Research on the Influence of Internal Control on Enterprise Credit Risk

Xiaohui Wang, Fangying Yuan

Department of Management, Shanghai University of Engineering Science, Shanghai 201600, China

Corresponding author: Fangying Yuan
471064795@qq.com

Abstract. This paper empirically tests the relationship between internal control and credit risk by taking a-share listed companies from 2014 to 2018 as samples. It is found that the quality of internal control is positively correlated with the credit risk. Further analysis shows that the five elements of internal control are significantly related to the size of credit risk, among which the internal environment, information and communication elements have a more significant impact on credit risk.

1. Introduction
Since the 21st century, with the Enron incident, Worldcom and other major financial frauds successively exposed, the United States issued the Sarbox Act in 2002, after which internal control has become the focus of attention at home and abroad. China also issued the Basic Norms for Internal Control of Enterprises in 2008, and five ministries and commissions of the Central Government issued the supporting guidelines for internal control of enterprises in 2010. Domestic internal control management system is basically completed, domestic scholars have also opened the pace of internal control research. In particular, in recent years, with the occurrence of default events, many scholars begin to pay attention to the influence of internal control on corporate credit risk. Duan Xiaole and Yang Yi respectively studied the bond defaults of Chaori and Gangtai Group and found that the major defects in internal control were one of the main reasons for bond defaults.

At present, scholars have done a lot of research on the economic consequences and influencing factors of internal control. There are many factors that influence internal control. For example, management shareholding, stock liquidity will have an impact on the level of internal control. What’s more, many scholars have drawn effective conclusions about the economic consequences of internal control. High-quality internal control can significantly reduce information asymmetry and improve the information environment of enterprises. High-quality internal control can reduce the external financing cost of enterprises and effectively alleviate financing constraints. High quality internal control plays an important role in preventing and controlling various risks. In addition, high-quality internal control can help analysts make more accurate earnings forecasts. However, most literatures only combine internal control with operational risk and financial risk. There is little literature that considers both credit risk and internal control. In addition, few literatures consider the relationship between internal control and various risks based on the five elements of internal control. Therefore, this paper will be further combined with the five elements of internal control, to explore its relationship with the credit risk, so as to help better manage the credit risk internal control.
According to the theory of information asymmetry, in the process of trading, the information possessed by both parties is usually different, and the party with more information is usually in a favorable position. When the subject is the investor and the enterprise, the enterprise is the advantageous party. In the process of making investment decisions, investors usually rely on the information released by enterprises to make investment decisions. Due to the existence of moral hazard, enterprises tend to hide bad news, which will aggravate the information asymmetry between investors and enterprises. Once investors perceive the abnormal behaviors of enterprises, credit risks will be easily triggered. According to the principal-agent theory, shareholders pursue the maximization of their own wealth, while management pursues the maximization of salary and free time, and the differences between the two goals lead to agency conflicts. When shareholders lack effective supervision of managers, the managers will damage the rights and interests of shareholders by opportunism. Internal control as an important part of corporate internal governance. Through the effective design and operation of internal control, whether it can alleviate information asymmetry and agency conflict to reduce the possibility of credit risk will become the focus of this paper.

2. Theoretical Analysis Hypothesis
There are many factors affecting the credit risk of enterprises. For example, excessive investment behavior, overconfidence of managers, financing constraints and so on will lead to potential credit risks. Effective internal control can restrain the excessive investment behavior of enterprises and ensure sufficient capital flow to deal with the uncertainty of future operation. The better the internal control quality is, the external financing cost of the enterprise can be effectively reduced, and the bank debt financing cost obtained by the enterprise is lower. Therefore, the possibility that the enterprise will not be able to pay in time will be greatly reduced. The possibility of enterprise credit risk is reduced accordingly.

In addition, high-quality internal control can effectively reduce the internal and external information asymmetry, alleviate the agency problem, so as to effectively reduce the information risks faced by enterprises. High-quality internal control can provide investors, creditors and other information users with the real situation of the enterprise. Financial report is an important basis for information users to understand the status of enterprises in the past, present and future. One of the objectives of internal control is to ensure the authenticity and reliability of financial reports. So the quality of internal control can provide information users with real, reliable accounting information, and improve the quality of accounting information, so that the information asymmetry of internal and external can be alleviated. In addition, high-quality internal control can help analysts make more accurate earnings forecast. Based on this, high-quality internal controls can help external information users obtain real and reliable information of enterprises.

According to the principal-agent theory, the interests of the management and shareholders are inconsistent. When the shareholders lack the restraint and supervision mechanism on the management, the management will damage the rights and interests of shareholders through opportunistic behaviors. The management is prone to misuse of funds, excessive investment and other behaviors, which will affect the operation of the enterprise and cause credit risks. And high quality internal control can reduce the agency costs faced by enterprises and alleviate agency conflicts. Internal supervision is one of the five elements of internal control. Under high-quality internal control, it can significantly improve the excessive investment behavior of the management, improve the efficiency of the company's capital investment, reduce the opportunism of the management, and thus alleviate the agency conflict between the two.

Based on the above theoretical analysis, the following hypotheses are proposed:

The higher the quality of internal control, the lower the level of credit risk faced by enterprises.

3. Study Design

3.1. Sample Selection and Data Sources
In this paper, companies listed in a-share market from 2014 to 2018 are selected as research samples, and data selection is carried out according to the following conditions: (1) considering that the role of strategy is not easy to be reflected in the short term, companies listed for less than three years are excluded; (2) considering that ST and *ST companies cannot normally implement the strategy, the companies that are subject to ST and *ST during the study period are excluded; (3) eliminate companies with incomplete financial data and extremely abnormal financial data. After processing, 6905 valid observations were obtained, and the sample data were processed at 1% level. The selected data were all from CSMAR database. Stata15.1 and MATLAB 2019a were used for data processing and analysis.

3.2. Variable Definitions

3.2.1 Explanatory variable: Internal control quality (ICQ)

The quality of internal control is measured by the natural logarithm of the internal control index plus the number one. Among them, the internal control index comes from DIB database.

3.2.2 Explained variable: Credit risk (DD)

This paper calculates the default distance based on the modified KMV model, and measures the credit risk of listed companies by default distance. The smaller the default distance, the higher the level of credit risk. Based on the calculation formula and assumptions of the KMV model, this paper uses MATLAB 2019a version to iterate the formula and obtain the required default probability. Where, the calculation formula of KMV model is as follows:

\[
\begin{align*}
    d_1 &= \frac{\ln \left( \frac{V}{D} \right) + \left( r + \frac{1}{2} \sigma^2 \right) t}{\sigma \sqrt{t}} \\
    d_2 &= d_1 - \sigma \sqrt{t} \\
    \sigma_E &= \frac{V}{E} N(d_1) \sigma_A \\
    DD &= \frac{V - D}{V \sigma_A} 
\end{align*}
\]

E is the equity value; V is the asset value; \( \sigma_A \) is the volatility of asset value; \( \sigma_E \) is the stock price volatility; T is the debt maturity (where T is equal to one); D is the book value of the adjusted liability; R is the risk-free interest rate, and DD is the default distance.

3.2.3 Control variables

Referring to existing credit risk influencing factors, the following variables are controlled in this paper: liquidity ratio CR, listing time Age, operating capacity TQ, and dummy variables of industry and year.

4. Empirical Results Analysis

4.1. Descriptive statistical results

Table 1 shows the descriptive statistical results of variables. As shown in the table, the average DD default distance is 2.286, where the minimum and maximum values are 0.776 and 5.265 respectively, indicating that most enterprises have a large default distance and face a small credit risk, while a few enterprises have a high level of credit risk. The average value, minimum value and maximum value of internal control quality are 6.368, 0 and 6.805, respectively. The results show that most enterprises have a high level of internal control, but there are still a few enterprises with internal control failure or significant defects.
Table 1 Descriptive statistical results

| Variable | Mean | Std.Dev. | Min  | Max  |
|----------|------|----------|------|------|
| DD       | 2.286| 0.845    | 0.776| 5.265|
| ICQ      | 6.368| 0.840    | 0.000| 6.805|
| CR       | 1.970| 1.503    | 0.272| 12.253|
| Age      | 13.870| 6.079  | 4    | 28   |
| TQ       | 2.106| 1.284    | 0.871| 9.093|

4.2. Regression results of internal control quality and credit risk

Table 2 shows the regression results of internal control quality and enterprise credit risk. Table 2 (1) lists the regression results of both under the full sample, and Table 2 (2) and (3) lists the regression results of state-owned enterprises and private enterprises under different property rights. It can be seen from the table that, under the full sample, the coefficient of ICQ is significantly positive at the significance level of 1%, indicating that the higher the quality of internal control, the greater the default distance, and the lower the level of credit risk faced by enterprises. The hypothesis is validated. In the state-owned enterprise group and the private enterprise group, the ICQ coefficient is significantly positive at the significance level of 5%, and the private enterprise group's ICQ coefficient is lower than that of the state-owned enterprise group, indicating that the internal control of the state-owned enterprise has a more significant impact on credit risk than the private enterprise group.

Table 2 Regression results of internal control quality and credit risk

| Variable | (1)     | (2)     | (3)     |
|----------|---------|---------|---------|
| DD       |         |         |         |
| ICQ      | 0.037***| 0.038** | 0.036** |
|          | (3.10)  | (2.01)  | (2.20)  |
| CR       | 0.031***| 0.050***| 0.027***|
|          | (4.35)  | (4.18)  | (2.78)  |
| Age      | 0.020***| 0.011***| 0.027***|
|          | (12.15) | (3.93)  | (10.24) |
| TQ       | -0.187***| -0.214***| -0.186***|
|          | (-22.42)| (-15.94)| (-15.86)|
| Constant | 2.096***| 2.257***| 2.044***|
|          | (25.09) | (16.90) | (18.16) |
| Industry | Control | Control | Control |
| Year     | Control | Control | Control |
| R-squared| 0.105   | 0.085   | 0.120   |

5. Further analysis

The relationship between internal control quality and enterprise credit risk has been studied above. This chapter will further study its relationship with credit risk based on the five elements of internal control. The five elements of internal control include internal environment(IE), risk assessment(RA), control activities(CA), information and communication(IAC), and internal supervision(IS). The regression results are shown in Table 3. It can be seen from the table that all the five elements of internal control are significantly correlated at the significance level of 1%, among which the four elements of internal environment, control activities, information and communication, and internal supervision are significantly positively correlated with default distance, that is, they are significantly negatively correlated with credit risk. In addition, risk assessment elements are significantly negatively correlated with default distance, that is, significantly positively correlated with credit risk. According
to the results of R-squared, the goodness of fit of internal environment, information and communication elements is better than the other three elements, indicating that enterprises should give full play to the role of internal control in the process of credit risk management, especially pay attention to internal environment elements, information and communication elements.

Table 3 Regression results of five elements of internal control and credit risk

| Variable | (1) | (2) | (3) | (4) | (5) |
|----------|-----|-----|-----|-----|-----|
| DD       | DD  | DD  | DD  | DD  | DD  |
| IE       | 0.073*** (20.02) |     |     |     |     |
| RA       | -0.069*** (-8.91) | 0.029*** (7.47) |     |     |     |
| CA       |     |     |     |     |     |
| IAC      |     |     |     |     | 0.127*** (13.60) |
| IS       |     |     |     |     | 0.030*** (8.88) |
| CR       | 0.021*** (3.07) | 0.027*** (3.70) | 0.030*** (4.14) | 0.032*** (4.49) | 0.032*** (4.44) |
| Age      | 0.020*** (12.30) | 0.019*** (11.10) | 0.021*** (12.50) | 0.023*** (13.87) | 0.017*** (9.90) |
| TQ       | 0.166*** (-20.21) | -0.192*** (-22.85) | -0.184*** (-21.93) | -0.166*** (-19.70) | -0.183*** (-22.06) |
| Constant | 1.801*** (42.42) | 2.810*** (44.25) | 2.084*** (43.61) | 1.946*** (44.50) | 1.993*** (39.22) |
| Industry | Control | Control | Control | Control | Control |
| Year     | Control | Control | Control | Control | Control |
| R-squared| 0.156 | 0.114 | 0.109 | 0.129 | 0.115 |

6. Conclusions and Implications
This paper empirically tests the relationship between internal control and credit risk by taking a-share listed companies from 2014 to 2018 as samples. At the same time, the whole sample is grouped according to different property rights. It is found that the higher the quality of internal control is, the smaller the credit risk is. And the internal control of state-owned enterprises has a more significant impact on credit risk than that of private enterprises. Through further analysis, it is found that the five elements of internal control are significantly related to the impact of credit risk, among which internal control, information and communication elements have a good interpretation of the relationship between credit risk.

This study provides a good perspective of internal governance for enterprise credit risk management. And promoting the construction of internal control can effectively prevent the occurrence of credit risk. In addition, in the design and operation of internal control, enterprises should focus on the internal environment, information and communication factors on the impact of credit risk.

Acknowledgments
This work was financially supported by National Natural Science Foundation of China Youth Program (71704102), Ministry of Education Humanities and Social Sciences Youth Fund Project
(15YJCZH060), Accounting discipline construction project, university scientific research start-up fund.

References

[1] Fang Hongxing, Jin Yuna. Can high-quality internal control inhibit earnings management? Empirical Research based on voluntary internal control Verification Report [J]. Accounting Research, 2011, 8: 53-60 (in Chinese).

[2] Chen Zuohua, Fang Hongxing. Financing Constraint, Internal Control and Corporate Tax Avoidance [J]. Management Science, 2008, 31(3): 125-139 (in Chinese).

[3] Dong Wang, Chen Jun, Chen Hanwen. Does the quality of internal control affect analyst behavior? -- Empirical Evidence from China's Securities Market [J]. Financial Research, 2017, 12: 191-204 (in Chinese).

[4] Chen Hanwen, Zhou Zhongsheng. Internal control quality and corporate debt financing cost [J]. Nankai management review, 2014, 17(3): 103-111 (in Chinese).

[5] Xu Chaohui, Zhou Zongfang. Research on the Impact of Earnings Management driven by financing needs on corporate credit risk [J]. Management Review, 2016, 7: 12-21 (in Chinese).

[6] Zhang Ruijun, Li Xiaorong. Pyramid structure, Performance Fluctuation and Credit Risk [J]. Accounting Research, 2012, 3: 62-71 (in Chinese).