

Financial Risk Early Warning Analysis for Yonghui Superstores Based on the Z-Score Model

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Abstract. In the context of increasingly fierce competition in the retail industry, traditional supermarkets face multiple challenges such as declining performance, increasing financial pressure and business model transformation, resulting in its financial risks constantly increasing. Establishing a scientific financial risk early warning system helps enterprises identify potential crises in advance, which is of great practical value for optimizing financial decisions and ensuring business safety. The article analyzes the financial data of Yonghui Superstores over the past five years (2020-2024) based on Altman's z-score for early warning of financial risks. The research shows that the z-score of Yonghui Superstores has generally been on a downward trend and has entered the gray warning zone, indicating the existence of several potential risks requiring attention. On this basis, the article analyzes in more detail the main factors leading to these risks from the perspectives of the external environment and internal business operations, and proposes corresponding risk prevention suggestions.

Keywords: Z-score, Yonghui Superstore, Financial Risk, Retail Industry.

1. Introduction

Under the dual circumstances of the comprehensive penetration of the digital economy and the continuous upgrading of the consumption structure, the physical retail industry in China is undergoing unprecedented deep changes and survival tests. In recent years, emerging business models such as e-commerce platforms, instant retail, and community group buying have rapidly emerged, continuously diverting offline customers and market share from traditional physical retail enterprises. The business models and profit logic of traditional physical retail enterprises have been fundamentally impacted. Maier et al.'s research indicates that although pure e-commerce enterprises' expansion into physical channels can lead to sales growth, there is a significant moderating effect on the financial performance during the channel integration process [1]. This further confirms the complex financial decision-making dilemmas faced by physical retail enterprises in their digital transformation. At the same time, rigid expenditures such as store rent, labor costs, and logistics distribution have continued to rise, and the fierce competition in the industry has become increasingly homogenized. Most enterprises have fallen into the predicament of weak revenue growth, continuously shrinking profit margins, and increasing pressure on capital turnover. Under

the combined pressure, the overall operational stability of the physical retail industry has declined, with rising debt ratios, tight cash flow, and weakened profitability. The financial vulnerability of enterprises has significantly increased, and financial risk prevention has become a core issue for the survival and development of the industry. Facing the complex and changing market environment, how to scientifically identify, accurately assess, and effectively prevent financial risks has become the key for physical retail enterprises to achieve digital transformation and sustainable development.

Yonghui Superstore was established in 2001 and went public on the A-share market in 2010. As the leading enterprise in the domestic fresh food chain supermarket sector, it has long held a leading position in the physical retail industry through its direct-sourcing supply chain for fresh produce, large-scale store layout, and affordable pricing strategies. It is a typical representative of the development of offline supermarkets in China. However, in recent years, Yonghui Supermarket has been facing continuous pressure on its operating performance, with a continuous decline in revenue and net profit, expanding losses, and significant fluctuations in the company's stock price. The lack of confidence in the capital market is also evident, triggering widespread concerns from the industry and all sectors of society about its financial situation and operational risks. From the financial performance perspective, Yonghui Superstore has consumed a large amount of funds in terms of scale expansion, store upgrading, and investment in online business, resulting in an increase in debt scale and greater debt repayment pressure; at the same time, affected by factors such as reduced foot traffic, declining gross profit, and asset impairment, the enterprise's profitability and cash flow situation have continued to deteriorate, and financial risks have accumulated continuously. As a benchmark enterprise in the physical retail industry, the financial difficulties faced by Yonghui Superstore reflect the common problems of traditional supermarkets during the transformation process. The causes of risks, transmission mechanisms, and response strategies of these risks have important research value and demonstration significance.

Based on the above real situation and industry issues, this paper takes Yonghui Supermarket as the specific research object and conducts a systematic analysis of the financial risks faced by physical retail enterprises. The research objective of this paper is: to deeply analyze the main types of financial risks that Yonghui Supermarket is confronted with under the current macro environment and industry trends, and to quantitatively assess its financial risk level from the dimensions of debt repayment ability, profitability, operational ability and cash flow status; to explore the internal management problems and external environmental factors that trigger financial risks, clarify the internal logic and transmission path of risk formation; finally, combined with the characteristics of the retail industry and the actual situation of the enterprise, propose targeted and operational financial risk prevention and optimization suggestions, providing decision-making references for enterprises to improve their financial conditions and enhance their risk resistance capabilities.

This research holds significant theoretical and practical value. From a theoretical perspective, this paper integrates the theory of financial risk management with the characteristics of the fresh food retail industry, enriching the case studies on the financial risks of physical retail enterprises in the context of digital transformation, providing a more comprehensive research framework and empirical references for the financial risk analysis of similar enterprises, and further supplementing and improving the application research of financial risk theory in the retail industry. From a practical perspective, through a comprehensive diagnosis of the financial risks of Yonghui Supermarket, it can help enterprises accurately identify risk weaknesses, optimize capital structure, improve operational efficiency, and strengthen fund management, thereby overcoming the dual difficulties of operation and finance; at the same time, the research conclusions can be used as a reference for other large chain supermarkets and physical retail enterprises in China, promoting the improvement of

financial resilience in the entire industry and facilitating the smooth transformation and high-quality development of the physical retail industry in the digital wave.

In terms of research methods, this paper mainly employs the case study method and the Z-score model analysis method, and combines the literature research method and financial indicator comparison analysis to conduct the research. By reviewing relevant literature on foreign financial risk warning, enterprise crisis management, and retail industry transformation, the theoretical basis and analytical basis for the research are established; taking Yonghui Supermarket as a single case study object, combined with the company's annual financial reports, industry data, and public information, the operating status and risk evolution process of the company are systematically sorted out. In studies targeting the Chinese context, some scholars have successfully applied the Z-score model to conduct systematic risk warning analysis for Chinese listed retail companies, providing a model example for its application in specific national markets [2]. At the same time, this paper introduces the Z-score multivariate financial risk warning model, quantitatively calculates the company's financial data over the years, and determines the enterprise's financial risk level and bankruptcy possibility through model scores, achieving precise measurement and dynamic monitoring of financial risks. On this basis, combined with qualitative analysis, the root causes and influencing factors of risks are deeply explored, achieving a combination of quantitative and qualitative analysis, theory and practice integration, ensuring that the research process is scientific and rigorous, and the research conclusions are true and reliable, providing solid data support and methodological guarantee for the subsequent proposal of risk prevention and control strategies.

2. Literature review

The Z-score was proposed by American scholar Altman in 1968 and was initially used for predicting the bankruptcy of manufacturing enterprises. Since the Z-score was proposed, the adaptability of the Z-score has been continuously tested and expanded in different countries and industries. For example, the review study by Altman et al. in 2017 affirmed the predictive efficacy of this model in an international context, providing theoretical support for its cross-domain applications [3].

In the field of research on financial risks in the retail industry, scholars have gradually recognized the particularity of this sector. Kaufinger and Neuenschwander conducted a study on the bankruptcy phenomenon of American retail enterprises and found that the choice of inventory valuation method significantly affects the survival probability of retail enterprises [4]. Adopting the cost-based inventory valuation method increases the failure probability of the enterprise by 2.3 times, revealing the significant impact of inventory management and accounting policy selection on the financial risks in the retail industry. From the perspective of the supply chain, Davis et al. conducted an experimental study and found that retail enterprises facing bankruptcy risks would significantly reduce the order quantity, while suppliers tended to lower the wholesale price to hedge the risk. This further reveals the transmission mechanism of financial risks in the supply chain [5].

In recent years, the research on financial risks has begun to expand in multiple dimensions. Habib et al. systematically reviewed the empirical literature on financial distress, defining it as the state where a company is unable to generate sufficient income to repay its debts [6]. They analyzed the consequences of financial distress from perspectives such as corporate governance and market reactions. At the research method level, Mai et al. combined deep learning models with textual information and discovered that the textual features of management discussion and analysis could significantly improve the accuracy of bankruptcy prediction, thus opening up a new path for financial risk research [7].

Overall, the existing research has achieved significant results in financial risk warning models, analysis of retail industry characteristics, and multi-source data fusion. However, there is still a need for further in-depth research on the financial risks of Chinese physical retail enterprises in the context of digital transformation. With the constant revision and improvement of the model, the Z-score has been widely applied in the financial risk monitoring of multiple industries such as retail, real estate, sports goods, and so on. The measurement criteria of Z-score are more comprehensive because more consideration was given to the capital level of the bank and changes in the change when constructing the Z-score model [8]. This paper takes Yonghui Supermarket as a case and uses the Z-score model for empirical analysis, which can fill the gaps in existing research and provide a new perspective for understanding the financial risks of Chinese retail enterprises.

3. Overview of the Z-score model

The Z-score was proposed by the American scholar Edward Altman in 1986. The model calculates multiple financial ratios based on the financial data in the public reports of the enterprise, assigns corresponding weights to each ratio according to its importance in financial risk prediction, and finally obtains the overall risk score of the enterprises (i.e., the Z-score) through weighted summation. The Z-score can be applied in measuring the financial stability of enterprises. Generally, a lower Z-score indicates a higher possibility that the enterprise is facing financial difficulties or going bankrupt. The classic calculation formula of the Z-score is as follows:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 0.999X5 \tag{1}$$

Among them, the meaning of each variable are as follows: X1=working capital/total assets, reflecting an ability of enterprise to repay short-term debts; X2=retained earnings/ total assets, reflecting the cumulative profitability and stability of financial structure of an enterprise; X3=earnings before interest and taxes/total assts, reflecting the profitability of an enterprise; X4=equity of shareholder/liabilities, reflecting the financial structure of an enterprise; X5=operating revenue/total assets, reflecting revenue efficiency of an enterprise.

According to the magnitude of the Z-score, the financial status of the enterprises is usually classified into three categories: crisis zone ($Z < 1.81$): the enterprise faces high risk of bankruptcy; gray alert zone ($1.81 \leq Z \leq 2.99$): the financial statue of enterprise is unstable; safe zone ($Z \geq 2.99$): the financial statue of the enterprise is good and the risk of bankruptcy is relatively low.

4. Key financial indicators of Yonghui superstore

4.1. Profitability: continuous losses, poor profitability

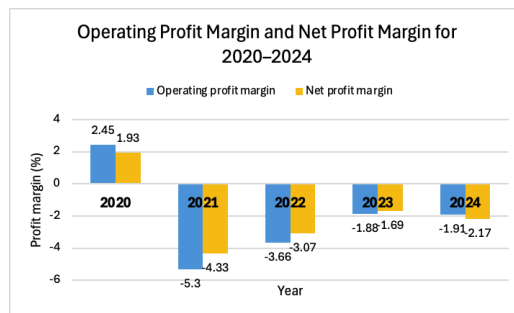


Figure 1. Operating profit margin and net profit margin for 2020-2024

As shown in Figure 1, according to the 2024 financial statement of Yonghui Superstore, the operating profit margin and net profit margin have been negative for several consecutive years. In 2024, they were -1.91% and -2.17% respectively, indicating that the company's main business has been continuously incurring losses. The profit efficiency is low, with the total asset return rate and weighted net asset return rate both being negative, at -3.09% and -29.17% respectively in 2024. This shows that both assets and net assets have been continuously depreciating. The gross profit margin remained within the range of 18% to 21%, at 20.46% in 2024. This indicates that the product itself still has some profit margin, but it cannot cover the period expenses, ultimately leading to losses.

4.2. Debt-paying ability: high debt levels, significant short-term repayment pressure

The company has poor debt-paying ability and a high debt level. Both in the short term and the long term, the repayment pressure is high. The debt-to-asset ratio has risen from 63.69% in 2020 to 89.87% in 2024, indicating that the debt scale is expanding quickly and the long-term debt repayment has become very high. The current ratio and quick ratio are 0.76 and 0.45, respectively, both significantly lower than 1. An insufficient current ratio means that the current assets available to Yonghui Superstores cannot cover its current liabilities. The low quick ratio further shows that after deducting the inventory with poor liquidity, Yonghui Superstore has less available cash, and the short-term cash flow is under more pressure.

4.3. Operational capacity: the turnover efficiency is acceptable, but it has not been converted into profits

The accounts receivable turnover rate (197.47 times) and the inventory turnover rate (7.01 times) remained at a high level, indicating that the collection of payments and inventory turnover efficiency were acceptable; the total asset turnover rate (1.43 times) was relatively stable, but the efficient asset turnover did not lead to profits, reflecting a fundamental problem in the profit model.

The growth rate of operating income has been negative for four consecutive years. In 2024, it was -14.07%. The revenue scale has continued to shrink. The growth rate of total assets (-17.87%) and the growth rate of net assets (-25.25%) are both negative, indicating that the company's scale and shareholders' equity are continuously shrinking. The growth rates of operating profit and net profit have been zero for three consecutive years, and in 2021, there were sharp drops of -311.30% and -319.78%, with the company's profitability coming to a standstill.

To sum up, the Yonghui Superstore is currently in a situation of continuous losses, high debt and shrinking scale with extremely high financial risks. Although some operational indicators (such as accounts receivable and inventory turnover) are acceptable, the fundamental problems of its profitability and development capabilities cannot be hidden.

5. Z-score calculation results

As shown in Table 1, the financial indicators Yonghui Superstores have shown a significant deteriorating trend over the past five years: X1 has been negative for five consecutive years, indicating that the enterprise has been chronically short of working capital and its short-term solvency remains persistently weak; X2 turned from 0.09 in 2020 to negative values for the following four years, reflecting a significant decline in the cumulative profitability of company and the loss of stability in its financial structure; X3 were negative in 2021, 2022 and 2024, core profitability is worrying; The X4 index fluctuated significantly. It dropped to around 0.6 from 2021

to 2023, indicating that the enterprise's debt scale was relatively large and the financial structure was unbalanced. X5 plummeted sharply to 0.51 in 2023, with a significant decline in asset operation efficiency. Although it showed some improvement in 2024, its overall performance was still poor.

Table 1. Annual changes in financial indicators

	X1	X2	X3	X4	X5
2020	-0.03	0.09	0.04	1.81	1.66
2021	-0.08	-0.04	-0.04	0.61	1.28
2022	-0.07	-0.09	-0.03	0.61	1.45
2023	-0.11	-0.13	0.002	0.55	0.51
2024	-0.18	-0.20	-0.01	1.50	1.58

According to Figure 2, the Z-score generally shows a trend of first decreasing and then slightly recovering. The Z-score in 2020 was 2.969, on the edge of the grey alert zone, and the signs of financial risk have already emerged. The Z-scores from 2021 to 2023 were 2.361, 1.506 and 0.583, both lower than 1.81, entering the crisis zone with high financial risks, and the Z-score in 2023 reached the lowest level in five years, the financial risk is the greatest. In 2024, the Z-score rebounded to 1.935, returning to the gray alert zone, but it remains stable and risks still exist.

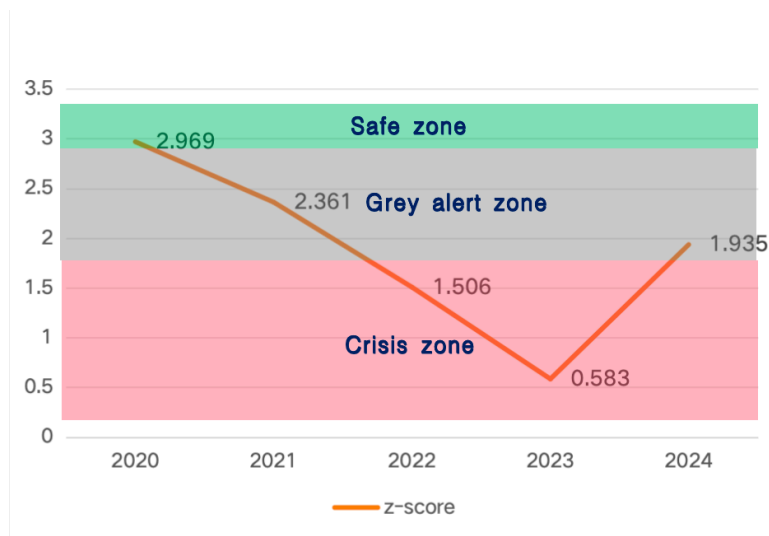


Figure 2. Z-score line chart and risk interval

The significant increase in the Z value from 2023 to 2024 was mainly due to the strategic contraction and capital operations initiated by Yonghui Supermarket, which directly improved the key indicators in the model. Firstly, asset efficiency was enhanced. The company achieved this by closing a large number of loss-making stores, reducing its total assets while concentrating its revenue on effective assets, and pushing the ratio of operating income to total assets (X5) from 0.51 to 1.58. Secondly, losses were effectively controlled. Through store closures and cost control, the operating losses were significantly reduced, preventing the further deterioration of the earnings before interest and taxes to total assets (X3), providing a foundation for the Z value's recovery. In summary, this was a rapid repair of the balance sheet. Yonghui Supermarket pulled the company out of the high-risk zone by closing stores and reducing losses. However, due to the still tight short-term liquidity (X1) and the fact that the sustainable profitability (X3) has not been fundamentally

reversed, the company only returned to a "gray warning" state rather than true safety. The key to the future lies in whether the repaired financial structure can be transformed into stable internal profitability.

6. Discussion

From the perspective of the external environment, the competition in the retail industry has intensified as people are increasingly inclined to purchase groceries and daily necessities online through platforms such as JD, Taobao, and Meituan, which is more convenient and time-saving. As a result, many traditional supermarkets have lost business to these online shopping platforms. Coupled with changes in consumer demands, the development of traditional supermarkets has stagnated and profits have decreased. Therefore, the integration of online and offline supermarkets is of vital importance. This is not an indication of technological progress, but rather a re-shaping of the entire supermarket industry [9]. Just like the company has a problem of insufficient profitability, which is specifically manifested in the decline of gross profit margin and net profit margin, and directly affects X3, which is an important reason for the decline in the z-score. Kliestik et al. emphasize that maintaining financial health indicators (such as profitability and equity-liability ratio) is the foundation for enterprises to maintain competitiveness. The deterioration of X2 (retained earnings), X3 (earnings before interest and taxes), and X4 (equity-liability ratio) of Yonghui Supermarket is a direct signal that its financial health has raised a red flag [10]. In terms of capital structure, the enterprise has a high debt scale and the equity value is not stable, the debt repayment pressure is relatively large. In addition, there is also room for improvement in operational efficiency, with low inventory turnover efficiency and high loss of fresh food products, which not only affects the efficiency of fund utilization but also increases financial risks.

7. Conclusion

This article employs the Z-score model to conduct a systematic early warning analysis of the financial situation of Yonghui Supermarket over the past five years. The research shows that the financial situation of Yonghui Supermarket has been on a downward trend in the past five years. Although it has somewhat recovered at present, maintaining stable finances is also a major challenge. The main risks include a significant decline in profitability and an excessively high debt ratio. To address the financial difficulties, Yonghui Supermarket needs to implement multi-level comprehensive management, which mainly includes controlling debt levels, improving operational efficiency, and optimizing cash flow management; promoting the integration of online and offline supermarkets to increase the novelty of customers and enhance Yonghui Supermarket's competitiveness among other supermarkets. The research indicates that the core of a successful omni-channel strategy lies in creating a seamless and value-added shopping experience for consumers; improving operational efficiency, reducing inventory consumption, and making every effort to minimize losses. Only by promptly issuing financial warnings and making scientific decisions can Yonghui Supermarket achieve sustainable development in the highly competitive market environment.

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