completeness of research conclusions. With the help of big data technology, enterprises can collect more comprehensive internal and external data, covering multi-dimensional information such as market public opinion data, industry competition pattern data, etc., thereby optimizing the prediction accuracy of early warning models. In addition, future research can focus on exploring the mechanism of the impact of digital finance development on corporate financial risks while also paying attention to innovative paths for early warning and prevention systems.

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