A Review of Financial Distress Identification

Jiawen Ouyang

School of Finance, Jiangxi Normal University, Nanchang City, Jiangxi Province 330022, China

Abstract: With the development of China's financial market, more and more listed companies have emerged. While the scale of these listed companies keeps growing, some companies are in financial distress because of poor management and further deterioration of their financial conditions. Both the investors and the enterprises themselves need a reasonable method to identify whether the enterprises are in financial distress or not. This paper focuses on the research of Chinese and foreign scholars in the three fields of financial distress identification standard, financial distress identification index system and financial distress identification method, combining text reading and combing, the main research situation of financial distress identification is summarized.

Keywords: financial distress; financial indicators; non-financial indicators; literature review

1. Introduction

Since the opening of China's first stock exchange in December 1990, the country's financial markets have played a new tune. According to the 2021 and the Wind database, there are more than 4,000 a-share listed companies in China. The development of the securities industry for more than 30 years has provided the investment channel for the majority of investors, many enterprises have also obtained huge amount of financing after listing, the scale of enterprises has been expanding continuously, and the comprehensive strength of enterprises has developed rapidly. However, while the scale of listed companies continues to grow, some companies due to poor management, further deterioration of financial conditions, financial difficulties, by delisting risk warning, or even facing bankruptcy. As of 2021,250 a-share listed companies had been targeted by St. Whether an enterprise is "ST" is a long-term capital market judgment of whether an enterprise is in financial distress.

In fact, there is a big gap between the financial practice of listed companies in the present age and the simple definition of St as the company's financial distress and the definition of non-ST as the company's financial health. On the one hand, China's stock market appears several rounds of ups and downs and many investors have suffered losses, investors urgently need a way to measure the financial situation of enterprises, scientific investment. On the other hand, some listed companies even fell into financial difficulties on the road of enterprise expansion due to poor management and further deterioration of financial conditions, in many cases, when managers identify the financial status of an enterprise, they use the theory that "ST and non-ST indicate whether the enterprise is in financial distress", which makes it difficult for listed companies to identify whether the company is really in financial distress at an accurate time, there are even some companies "ST" and not long after the "ST", these companies are difficult to truly extricate themselves from financial difficulties.

Therefore, both the investors and the enterprises themselves need to adopt a reasonable method, which can accurately identify that the enterprises have fallen into financial difficulties, so as to better prevent the probability of such difficulties and adjust the business strategy in time, alleviating a series of negative reactions to financial distress. In the past 60 years, many scholars have done a lot of research in the field of financial distress, both the concept of financial distress and the method of identifying financial distress have been improved and developed. This paper focuses on the research of Chinese and foreign scholars in the three fields of financial distress identification standard, financial distress identification index system and financial distress identification method, combining text reading and combing, this paper summarizes the main research situation of the identification of financial distress.

2. Definition of the Concept of Financial Distress

At present, there is no unified definition of the concept of financial distress, the earliest concept of financial distress can be traced back to William Beaver's research, which brought about the bankruptcy of enterprises, the concept of financial distress has been enriched and developed in the research of scholars ever since the default of preferred stock dividend and default of debt were considered as financial distress.

2.1. Bankruptcy or Insolvency

In addition to the Beaver mentioned above, Deakin also considered bankruptcy and insolvency as the criteria for defining financial distress, supplementing the criteria for liquidation [1]. Carmichael holds that the key to determine whether an enterprise is in financial distress lies in the form of obstruction in the performance of its obligations The enterprise is unable to repay the debt, has the loan default behavior, the enterprise presents the negative equity, the long-term debt repayment ability is deficient, the enterprise financing ability is deficient, can not raise the external fund. Ross considers a business to be in financial distress if it fails to pay its debts after liquidation, if either the business or its creditors file a bankruptcy petition with the court, if the business fails to pay its debts on time and if its net assets are negative. Balan, Robu, Jaba argue that firms with equity ratios greater than two but negative ROE and negative net worth are in financial trouble.

2.2. Net Income Negative

Some scholars pay attention to the impact of net profit on financial distress, Gu Qi and Liu Shulian put the enterprise into financial distress when the average net profit margin was negative in each quarter for two consecutive years. Ma fengning and Song Mingyuan judge whether a business is in financial trouble by whether its after-tax net profit is negative. Santoson, WIBOWOW also uses negative net income as a measure of a company’s financial distress [2].

2.3. Negative Value Added

Economic Value Added (Eva) is a concept of financial performance evaluation proposed by American scholar Stewart. It refers to the income after deducting the cost of capital including equity and debt from the net operating profit after tax, xing youhong and Zhang Jing think that the negative Eva of the listed company represents that the listed company is in financial distress. Yuan Kanglai and Luo Ying believe that enterprises only two consecutive negative EVA in financial distress on behalf of enterprises. Yang Qiuhai does not think that the concept of EVA can be used to determine the financial distress of enterprises.

2.4. Special Treatment

Special treatment, refers to the listed company by St. “ST” stands for special treatment. This is a warning sign for listed companies in the financial market. When the financial conditions of listed companies are abnormal, resulting in the risk of their stocks being delisted, and investors’ investment rights and interests may be damaged, the stock exchange will implement the risk alert to the stock of the listed company. Since the symbol of “St” is the abnormal financial situation of enterprises, many scholars, such as Guan Xin and Wang Zheng, Wang Xiuli, Zhang Longtian and he Xiaoxia, Liu Yumin, Shen Li Ying and Ren Guangqian, based on the characteristics of trading rules in China’s stock market, listed companies will be “ST” as a sign of financial distress. Liang Mo and Li Hongxiang set up the financial distress prediction model of listed company St with the method of machine learning.

2.5. Poor Financial Results

With the further research on the concept and definition of financial distress, some scholars have proposed that the financial situation of enterprises should not be limited to only two types, namely, normal financial situation or financial distress, they use some methods to analyze and classify the financial situation of enterprises, and identify those enterprises with poor financial analysis results as financial distress. Bao xinzhong, Tao Qiuyan and Fu Hongyu divided the financial situation of listed companies into five grades and defined the worst financial situation as being in financial trouble. Liu Ronghui, Lei Huaiying and Fu Jingli also classified the financial situation of enterprises into five categories through analysis, and judged the two categories with the worst financial situation as two different degrees of financial distress, Zhou Shouhua based on Altman added the independent variable of cash flow and analyzed whether the enterprise was in financial distress.

3. Financial Distress Identification Index System

In the research of defining the concept of financial distress, many scholars use some economic indicators as the measurement standard of financial distress. In the past 60 years, the financial distress identification index has been changed and the index system has been improved gradually. In recent years, the role of non-financial indicators in the identification of financial distress has begun to attract the attention of scholars all over the world.

3.1. Financial Indicators

Beaver and Altman were the first to apply financial indicators to the screening of financial distress. For the selection of financial indicators, scholars mainly consider the debt-paying ability, operating ability, profitability and development ability of the enterprise, some scholars in the specific indicators of the selection will be different.

Altman chose the ratio of EBITDA, working capital, retained earnings, sales revenue to total assets, and the ratio of market value to corporate debt to construct his index system for identifying financial distress. Qian Aimin, based on Free Cash Flow, selects indicators from the debt-paying capacity, operating capacity, profitability and development capacity of enterprises, and highlights the role of income quality and financial flexibility in identifying financial distress, overall evaluation of the financial situation of the enterprise. Gao Peiye and Zhang Daokui chose 29 financial indicators to construct the system, and emphasized the role of four ratios of EBITDA, retained earnings, sales revenue and working capital to total assets. Li Chunling and Liu Liang innovatively added the Index of investment return in the financial distress identification index system for airlines, and empirically studied the significant role of this kind of index in identifying the financial distress of airlines. Liu Yumin, Shen Li Ying and Ren Guangqian focused on the financial distress of the manufacturing industry, taking listed manufacturing companies in China as a sample, and found that the per-share index level has a significant impact on the identification of the financial distress of the manufacturing industry, in order to identify the financial distress of manufacturing enterprises, it is necessary to add net cash flow and earnings per share from operating activities.

Guan Xin and Wang Zheng take all the companies in the a-share market of China as the sample to do the empirical research, the final result shows that the financial distress identification index system of listed companies in the a-share market, it is necessary to add some indicators to the traditional financial distress identification system, such as increasing the multiple of cash flow interest guarantee and the rate of increase of shareholders’ equity. Wang Xiuli, Zhang Longtian and he Xiaoxia also conducted an empirical study, and added long-term capital debt ratio as an important index of solvency to the traditional index system for identifying financial distress [3]. Wang Zhuquan, Song Xiaobin and Wang Yuanzhuo found out the defects in the traditional index system and reconstructed the short-term financial risk assessment system focusing on Stock and flow, which was applied to identify financial distress. Wang Yu and Yang Shanshan introduced multi-dimensional Efficiency Index in the Financial Index Foundation, can more comprehensively and effectively reflect the different industry, the different asset size listed company overall situation, therefore, it has better warning effect to the listed company’s financial distress [4].

3.2. Non Financial Indicators

The economic environment is becoming more and more complex in the new era, and the business management of enterprises is facing unprecedented challenges. The development of big data, Internet of things and Ai is impacting a new round of industrial transformation, the operation, management and future development of an enterprise are influenced by many factors. To measure the financial status of an enterprise, not only the financial index should be considered, but also the non-financial index is becoming more and more important and necessary.

Simpson and Gleason take the number and proportion of large shareholders and management as variables, and add the index of board structure and ownership structure to the index system of financial distress identification. Cout and Radoff introduce the Index of macroeconomic and policy environment to improve the non-financial indicators of financial distress, and forecast the lag value of financial distress. Zheng Guojian, Lin Dongjie and Zhang Feida found that the traditional static financial indicators to analyze the financial distress of enterprises have index defects, and put forward to join the legal supervision, shareholders checks and balances, the proportion of independent directors and other dynamic non-financial indicators analysis of financial distress [5]. Chen Yiyun through data mining technology, extract and analyze the information disclosure text of listed companies, obtain valuable non-financial indicators, innovative use of big data technology to improve the financial distress identification index system.

4. Ways to Identify Financial Distress

There are two kinds of methods used to establish financial distress recognition model: statistical analysis method and data mining technology.

4.1. Statistical Analysis

Altman created a z-value model for identifying financial distress, and first introduced the multivariate linear decision model into the field of financial distress, the z-value model requires that the variables in the financial distress identification model conform to the normal distribution, but in reality most enterprises’ financial indicators are difficult to meet this requirement. Chen Jing, a Chinese scholar, first devoted himself to the research of financial distress recognition model, and summed up foreign scholars’ financial distress recognition models, including profile analysis, Dicho Tomous crimination test, Cutoff Point, uniform critic model and Multivariate discriminant model [6]. And empirical analysis of the applicability of these models for Chinese Enterprises, empirical results show that, for Chinese listed companies, these models have various limitations, but as a simple and efficient forecasting method, these models are of great practical significance to the research on the identification of financial distress of Chinese listed companies.

4.2. Data Mining Techniques

With the development of data mining technology, some scholars begin to apply knowledge discovery data mining technology to the field of financial distress. Wilson and Sharda, for example, used neural network models to judge the financial distress of Italian firms with 97 per cent accuracy. Ma Ruowei applied rough set theory and information entropy theory to establish financial distress model of listed companies, and introduced cash flow index into early-warning model. Zhang Liang, Zhang Lingling et al. a data mining model based on SVM and Logistic regression is proposed to identify the financial distress of a company based on information fusion, on the basis of retaining the advantages of the two data mining models, the accuracy of identifying the financial distress of Chinese listed companies is improved. Wang Yu and Yang Shanshan construct financial distress early warning technology based on Support vector machine, neural network and decision tree technology, and conduct empirical research on Chinese listed companies, this multi-dimensional efficiency index of financial distress identification model has high accuracy [7].

5. Summary and Outlook

Through the review of the above-mentioned literature, we can find that there are various judgment criteria for companies in financial distress, which can be used for reference. Combing the development of these studies, we can find that the study of financial distress of listed companies has experienced from simple to complex, from single to multiple, from subjective to intelligent. In the construction of the indicator system for the identification of corporate financial distress, the research on financial distress has been abundant. On the one hand, scholars from different countries have been adding industry-specific indicators for the identification of financial distress; on the other hand, scholars also pay more and more attention to the importance of non-financial indicators in the identification of financial distress. Many new progresses have been made in the methods of financial distress recognition, especially some scholars have begun to use neural network and data mining to improve the efficiency and scientificity of the recognition methods. With the in-depth development of research, the future financial distress identification system will be more scientific and sound. Deep Learning Technology and big data technology will also be used in the financial distress identification method, and there will be more and more research on the financial distress of specific industries.

Acknowledgment

This work was supported in part by Jiangxi Provincial Department of Education Graduate Innovation Found Project: Jiangxi Province 2021 post graduate funding project: Manufacturing listing based on data mining and k-means clustering – takes *ST Shenji as an example(YJS2021006).

References

[1] Deakin. Discriminant Analysis of Predictors of Business Failure. Journal of Accounting Rearch, 1972(spring): 167-169.

[2] Santoso N, Wibowo W. Financial distress prediction using linear discriminant analysis and support vector machine. Journal of Physics: Conference Series, 2018, 979(1): 012089.

[3] Wang Xiuli, Zhang Longtian, he xiaoxia. Comparative study on financial crisis warning effect based on consolidated statement and parent statement Accounting Research, 2017(06): 38-44 + 96.

[4] Wang Zhuquan, Song xiaobin, Wang Yuanzhuo. Evaluation and judgment of short-term financial risk of real economy in China —— Comprehensive Evaluation and early warning of short-term financial risk considering both stock and flow. Managing the world, 2020, 36(10): 156-170+216-222.

[5] Zheng Guojian, Lin Dongjie, Zhang Feida. Financial distress, tunneling and the effectiveness of corporate governance: evidence from large shareholder financial data. Managing the world, 2013, (05): 157-168.

[6] Chen Jing. Empirical analysis of financial deterioration prediction of listed companies. Accounting Research, 1999(04): 32-39.

[7] Wang Yu, Yang Shanshan. Financial distress warning study of listed companies. China Management Science, 2021, 29 (02): 32-41.