# Research on Managerial Overconfidence, Corporate Financial Risk and Corporate Surplus Management

Luyu Yang

School of Economics and Management, Harbin Institute of Technology (Weihai), Weihai, China

1685363150@qq.com

**Abstract.** Based on the data of A-share listed companies in Shanghai and Shenzhen from 2008 to 2018, this paper investigates the impact of corporate financial risk on corporate surplus management and further tests the heterogeneous role of power concentration and overconfidence on corporate financial risk through heterogeneity analysis. The empirical findings show that (i) all else being equal, corporate financial risk has a significant contribution to corporate surplus management, i.e., an increase in corporate financial risk causes firms to engage in surplus management behavior; further heterogeneity analysis results show that (ii) all else being equal, overconfident firms have an inhibitory effect on the positive relationship between financial risk and surplus management. In addition, the paper finds that the previous findings remain robust through lagged variable regressions, the use of instrumental variables and the replacement of different measures of surplus management. Finally, the paper combines the findings with corresponding policy recommendations and insights.

**Keywords:** Corporate Financial Risk; Surplus Management; Overconfidence.

## 1. Introduction

Hutton et al. (2009) and Kim et al. (2011) argue that the quality of a firm's accounting information can be reflected by the level of its surplus management, i.e., The degree of surplus management is inversely proportional to the transparency of the firm. Wei Minghai (2000) argues that surplus management is the process by which management "constructs" transactions or makes accounting choices to change financial reports to mislead users of accounting information. Due to the separation of management and ownership and the secrecy of research and development activities, the existing research on surplus management is based on the conflict between agency and contract theory and information mismatch and has studied corporate surplus management behavior in depth in terms of capital market motives, contractual motives, regulatory motives and debt contract motives. We should recognize that while companies may engage in surplus management for a variety of these motives, surplus management as a means of profit manipulation is a distortion of accounting information that is detrimental to long-term corporate development. 2001 saw Enron Corporation (Enron) manipulate earnings and disguise risks through covert surplus management to gain a foothold in the competitive capital markets, ultimately becoming the largest in US history the largest corporate bankruptcy on record.

In traditional financial research, the 'rational person' assumption has been the basis of most studies. However, in reality, irrational investment decision-making behavior is common. Gervais, Heaton and Odean (2002) propose a theory of overconfidence, which defines overconfidence as a belief that one's knowledge is more accurate than it is, i.e., that one gives more weight to one's information than is in fact the case. Overconfidence theory argues that managers are not fully compliant with the 'rational person' hypothesis and that their decision-making processes are susceptible to irrational factors, which habitually produce cognitive biases such as overconfidence and overoptimism, as well as differences in preferences such as loss aversion. Managerial overconfidence, an important psychological factor influencing managerial behavior, can also lead to biased decision-making. HSIEH et al. found that after the enactment of the SOX Act, overconfident managers of listed companies would use actionable accrued profits to increase revenue, influencing corporate surplus management and interfering with the timely and accurate recognition of accounting information. In other words, overconfident managers may use surplus management to achieve desired profitability

goals, and the decisions they make can affect the quality of accounting information and cause the business to operate at a level that deviates from expectations. Therefore, it is necessary to incorporate theories of behavioral finance such as overconfidence into the study of managers' surplus management behavior, and it is also of more effective practical significance.

Among the information disclosure violation cases announced by the SFC in 2020, financial falsification cases dominated, with 51 cases of financial falsification by listed companies punished throughout the year. Among them, on 1 February 2020, RuiXing coffee was exposed by Muddy Waters in the United States for shorting, and subsequently, RuiXing was forced to admit to falsifying transactions of RMB2.18 billion and financial falsification during the period from 2Q to 4Q 2019. In May of the same year, the China Securities Regulatory Commission (CSRC) found that a number of annual reports disclosed by Kangmei Pharmaceuticals from 2016-2018 contained false records and material omissions and other financial falsifications, inflating operating revenue by RMB27.515 billion, interest income by RMB510 million and operating profit by RMB3.926 billion.2021 Among the 609 cases handled by the CSRC, a large number of corporate falsifications were involved, including falsifying engineering progress, early recognition of inflated profits, falsification of bank statements, appropriation of investment funds and other means. Corresponding to the widespread surplus management phenomenon is China's increasingly stringent external regulatory environment. 339 administrative penalty decisions were handed down in 2020, involving a variety of acts such as letter-disclosure violations, insider trading, market manipulation and fabrication and dissemination of false information, compared to 304 cases in 2019, an increase of approximately 10% year-on-year; the annual amount of fines and forfeitures was RMB5.296 billion, compared to 2019's fines and forfeitures of amounting to RMB4.183 billion, representing a year-on-year increase of 25%. Therefore, against the background of enhanced regulation while corporate surplus management is still common, it is necessary to study corporate surplus management, improve the accuracy and reliability of financial information, maintain the order of the capital market and promote healthy economic development.

Taken together, existing research suggests that there is a relationship between corporate surplus management and corporate financial risk, which has certain research implications; at the same time, existing research suggests that overconfidence on the part of managers may lead to actual corporate operating results falling short of managers' expected profitability targets, which gives managers an incentive to engage in surplus management. When the degree of surplus management increases, it may lead to financial risk. This has important practical implications and research value. Current research on the factors influencing surplus management focuses on the external environment, policies and systems, internal governance, executives and corporate characteristics, with little research on corporate financial risk to surplus management. Therefore, in the current context, it is urgent to study the relationship between corporate financial risk and surplus management and to try to open the black box of the mechanism of the role of corporate financial risk and surplus management from the perspective of overconfidence.

In view of this, this paper investigates the impact of corporate financial risk on corporate surplus management based on the data of A-share listed companies in Shanghai and Shenzhen from 2008 to 2018 and further tests the heterogeneous role of power concentration and overconfidence on corporate financial risk through heterogeneity analysis. The empirical findings show that (1) all else being equal, corporate financial risk has a significant facilitating effect on corporate surplus management, i.e., an increase in corporate financial risk causes firms to engage in surplus management behavior; further heterogeneity analysis results show that (2) all else being equal, overconfident firms have an inhibiting effect on the positive relationship between financial risk and surplus management. Finally, the paper combines the findings with corresponding policy recommendations and insights.

# 2. Empirical Design

## 2.1 Model

$$DA1_{it} = \beta + \beta_1 * RISK_{it} + \alpha\, CVs_{it} + \sum Stkcdfe + \sum Yearfe + \mu_{it}$$

where $DA1_{it}$ represents the level of corporate surplus management of firm i in year t and $RISK_{it}$ represents the corporate financial risk of firm i in year t. $CVs_{it}$ represent the control variables.

## 2.2 Variable Design

1. Surplus management

Scholars at home and abroad have conducted much research on surplus management indicators, and common models include the Healy model, Jones model, modified Jones model, cross-sectional Jones model, modified cross-sectional Jones model and cross-sectional Jones model of current accrued profits. Xia Lijun (2003) shows that the cross-sectional Jones model performs better than other models in measuring the level of surplus management of a company. Therefore, the cross-sectional Jones model is used to measure the level of surplus management. The calculation method is as follows.

$$NDA_t = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta REV_t}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}}$$

where $NDA_t$ denotes the nonmanipulated accrued profit in period t, $A_{t-1}$ denotes the total assets in period (t-1), $\Delta REV_t$ denotes the difference in income between period t and period (t-1), $PPE_t$ denotes the value of fixed assets in period t, and $\alpha_1\alpha_2\alpha_3$ are firm characteristic parameters, which are obtained from the following linear regression.

$$\frac{TA_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta REV_t}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}}$$

where$TA_t$ denotes the total accrued profit in period t.

Therefore, operable accrued profit = total accrued profit - nonoperational accrued profit, i.e., $DA_t = TA_t - NDA_t$.

2. Financial risks

**Table 1.** Design of control variables

| Variable name | Variable symbols | Variable Description |
|---|---|---|
| **Concentration of power** | *BOTH* | Dummy variables for both the chairman and managing director of a listed company, with a value of 1 for the two positions combined and 0 otherwise |
| **Overconfidence** | *CON* | Compare the top three highest paid executives with the industry average, above the industry average is recorded as 1 and the opposite is recorded as 0 |
| **Size of business** | *SIZE* | Ln (total assets) |
| **Gearing ratio** | *LEV* | Total liabilities/total assets |
| **Profitability** | *ROA* | Net profit/total assets |
| **Board size** | *BOARD* | Ln (number of board members) |
| **Executive shareholding ratio** | *SR* | Executive shareholding as a percentage of total shareholding = number of management shares/paid-up capital |
| **Nature of ownership** | *STATE* | State-owned enterprises are recorded as 1, otherwise they are recorded as 0 |
| **Age of business** | *AGE* | Number of years the business has been established |

The most widely accepted model for measuring financial risk is the multivariate financial formula "Z Score Financial Risk Early Warning Model" created by Altman in 1968; therefore, this paper uses this model to measure the level of financial risk of an enterprise. The model is therefore used to measure the level of financial risk. The formula is:

Z = 0.012*(current assets - current liabilities)/total assets + 0.014*(undistributed profit + surplus)/total assets + 0.033*(profit before tax + interest expense)/total assets + 0.006*(market price per share * total equity)/total liabilities + 0.999*income from main business/total assets.

The higher the probability of bankruptcy, i.e., the higher the financial risk.

The remaining variables are designed as shown in the table 1.

### 2.3 Data Sources

In this paper, all A-share listed companies from 2008-2018 were selected as the sample and screened: (i) to exclude listed companies in the financial and insurance sectors and real estate sectors, as they are overleveraged and prone to outliers compared to other sectors; and (ii) to exclude samples with missing data, resulting in a final sample of 14,941 annual company observations. The data were obtained from the Guotaian database and manually collated by the author. To mitigate the effect of extreme values, the main continuous variables in the analysis were Winsorized at the 1% and 99% levels in this paper.

## 3. Empirical Results

### 3.1 Descriptive Statistics

**Table 2.** Descriptive statistics of the main variables

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| da1 | 0.012 | 0.446 | -11.329 | 20.031 |
| risk | 0.066 | 0.042 | 0 | 0.15 |
| STATE | 0.479 | 0.5 | 0 | 1 |
| SR | 0.108 | 0.25 | 0 | 12.063 |
| LEV | 0.455 | 0.205 | 0.007 | 2.529 |
| SIZE | 22.165 | 1.328 | 15.577 | 28.52 |
| BOARD | 2.165 | 0.201 | 1.099 | 2.89 |
| AGE | 2.653 | 0.42 | 0 | 3.892 |
| ROA | 0.038 | 0.067 | -2.746 | 0.59 |

Descriptive statistics for the main study variables are shown in Table 2.

The descriptive statistics of the main study variables are shown in Table 2. The indicator of surplus management, da1, has a mean value of 0.012, a standard deviation of 0.446, a minimum value of -11.329 and a maximum value of 20.031, indicating that the surplus management of the study sample includes both positive and negative surplus management and that there are significant differences between the samples. The mean value of risk, a measure of the financial risk of enterprises, is 0.066, with a standard deviation of 0.042, a minimum value of 0 and a maximum value of 0.15, indicating that the financial risks in the sample do not differ significantly, some enterprises even do not have financial risk problems, and the overall level of financial risk is low. The nature of ownership, as a binary variable, has a mean value of 0.479, indicating that the number of nonstate enterprises in the sample is slightly greater than that of state enterprises. The standard deviation of SR for executive shareholding is 0.25, with a maximum value of 12.063 and a minimum value of 0, indicating that the maximum percentage of executive shareholding in the sample is 12.063% and that there are some managements who do not hold shares. The mean value of the gearing LEV was 0.455, indicating that the average level of gearing in the sample was 45.5%. After excluding financial and insurance companies, there were still some companies with high leverage, with a gearing as high as 2.529, indicating that on average, there were 2.529 units of debt for one unit of assets, and the debt risk was

high. The mean value of SIZE of firms was 22.165 with a standard deviation of 1.328, indicating a significant size gap between firms. The mean value of board size BOARD is 2.165, and the average age of enterprises is 2.653. There are enterprises in the sample that have just gone public, and the age of the longest listed enterprise is 3.892. The mean value of net profit margin on total assets is 0.038, and the minimum value is -2.746, indicating that there are loss-making enterprises in the sample and that the overall return on assets is low.

### 3.2 Relevance Analysis

The correlation analysis of the main variables is shown in the figure. The correlation coefficients of the explanatory variables and the control variables are mostly between 0.1 and 0.5, and multicollinearity is not obvious; the correlation coefficients between the explanatory variables, the control variables and the explanatory variables mostly show significant performance, indicating that the model variables are appropriately selected, and the regression data obtained based on this model are more convincing. From the perspective of correlation, the correlation coefficient between financial risk indicators and surplus management was 0.019, showing a positive correlation, which was tentatively determined to be consistent with the hypothesis of this paper; that is, corporate financial risk would force companies to engage in surplus management. The nature of ownership, the proportion of executive shareholding and the gear ratio showed a negative correlation with surplus management; the size of the enterprise, the size of the board of directors, the age of the enterprise and the net profit margin of total assets showed a positive correlation with the surplus management of the enterprise.

**Table 3.** Correlation analysis of the main variables

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| (1) da1 | 1.000 | | | | | | | | |
| (2) risk | 0.019** | 1.000 | | | | | | | |
| (3) STATE | -0.001 | -0.216*** | 1.000 | | | | | | |
| (4) SR | -0.015 | 0.149*** | -0.400*** | 1.000 | | | | | |
| (5) LEV | -0.030*** | -0.663*** | 0.305*** | -0.254*** | 1.000 | | | | |
| (6) SIZE | 0.004*** | -0.442*** | 0.341*** | -0.226*** | 0.449*** | 1.000 | | | |
| (7) BOARD | 0.007 | -0.157*** | 0.288*** | -0.165*** | 0.146*** | 0.262*** | 1.000 | | |
| (8) AGE | 0.015* | -0.104*** | 0.166*** | -0.208*** | 0.196*** | 0.151*** | 0.017** | 1.000 | |
| (9) ROA | 0.012 | 0.327*** | -0.100*** | 0.116*** | -0.371*** | -0.002 | 0.026*** | -0.099*** | 1.000 |

The correlation analysis of the main variables is shown in the figure.

### 3.3 Regression Results and Analysis

Regression analysis was conducted on the sample, and the results are shown in Table 4. Model (1) is a regression of surplus management on financial risk alone, and the results show that the coefficient of corporate financial risk is 1.009 and the t value is 5.94, which is significantly positive at the 1% level of significance, indicating that corporate financial risk forces firms to engage in surplus management behavior, which is consistent with the hypothesis of this paper. After adding control variables such as the nature of ownership, top shareholding ratio and gearing ratio, the regression was conducted again, and the results are shown in (2). The coefficient of financial risk of enterprises is 0.435, which is significantly positive at the 5% level of significance, indicating that after adding the control variables, the financial risk of enterprises still aggravates the surplus management behavior of enterprises, and for every increase of 1 in the financial risk of enterprises, the surplus management increases by 0.435. Among the control variables, the gearing ratio is significantly negative at the 1% level, indicating that the higher the gearing ratio is, the lower the level of surplus management of enterprises. The smaller the size of the firm is, the more likely the firm is to engage in surplus management. The age of the firm is significantly positive at the 10% level, indicating that the older the firm is established, the more likely it is to engage in surplus management.

**Table 4.** Baseline regression

| | (1) | (2) |
|---|---|---|
| | da1 | da1 |
| risk | 1.009*** | 0.435** |
| | (5.94) | (2.15) |
| _cons | -0.061*** | 0.616 |
| | (-3.30) | (1.40) |
| CVs | No | Yes |
| Industry fe | Yes | Yes |
| Year fe | Yes | Yes |
| N | -0.054*** | 0.456 |
| R2 | (-4.54) | (1.64) |

Regression analysis was performed on the sample, and the results are shown in Table 4.

## 4. Conclusion and Insights

Against the backdrop of an increasingly complex external environment and fierce market competition, the phenomenon of surplus management by companies is widespread in China, attracting widespread attention from the government and society and becoming a hot issue for research. It is important to identify the motives for surplus management and thus avoid the occurrence of malignant surplus management. Based on the perspective of corporate financial risk, this paper selects data on A-share listed companies in Shanghai and Shenzhen in China from 2008-2018 and explores the impact of corporate financial risk on surplus management through a combination of theory and empirical evidence, starting from the motives of surplus management. The study finds that there is a significant positive relationship between corporate financial risk and surplus management and that the contribution of financial risk to surplus management is more significant in nonoverconfident firms than in overconfident firms. The findings provide lessons for Chinese enterprises to improve their corporate governance structure, improve the current situation of surplus management and promote the healthy development of China's capital market. Unlike previous studies, this paper examines corporate surplus management from the perspective of financial risk in combination with managerial overconfidence, which breaks through the perspective of previous surplus management studies while enriching the literature on the drivers of corporate surplus management, with implications for surplus management and even corporate governance studies. At the same time, existing solutions to corporate surplus management behavior are based on agency theory, emphasizing the impact of differences in corporate governance on surplus management behavior and ignoring the impact that managerial characteristics may have on surplus management behavior. This paper shows that the degree of rationality of the managerial team can also have an important impact on surplus management behavior and that overcoming irrational psychology in the financial decision-making process by optimizing the managerial team is also an important idea for managing corporate surplus management behavior.

The paper incorporates the conclusions and makes corresponding recommendations.

At the company level, first, it is necessary to strengthen financial risk awareness, improve the financial risk early warning mechanism, regularly analyze the level of financial risk warning and improve sensitivity to financial indicators, monitor the financial risk profile and bring the financial risk factor under control. Second, it is necessary to maintain the profitability of the company and keep financial indicators such as the gearing ratio within a reasonable range to prevent the financing risks that occur when a company raises debt on a large scale. Improve the company's accounting system and internal control mechanism, improve the accuracy and reliability of information disclosure, establish relevant systems and attach importance to the interests of management. Finally, active

measures should be taken to remedy financial risks when they occur to stop the further spread of risks and prevent the loss of control of corporate surplus management due to risks.

At the government level, supervision should be strengthened, and a multi-indicator appraisal system should be established. At present, the SFC's supervision of listed companies mainly focuses on financial indicators, so nonfinancial indicators can be included in the assessment, requiring companies to disclose more information, reducing the information asymmetry between the market and the company, comprehensively analyzing the potential and capability of the company, and reducing the need for companies to engage in surplus management. At the same time, penalties should be strengthened to increase the cost of corporate surplus management. At present, the penalties for surplus management in China are low, and the cost of penalties is extremely low compared to the gains obtained through the whitewashing of statements, resulting in companies being willing to take risks in surplus management when faced with a financial crisis. Therefore, it is necessary to strengthen the penalties for surplus management, establish a capital market blacklist, disqualify the listing of an enterprise that has illegally engaged in surplus management and restrict the enterprise's activities in the capital market.

At the investor level, it is important to rationally examine the financial risks of companies and focus on long-term returns. It is important to promote the stable development of the capital market by not focusing only on financial indicators and not investing just because of improved short-term performance and selling off when short-term performance declines. At the same time, they actively participate in the monitoring of companies' financial risks and surplus management, cooperate with the government to establish an external market monitoring mechanism, improve information transparency and reduce the scope for corporate surplus management.

The practical implications and insights of the findings are as follows: from the perspective of internal corporate governance, companies should be aware that the irrational behavior of overconfident managers is usually accompanied by aggressive external reporting strategies and that maintaining appropriate accounting robustness is a credo that overconfident managers should adhere to. At the same time, by optimizing the company's managerial team, establishing an effective managerial training mechanism, and suppressing managerial characteristics such as irrational psychology in the financial decision-making process, the company can improve corporate governance, manage the company's surplus management behavior, and reduce the company's financial risks. While the company is in financial distress, the calm confidence of managers can effectively avoid the negative impact of surplus management behavior on the company. From the perspective of the government, to further avoid the financial risks caused by surplus management practices, the government should further improve the transparency of corporate information disclosure, strengthen the supervision of managers' M&A practices and their processes, and strengthen the internal governance capacity of enterprises to weaken managers' motivation to achieve opportunism, thereby reducing corporate financial risks and enhancing investors' confidence to guide economic development and solving the problem of financing constraints. From the perspective of investors, the majority of investors need to be highly alert to the accounting information of companies with high financial risks and companies with overconfident managers. From an investor's perspective, investors need to be highly alert to the quality of accounting information of companies with high financial risks and companies with overconfident managers and carefully screen their surplus management practices to avoid being misled into making wrong investment decisions.

## References

[1] Sugata Roy Chowdhury, Earnings management through real activities manipulation, Journal of Accounting and Economics, Volume 42, Issue 3,2006, Pages 335-370.

[2] Healy P M. The effect of bonus schemes on accounting decisions[J]. Journal of accounting and economics, 1985, 7(1): 85-107.

[3] Watts, R.L. and Zimmerman. J.L. (1986) Positive Accounting Theory. Prentice Hall, Inc., Englewood Cliffs.

[4] Blacket E L, Sellers K F, Manly T S. Earnings management using asset sales: An international study of countries allowing noncurrent asset revaluation [J]. Journal of Business Finance and Accounting,1998, 25(9): 1287-1319.

[5] Guedhami O, Pittman J. The importance of IRSmonitoring to debt pricing in private firms [J]. Journal of Financial Economics,2008,90(1):38-58.

[6] R Gopalan, S Jayaraman. Private Control Benefits and Earnings Management: Evidence from Insider Controlled Firms.

[7] Tiago Gonçalves, Victor Barros, Gonçalo Serra, Political elections uncertainty and earnings management: Does firm size really matter?, Economics Letters,2022,110438.

[8] Mian Yang, Wenliang Tang, Air pollution, political costs, and earnings management, Emerging Markets Review,2021,100867.

[9] Dequan Jiang, Weiping Li, Yongjian Shen, Shuangli Yu, does air pollution affect earnings management? Evidence from China,Pacific-Basin Finance Journal,Volume 72,2022,101737.

[10] Bedard R. H., U. Hoitash. Chief financial offi -cers as inside directors[J] Contemporary Account-ing Research,2014(19):787 ~ 817.

[11] COHEN D A, DEY A,LYS T Z. eal and accrual based earnings management in the pre and post Sarbanes Oxley periods [J] The Accounting Review,2008,83(3): 757-787.

[12] DOYLE J T, GE W, MCVAY S. Accruals quality and internal control over financial reporting[J]. The Accounting Review,2007,82(5): 1141-1170.

[13] A1tman. E. I, Financial Rations.1968. Discriminant Analysis and the Prediction of Corporate Failure. The Journal of Finance, (4): 23.

[14] Ohlson. 1980. J. A. Financial Rations the Probabilistic Prediction of Bankruptcy. Journal of Accounting Research.VI0.18. Spring, 110-132.

[15] Marcus D Odom, Ramesh Sharda. 1990. A neural Network model for bankruptcy prediction. In: International Joint Conference on Neural Networks.Washington,163-168.

[16] KRASNIKOV A, MISHRA S, OROZCO D A. Evaluating the financial impact of branding using trademarks: a framework and empirical evidence[J]. Journal of marketing,2009(11): 154-166.

[17] Jensen MC, Meckling WH. Theory of the firm:Managerial behavior, agency costs and ownership structure[J ]. Journal of Financial Economics, 1976,3(4): 3053.

[18] Junjian Gu, Do at home as Romans do? CEO overseas experience and financial misconduct risk of emerging market firms,Research in International Business and Finance,Volume 60,2022,101624.

[19] Amar Gande, Swaminathan Kalpathy, CEO compensation and risk-taking at financial firms: Evidence from U.S. federal loan assistance, Journal of Corporate Finance, Volume 47,2017,Pages 131-150.