

Article

Managerial Sentiment and Default Risk: Evidence from China

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Abstract

This study examines the relationship between managerial sentiment and default risk in China. Using a dataset of managerial sentiment derived from textual emotional tone analysis of corporate reports, and a sample of 13,137 firm-year observations from 2010 to 2022 for publicly listed A-share firms, we find that positive managerial sentiment significantly reduces firm default risk. In addition, the mitigating effect of managerial sentiment on default risk is more pronounced under lower ownership concentration, lower research and development expenditure intensity, lower industry competition, and higher firm leverage. Mediation analysis indicates that both financial constraints and environmental, social, and governance ratings provide channels through which managerial sentiment influences default risk. The results are robust to alternative measures of managerial sentiment and default risk. Endogeneity concerns are alleviated through two-stage least squares regression and propensity score matching. This study offers practical implications for investors, corporate managers, and policymakers seeking to mitigate firm financial distress risk in modern capital markets.

Keywords: managerial sentiment; default risk; ownership concentration; R&D intensity; industry competition; financial constraints; ESG; China

JEL Classification: G32; G33; G34; G41; M41

1. Introduction

Managerial sentiment has emerged as a critical factor in understanding corporate performance and financial decision-making. PwC's report documents how CEO sentiment is associated with organizational outcomes and market dynamics.¹ Chinese government reports routinely employ metrics such as the Business Climate Index and the China Manufacturing Purchasing Managers' Index to assess managerial confidence and its effects on economic performance.² Investors seeking timely signals of firm performance also depend heavily on corporate reports. However, managers may obscure poor firm performance by producing longer and difficult-to-interpret reports, thereby causing market pricing inefficiencies and delayed price adjustment dynamics (R. J. Bloomfield, 2002; R. Bloomfield, 2008; F. Li, 2008). Studies employing textual analysis of managerial sentiment in corporate filings demonstrate that managerial sentiment in firm disclosures provides substantial predictive information to investors about subsequent stock returns (Jiang et al., 2019). Q. Zhao et al. (2023) show that machine learning methods can accurately predict financial distress among Chinese firms using detailed financial data alone, and that predictive accuracy does not improve when combined with variables derived from textual disclosures. However, they define financial distress using the designation of special treatment firms by the China



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Securities Regulatory Commission as the outcome variable.³ A gap remains in the literature concerning the predictive role of managerial sentiment in evaluating default risk using accounting- and market-based models of financial distress for Chinese firms. This study aims to fill this gap.

The Chinese institutional environment offers a particularly informative setting for examining the role of managerial sentiment in assessing default risk. Compared to developed markets, China's capital market is characterized by higher information asymmetry (Chan et al., 2008), relatively weaker external monitoring mechanisms (Bourveau et al., 2025), and heavier reliance on narrative disclosures to convey firm-specific information (Fu et al., 2025). Analyst coverage remains uneven across firms (C. Li, 2021), short-selling mechanisms are constrained (Chang et al., 2014), and legal enforcement related to disclosure quality remains less stringent (Pistor & Xu, 2005), heightening the importance of managerial communication in shaping investor perceptions.

Moreover, China's corporate sector operates within a distinctive ownership and governance structure, featuring a substantial presence of state-owned enterprises and highly concentrated ownership among controlling shareholders (Jiang & Kim, 2020). These features can both attenuate and obscure default risk through implicit government support (Walker et al., 2021), soft budget constraints (Megginson et al., 2014), and preferential access to credit (Cong et al., 2019), rendering traditional accounting-based and market-based distress signals less transparent. In such an environment, managerial sentiment may function as a particularly valuable non-financial signal, reflecting managers' private assessments of firm prospects and strategic risk. These institutional characteristics imply that the Chinese market provides a distinct and economically meaningful context in which to examine whether managerial sentiment conveys incremental information about corporate default risk beyond conventional financial indicators.

We utilize a dataset of managerial sentiment derived from the textual emotion tone analysis of the Management Discussion and Analysis (MD&A) section in corporate reports of publicly listed A-share firms in China to assess the relationship between managerial sentiment and firm default risk. Using a sample of 13,137 firm-year observations over 2010–2022, we employ firm and year fixed effects regressions to show that positive managerial sentiment reduces firm default risk. Moderating effect analysis further shows that this negative relationship is stronger under lower ownership concentration and lower research and development (R&D) expenditure intensity. In addition, we conduct channel analysis to investigate the mediating roles of financial constraints and environmental, social, and governance (ESG) ratings. The results suggest that two channels, financial constraints and ESG ratings, explain 11% and 5% of the indirect effects of managerial sentiment on default risk, respectively. Subsample analysis further indicates that this negative relationship is stronger for firms operating in low-competition industries or those with high leverage. We perform robustness checks using alternative measures of managerial sentiment and default risk. To mitigate endogeneity concerns, we implement two-stage least squares (2SLS) estimation and propensity score matching (PSM). Our findings remain robust under these more stringent empirical approaches.

This study makes several contributions to the literature. First, we emphasize managerial sentiment as an important psychological factor shaping corporate financial stability. Prior research has primarily focused on macroeconomic factors (Arellano, 2008; Bai, 2021; Foley-Fisher & Guimaraes, 2013) and firm-specific financial metrics (Molina, 2005; Berríos, 2013). Second, although the impact of managerial sentiment has been examined in relation to corporate financial performance (Jiang et al., 2019) and operational efficiency (C. Wang et al., 2024), limited attention has been devoted to its effect on default risk. Existing studies

on this topic are confined to U.S., Japanese, and Spanish firms (L. Wei et al., 2023; Yamanaka & Ohsato, 2023; Delgado-García et al., 2010).

Additionally, we introduce ownership concentration and R&D expenditure intensity as moderating factors. Existing studies generally document that ownership concentration negatively moderates the relationship between independent and dependent variables (Peng & Yang, 2014; Buerter, 2021; W. Hu & Sun, 2025). Similarly, R&D expenditure intensity is commonly shown to positively moderate such relationships (J. Lee & Shim, 1995; Han et al., 2022). However, our findings diverge from these results. Specifically, we show that the negative relationship between managerial sentiment and default risk weakens at higher levels of R&D expenditure intensity. We attribute this to the dual nature of R&D investments, which simultaneously generate opportunities for improved future firm performance in the longer term, and introduce risks in terms of default in the shorter term.

Finally, we examine the mediating effects of financial constraints and ESG ratings. Our results indicate that positive managerial sentiment significantly reduces default risk, with its effects operating through alleviated financial constraints and enhanced sustainable and ethical practices. Prior studies examine ESG ratings and financial constraints as mediators (Zhou et al., 2022; M. S. Lee, 2024; Tang, 2022), and our findings are largely consistent with their conclusions, thereby further validating these channels.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 describes the data sources, sample selection procedures, empirical measures, and the empirical models employed. Section 4 presents the empirical results and robustness checks. Section 5 discusses the findings in relation to the underlying theory and the institutional context of the Chinese market. Section 6 concludes the paper by summarizing the key findings and outlining implications for future research.

2. Literature Review and Hypotheses Development

2.1. Determinants of Default Risk

Firm default risk is typically measured using either accounting-based or market-based models. Beaver (1966) initiated the analysis of accounting-based measures to forecast corporate failure, defined as a firm's inability to meet its financial obligations (e.g., bankruptcy). To improve precision, Beaver employed multiple financial ratios independently, along with specific cutoff points to predict default risk. Altman (1968) extended Beaver's framework by applying multivariate discriminant analysis, combining several financial ratios into a single weighted statistic, the Z-score model. Subsequently, Ohlson (1980) proposed a logistic O-score model that relied on accounting ratios derived from financial statements for prediction. Around the same time, Zmijewski (1984) developed a comparable ZM-score model. The aforementioned models are accounting-based.

We next examine market-based default risk models. Merton (1974), building on Black and Scholes' (1973) contingent claims framework, proposed that a firm's equity can be viewed as a call option, with total firm value as the underlying asset and the face value of debt as the strike price. From this perspective, default occurs when a firm's asset value falls below a critical threshold linked to its debt obligations. Subsequent research refined Merton's model. Black and Cox (1976) contended that default should be triggered once asset values drop below a set threshold. Geske (1977) employed a compound option approach to value risky corporate bonds. Shumway (2001) later integrated Altman's (1968) and Zmijewski's (1984) variables with market-based factors, employing a discrete-time duration model to predict default.

Bakshi et al. (2006) propose two primary factors driving default risk: systematic and firm-specific elements. We first examine firm-specific determinants of default risk. Vu

et al. (2019) document a positive association between profitability and distance to default, emphasizing profitability's role in generating cash flows and servicing debt obligations. Brogaard *et al.* (2017) demonstrate that greater liquidity reduces default risk. Cathcart *et al.* (2020) show that financial leverage exerts a stronger effect on default probabilities for small and medium-sized enterprises than for large corporations. Peterkort and Nielsen (2005) propose the book-to-market ratio as a proxy for risk, reflecting the link between financial risk and capital structure. B. Y. Zhang *et al.* (2009) find that high-frequency volatility provides additional insight into credit spreads beyond explanations based solely on leverage ratios. K. Wei *et al.* (2025) show that higher educational attainment among board members significantly lowers default risk. Meles *et al.* (2023) find that green innovation is negatively related to firms' default risk.

Lastly, we examine macroeconomic determinants of default risk. Kwark (2002) shows that the spread between risky loan rates and risk-free rates may reflect a risk premium due to a difference in default risk of risky loans. Iacoviello (2015) finds that financial shocks, including redistribution effects across leveraged sectors, explain nearly two-thirds of the output collapse during the credit crunch. Bhamra *et al.* (2018) argue that fixed nominal coupons and sticky profitability frictions raise real equity prices and credit spreads during periods of declining inflation, while inflation increases generate opposite but more muted effects. Bai (2021) documents a strong positive relationship between unemployment and credit risk, together with key features of the credit spread, including its level, volatility, cyclical, and asymmetry.

2.2. Effects of Managerial Sentiment

The content of managers' narratives in the MD&A section, including elements such as emotion tone, has become an important information source for investors seeking informational advantages (Loughran & McDonald, 2016). These textual disclosures serve as a primary channel for managers to communicate their outlook on the firm's prospects. A growing body of research in accounting and finance increasingly employs textual analysis to examine the sentiment and tone of corporate annual reports. While studies such as J. Lee and Park (2019), D'Augusta and DeAngelis (2020), D. X. Wu *et al.* (2021), Ayuningtyas and Harymawan (2022), and S. Zhao *et al.* (2022) focus on specific managerial expressions and emotions, Campbell *et al.* (2020) and Elsayed and Elshandidy (2021) offer comprehensive assessments of risk sentiment across corporate disclosures. We utilize the Loughran and McDonald (2011) method for text analysis, as their newly developed negative word list, along with five supplementary lists, more accurately captures tone in financial texts.

Managerial sentiment has emerged as an important factor shaping corporate behavior and financial outcomes. Jiang *et al.* (2019) demonstrate that greater managerial optimism is associated with market-wide overvaluation, which subsequently leads to lower future returns as prices adjust. Chen *et al.* (2022) reveal that good signal sentiment positively affects stock returns, while bad signal sentiment negatively impacts them. Huang *et al.* (2024) show that the Bitcoin sentiment index positively affects Bitcoin returns. Sahu *et al.* (2024) report that optimistic managerial sentiment is associated with higher performance among Indian-listed nonfinancial firms. Xu *et al.* (2024) find that investor sentiment positively affects stock liquidity in the Chinese market. By contrast, W. Zhao and Zhang (2024) show that investor attention adversely affects future stock liquidity. Hribar *et al.* (2017) document that managerial sentiment is inversely related to loan loss provision estimates.

Managerial sentiment not only influences financial reporting but also operational and strategic decisions. For instance, C. Wang *et al.* (2024) find that managerial sentiment influences stock returns by improving internal operations, highlighting its role in enhancing efficiency. Moreover, Hsiao *et al.* (2011) demonstrate that optimistic managerial sentiment

increases the likelihood of overinvestment, particularly when firms possess substantial investment opportunities. Likewise, [Qin et al. \(2024\)](#) show that positive managerial sentiment drives higher corporate risk-taking. [Collins et al. \(2024\)](#) report a negative association between managerial sentiment and conditional conservatism.

Beyond financial and operational decisions, managerial sentiment also affects employment and organizational behavior. [Montone et al. \(2024\)](#) document a positive association between managerial sentiment and employment growth, particularly among firms with limited investment opportunities, and show that this effect arises independently of cash resources. Meanwhile, [Askarzadeh et al. \(2023\)](#) find that optimistic managers misclassify fewer expenses, reflecting their confidence in firm performance, whereas pessimistic managers misclassify more to manage risks and perceptions.

2.3. Managerial Sentiment and Default Risk

Managerial sentiment has attracted attention as a potential indicator of financial health, with numerous studies examining this issue. [Nguyen and Huynh \(2022\)](#) suggest that novel financial sentiment measures derived from textual report mining can enhance the predictive accuracy of credit risk models. Similarly, [S. Zhao et al. \(2022\)](#) introduce a new framework that integrates sentiment tone features extracted from online stock forum comments, MD&A, and financial statement notes, to forecast corporate financial distress. [L. Wei et al. \(2023\)](#) observe that managers' fintech risk sentiment index exerts a stronger influence on corporate bankruptcy than that of investors. These findings indicate that the fintech risk sentiment index may detect underlying instabilities within fintech firms, thereby assisting regulators in enhancing early warning systems for the sector. [Yamanaka and Ohsato \(2023\)](#) provide empirical evidence that managerial sentiments effectively capture trends in corporate bankruptcy rates in Japan.

Credit default swaps (CDS) serve as an additional metric for default risk. [Giglio \(2016\)](#) shows that CDS spreads can forecast systemic financial risk. Additionally, managerial sentiment influences investors' hedging activities in CDS markets ([Liang et al., 2023](#)). They document a negative association between managerial tone and CDS spreads, with stronger effects among investors with limited access to reliable information and firms with a higher likelihood of default. Thus, positive managerial sentiment may help mitigate default risk.

It is posited that managerial sentiment may reduce default risk through strategic management. As extensively documented in the literature, managerial sentiment mirrors strategic management. [Hodgkinson and Healey \(2011\)](#) emphasize the growing focus on the interplay among cognitive, behavioral, and emotional dynamics within key strategic management figures. [Brundin and Liu \(2015\)](#) contend that emotions significantly shape the processes and outcomes of strategic management. [Y. Wu and Ou \(2024\)](#) demonstrate that corporate debt defaults can be affected by effective leadership, strong internal governance, and related factors. Consequently, managerial sentiment may shield firms from default through prudent leadership decisions.

Recent research emphasizes the importance of behavioral and perceptual factors in shaping firms' financial distress and default risk, beyond purely balance-sheet-based explanations. Evidence from China indicates that elevated managerial perceptions of economic policy uncertainty, measured through textual analysis of MD&A sections in financial reports, influence risk-taking and financial stability, resulting in lower leverage, improved liquidity management, and reduced default risk ([Kong et al., 2025](#)). Extending this behavioral perspective, excessively optimistic managerial sentiment regarding favorable macroeconomic conditions in China has been shown to encourage riskier asset allocation and heightened financial risk ([Guo et al., 2024](#)). Complementary strands of the literature further demonstrate that external stakeholder perceptions are also relevant. In China, retail-

and institutional-investor-based assessments of corporate ESG performance are informative about firms' default risk, suggesting that sustainability performance and perceived managerial responsibility shape credit risk evaluation (Yang et al., 2026). Similarly, sustainability and social responsibility considerations can alter risk management practices and distress outcomes, particularly in capital-intensive sectors (Fülöp & Ionescu, 2025). Finally, additional textual-based sentiment evidence from China shows that managerial confidence, as a behavioral trait, affects market reliability and risk forecasting, providing a dynamic channel through which managerial sentiment influences default-relevant risk assessments in financial markets and firm valuations (J. Hu et al., 2026). Dunham and Garcia (2021) show that enhanced investor sentiment extracted from both news articles and Twitter content leads to reduced firm-level financial distress. Hajek and Munk (2023) further show that speech-based emotion recognition from earnings conference calls provides a reliable predictor of financial distress in capital markets. Taken together, this growing literature highlights that default risk is not solely a function of balance-sheet-based financial fundamentals, but is also shaped by managerial sentiment, cognitive attention, and stakeholder perceptions, especially in environments characterized by greater informational frictions such as China. Based on the above analysis, we propose the following hypothesis:

Hypothesis 1. *Positive managerial sentiment reduces the default risk of Chinese listed firms.*

2.4. Moderating Role of Ownership Concentration

Shleifer and Vishny (1986) examine the role of large shareholders in corporate control, emphasizing that high ownership concentration improves the effectiveness of managerial monitoring and alleviates information asymmetry. La Porta et al. (1999) argue that ownership concentration in modern corporations remains persistently high. Rubin (2007) suggests that ownership concentration may induce adverse selection. Consequently, higher ownership concentration strengthens the supervisory role of large shareholders, who prioritize financial statements over external signals, such as emotional tone. Morck et al. (1988) observe that when managerial ownership is relatively low, agency problems become more severe, restricting the market's access to the firm's internal and accurate information. In such circumstances, investors rely more heavily on publicly available external signals, such as financial statements and managerial tone, to assess the firm's financial health.

Javeed et al. (2022) show that ownership concentration positively moderates the association between the board sustainability committee and corporate social responsibility. Shatnawi et al. (2021) report that ownership concentration positively moderates the relationship between the effectiveness of the audit committee and firm performance. Xu et al. (2024) reveal that the adverse impact of investor sentiment on stock illiquidity intensifies with greater institutional ownership. In contrast, Buerter (2021) shows that ownership concentration adversely moderates the positive association between board gender diversity and the assurance of corporate social responsibility. J. Wu et al. (2025) reveal that higher institutional ownership attenuates the beneficial effect of executives' educational background on stock liquidity. K. Wang et al. (2024) show that the adverse effect of gender diversity on firm performance weakens when institutional ownership is relatively higher. Tsao and Chen (2012) classify ownership effects into incentive alignment and entrenchment effects. They find that the incentive alignment effect strengthens the association between internationalization and performance, whereas the entrenchment effect weakens this association among publicly listed firms in Taiwan. In light of preceding analysis, we propose the following hypothesis.

Hypothesis 2. *The mitigating effect of positive managerial sentiment on default risk weakens under higher ownership concentration.*

2.5. Moderating Role of R&D Intensity

Building on [Spence's \(1973\)](#) signaling theory, one can interpret managerial sentiment as a nonfinancial signal through which managers convey confidence in their firm's future financial stability. R&D disclosures may complement financial statements by highlighting growth opportunities and innovation value, particularly when profits are low ([Merkley, 2014](#)). However, the inherent risks associated with R&D may diminish the credibility of managerial sentiment as a standalone signal of favorable future financial outcomes, leading investors to prioritize tangible financial performance metrics over narrative signals.

Prior studies on the moderating effects of R&D expenses are mixed. [J. Lee and Shim \(1995\)](#) identify R&D expenditure as a moderating variable and show that it strengthens the relationship between competitive capabilities and firm performance. Similarly, [Han et al. \(2022\)](#) find that higher R&D expenditure amplifies the positive association between supplier-base concentration and buyer efficiency. [Tsai et al. \(2011\)](#) document that R&D spending enhances the effect of external technology acquisition on product innovativeness. Similarly, [Hung and Chou \(2013\)](#) report that higher internal R&D magnifies the positive effects of external technology acquisition on firm performance. [Xie et al. \(2019\)](#) further show that greater R&D intensity positively moderates the relationship between non-R&D innovation and new product performance.

In contrast, [Barakat et al. \(2025\)](#) show that R&D investments negatively moderate the relationship between knowledge sourcing and global innovation. [T. Q. Duong and Huang \(2025\)](#) reveal that R&D spending negatively moderates the correlation between ESG reporting and firm value. [Xu et al. \(2017\)](#) find that the negative effect of knowledge network density on firms' exploratory innovation is mitigated by the increases in a firm's R&D collaborations with external actors. Based on the above analysis, we propose the following hypothesis.

Hypothesis 3. *The mitigating effect of positive managerial sentiment on default risk weakens under higher levels of R&D expenditure intensity.*

3. Data and Methodology

3.1. Data

Our data source is the China Stock Market and Accounting Research (CSMAR) Database. We restrict our empirical analysis to A-share publicly listed firms in China. Data on default risk are directly obtained from CSMAR or computed using variables obtained from CSMAR. Data on managerial sentiment are also obtained from CSMAR. We construct control variables from CSMAR capturing firm characteristics, including firm size, firm age, leverage, sales growth, a state-owned enterprise dummy, Tobin's Q as a firm performance measure, ownership concentration, board size, a CEO–board chair duality dummy, and executive pay. The ESG ratings data are obtained from Sino-Securities Index Information Service Co. Ltd. We exclude special treatment stocks from the sample because of their elevated delisting risk. We also exclude financial institutions due to their distinct leverage structure. After eliminating observations with missing values, all variables are winsorized at the 1st and 99th percentiles. The final sample comprises 13,137 firm-year observations spanning 2010 to 2022, representing 1939 unique A-share listed firms in China.

3.2. Dependent Variable

For the dependent variable, we employ both accounting-based and market-based models of firm financial distress to examine the effect of managerial sentiment on firm default risk, as [Abdullah \(2016\)](#) argues that accounting-based models outperform market-based models across various methodologies.

From CSMAR, we obtain relevant variables and compute the first accounting-based measure of financial distress, Z'' -score, following Altman et al. (1998) and Meles et al. (2023):

$$Z'' \text{ Score} = 6.56 \frac{WC}{TA} + 3.26 \frac{RE}{TA} + 6.72 \frac{EBIT}{TA} + 1.05 \frac{EQ}{TL} \quad (1)$$

where WC represents working capital, TA denotes total assets, RE refers to retained earnings, $EBIT$ is earnings before interest and taxes, EQ indicates the book value of total equity, and TL represents total liabilities. With this accounting-based model, the higher the Z'' Score, the lower the default risk.

The second accounting-based model we employ is the O-score (Ohlson, 1980), which is directly obtained from CSMAR:

$$\begin{aligned} OScore = & -1.32 - 0.407 \ln(TA) + 6.03 \frac{TL}{TA} - 1.43 \frac{WC}{TA} + 0.0757 \frac{CL}{CA} \\ & - 2.37 \frac{NI}{TA} - 1.83 \frac{FU}{TL} + 0.285 INTWO - 1.72 OENEG \\ & - 0.521 \frac{NI_t - NI_{t-1}}{|NI_t| + |NI_{t-1}|} \end{aligned} \quad (2)$$

where TA is total assets, TL is total liabilities, WC is working capital, CL is current liabilities, CA is current assets, NI is net income, and FU is net operating cash flow. $INTWO$ is a dummy variable equal to one if net income was negative for the last two years and zero otherwise. $OENEG$ is a dummy variable equal to one if total liabilities exceed total assets and zero otherwise. A high $OScore$ reflects elevated default risk.

The market-based model we employ is the structural distance-to-default model (Bharath & Shumway, 2008), which is directly obtained from CSMAR:

$$DistDefault = \frac{V - F}{V \times \sigma_V} \quad (3)$$

$$V = E + F \quad (4)$$

$$E = P \times N_c + B \times N_n \quad (5)$$

$$F = CL + 0.5 \times NCL \quad (6)$$

$$\sigma_V = \frac{E}{V} \sigma_E + \frac{F}{V} \sigma_D = \frac{E}{E + F} \sigma_E + \frac{F}{E + F} (0.05 + 0.25 \sigma_E) \quad (7)$$

where V is the market value of the firm's assets, F is the market value of the firm's debt, σ_V is the volatility of the firm's assets, and E is the market value of equity. P is the closing price at the period end, N_c denotes the number of circulating shares, B denotes the book value per share, and N_n denotes the number of non-circulating shares. CL represents current liabilities and NCL represents non-current liabilities. σ_E denotes stock return volatility estimated from daily stock returns, and σ_D denotes debt volatility, which is proxied by 0.05 plus 0.25 σ_E . This study forgoes Merton's (1974) distance-to-default model in favor of the distance-to-default framework developed by the KMV Corporation, later acquired by Moody's. The model we employ exhibits marginally superior performance relative to the Merton's (1974) model in hazard models and out-of-sample forecasts. A higher $DistDefault$ value indicates lower default risk.

3.3. Explanatory Variable

For the primary explanatory variable, we directly obtain managerial sentiment measures from CSMAR, which are constructed using textual analysis of the MD&A section in firms' semi-annual corporate reports disclosures:⁴

$$EmotionTone1 = \frac{Num_{pos} - Num_{neg}}{Num_{total}} \quad (8)$$

$$EmotionTone2 = \frac{Num_{pos} - Num_{neg}}{Num_{pos} + Num_{neg}} \quad (9)$$

where Num_{pos} is the number of positive-tone words, Num_{neg} is the number of negative-tone words, and Num_{total} is the total number of words in the MD&A disclosures. The semi-annual sentiment measures are averaged to obtain annual sentiment values used in the empirical analysis. Higher values of the emotion tone measures indicate more positive managerial sentiment.

3.4. Methodology

To test Hypothesis 1, we estimate the following fixed-effects regression model to examine the effect of managerial sentiment on firm default risk:

$$\begin{aligned} Default_{i,t} = & \beta_0 + \beta_1 EmotionTone_{i,t} + \beta_2 FirmSize_{i,t} + \beta_3 FirmAge_{i,t} \\ & + \beta_4 Leverage_{i,t} + \beta_5 SaleGrow_{i,t} + \beta_6 SOE_{i,t} + \beta_7 TobinQ_{i,t} \\ & + \beta_8 OwnConc_{i,t} + \beta_9 BoardSize_{i,t} + \beta_{10} Duality_{i,t} \\ & + \beta_{11} TMTPay_{i,t} + YearFE + FirmFE + \varepsilon_{i,t} \end{aligned} \quad (10)$$

where subscript i denotes firm i and subscript t denotes year t . The dependent variable, *Default* represents firm default risk, measured by the *Z''Score*, *OScore*, or *DistDefault*, as defined in Equations (1)–(3). The key explanatory variable, *EmotionTone*, represents managerial sentiment measured by *EmotionTone1* or *EmotionTone2* in Equations (8) and (9). Among the control variables, *FirmSize* is defined as the natural logarithm of total assets. *FirmAge* is measured as the natural logarithm of one plus the number of years since the firm's establishment. *Leverage* is defined as total liabilities divided by total assets. *SaleGrow* measures the change in sales revenue relative to the previous year. *SOE* is a dummy variable equal to one if the firm is a state owned enterprise and zero otherwise. *TobinQ* measures firm performance and is calculated as the ratio of firm market value to total assets. *OwnConc* is the Herfindahl index of ownership concentration, measured as the squared ownership share of the largest shareholder. *BoardSize* denotes the number of directors on the board. *Duality* is a dummy variable equal to one if the CEO concurrently serves as board chair, and zero otherwise. *TMTPay* is the natural logarithm of the total compensation of the top three executives. *YearFE* denotes year fixed effects, *FirmFE* denotes firm fixed effects, and ε is the error term. The definitions of all variables are provided in Appendix A.

Following prior studies that incorporate firm-level controls to account for default risk (Boubaker et al., 2020; Zheng et al., 2019), we include a set of standard control variables in our analysis. *FirmSize* is expected to be negatively related to default risk, as larger firms are generally less likely to default (L. Q. Duong & Bertrand, 2022). *FirmAge* is also expected to be negatively associated with default risk, consistent with conventional wisdom. *Leverage* is expected to increase default risk, as firms with higher leverage are riskier (Hussan, 2016). Higher *SaleGrow* is associated with a lower likelihood of default (Shumway, 2001). *SOE* is expected to be negatively associated with default risk, as government intervention may alleviate liquidity-driven default risk (Geng & Pan, 2024). *TobinQ* is also expected to be negatively associated with default risk, as stronger firm performance reduces the likelihood of payment default. Ownership concentration, *OwnConc*, is expected to be inversely related to default risk (Zeitun & Tian, 2007). *BoardSize* is expected to be negatively related to default risk because larger boards tend to make less extreme decisions (Cheng, 2008). *Duality* may reduce default risk (Hassan et al., 2023). Finally, higher *TMTPay* may reflect stronger managerial ability or better incentive alignment, thereby reducing default risk.

4. Results

4.1. Descriptive Statistics

The descriptive statistics of all variables used in our study are presented in Table 1. The sample comprises 13,137 Chinese firm-year observations covering 1939 unique firms over the period from 2010 to 2022. The *Z''Score* has a mean of 4.791 and a standard deviation of 4.701. The mean *OScore* is −8.814 and the mean *DistDefault* is 0.990. Higher *Z''Score* and *DistDefault* values are associated with lower default risk, whereas a higher *OScore* is associated with greater default risk. The means of *EmotionTone1* and *EmotionTone2* are 0.033 and 0.272, with standard deviations of 0.016 and 0.122, respectively. The sample mainly comprises large, relatively young firms, with an average log firm size of 22.509 and an average log firm age of 2.927 years. *Leverage* is moderate, with an average leverage ratio of 43.6%. Firms exhibit growth potential, with an average *SaleGrow* of 18.7%. Approximately 10.2% of the firms are state owned. *TobinQ* averages 2.081, indicating favorable prospects. *OwnConc* is relatively dispersed, with an average value of 0.146. Firms tend to have relatively large boards, with a median *BoardSize* of nine members. Around 25.5% of firms have CEOs who also serve as board chair. The top three executives are well compensated, with an average log compensation of 14.627, corresponding to 2.25 million RMB.

Table 1. Descriptive statistics.

Variable	Obs	Mean	SD	Min	P25	Median	P75	Max
<i>Z''Score</i>	13,137	4.791	4.701	−15.883	1.982	3.837	6.466	100.119
<i>OScore</i>	13,137	−8.814	2.154	−16.457	−9.927	−8.511	−7.388	−4.309
<i>DistDefault</i>	13,137	0.990	2.022	−9.749	0.823	1.443	1.933	4.379
<i>EmotionTone1</i>	13,137	0.033	0.016	−0.006	0.023	0.034	0.044	0.070
<i>EmotionTone2</i>	13,137	0.272	0.122	−0.046	0.193	0.278	0.358	0.533
<i>FirmSize</i>	13,137	22.509	1.350	19.585	21.523	22.293	23.334	26.444
<i>FirmAge</i>	13,137	2.927	0.300	1.386	2.773	2.944	3.135	3.689
<i>Leverage</i>	13,137	0.436	0.201	0.032	0.276	0.434	0.586	0.909
<i>SaleGrow</i>	13,137	0.187	0.397	−0.653	−0.005	0.122	0.286	4.124
<i>SOE</i>	13,137	0.102	0.303	0.000	0.000	0.000	0.000	1.000
<i>TobinQ</i>	13,137	2.081	1.388	0.803	1.223	1.646	2.395	15.400
<i>OwnConc</i>	13,137	0.146	0.117	0.006	0.055	0.109	0.208	0.575
<i>BoardSize</i>	13,137	8.611	1.722	5.000	7.000	9.000	9.000	15.000
<i>Duality</i>	13,137	0.255	0.436	0.000	0.000	0.000	1.000	1.000
<i>TMTPay</i>	13,137	14.627	0.697	12.283	14.169	14.602	15.041	16.882

Note: This table reports descriptive statistics for all variables. Variable definitions are provided in Appendix A. The sample includes 13,137 firm-year observations from 1939 unique firms over the period spanning 2010 to 2022.

The Pearson pairwise correlations among the variables are reported in Table 2. As expected, the *Z''Score* exhibits significantly positive correlations with managerial sentiment, measured by *EmotionTone1* and *EmotionTone2*. Similarly, *OScore* shows significantly negative correlations with managerial sentiment. By contrast, *DistDefault* does not exhibit a significant correlation with managerial sentiment. Consistent with expectations, the *Z''Score* is significantly positively correlated with *DistDefault* and negatively correlated with *OScore*. *EmotionTone1* is highly correlated with *EmotionTone2*, with a correlation coefficient of 0.955. *FirmSize*, *FirmAge*, *Leverage*, *SOE*, *OwnConc*, *BoardSize*, and *TMTPay* are among the control variables that exhibit significant negative correlations with the *Z''Score* at the 1% level. In contrast, with the exception of *SaleGrow*, which is insignificant, *TobinQ* and *Duality* display significant positive correlations with the *Z''Score* at the 1% level. In unreported results, variance inflation factor tests yield values below 2.21, indicating that multicollinearity is not a material concern.

Table 2. Pairwise correlations.

	<i>Z''Score</i>	<i>OScore</i>	<i>DistDefault</i>	<i>EmotionTone1</i>	<i>EmotionTone2</i>	<i>FirmSize</i>	<i>FirmAge</i>	<i>Leverage</i>	<i>SaleGrow</i>	<i>SOE</i>	<i>TobinQ</i>	<i>OwnConc</i>	<i>BoardSize</i>	<i>Duality</i>	<i>TMTPay</i>
<i>Z''Score</i>	1														
<i>OScore</i>	−0.776 ***	1													
<i>DistDefault</i>	0.346 ***	−0.407 ***	1												
<i>EmotionTone1</i>	0.028 ***	−0.042 ***	−0.006	1											
<i>EmotionTone2</i>	0.057 ***	−0.060 ***	−0.003	0.955 ***	1										
<i>FirmSize</i>	−0.399 ***	0.178 ***	−0.432 ***	0.022 **	0.002	1									
<i>FirmAge</i>	−0.143 ***	0.072 ***	−0.086 ***	−0.065 ***	−0.105 ***	0.210 ***	1								
<i>Leverage</i>	−0.777 ***	0.792 ***	−0.588 ***	0.016 *	−0.007	0.542 ***	0.142 ***	1							
<i>SaleGrow</i>	−0.009	−0.066 ***	−0.039 ***	0.132 ***	0.161 ***	0.002	−0.077 ***	0.033 ***	1						
<i>SOE</i>	−0.126 ***	0.091 ***	−0.205 ***	0.050 ***	0.032 ***	0.199 ***	−0.013	0.163 ***	0.057 ***	1					
<i>TobinQ</i>	0.301 ***	−0.320 ***	0.281 ***	0.063 ***	0.083 ***	−0.377 ***	−0.069 ***	−0.341 ***	0.082 ***	−0.132 ***	1				
<i>OwnConc</i>	−0.060 ***	−0.028 ***	−0.117 ***	0.018 **	−0.011	0.273 ***	−0.098 ***	0.110 ***	−0.013	0.171 ***	−0.119 ***	1			
<i>BoardSize</i>	−0.168 ***	0.079 ***	−0.123 ***	0.053 ***	0.029 ***	0.296 ***	0.041 ***	0.187 ***	−0.026 ***	0.187 ***	−0.143 ***	0.092 ***	1		
<i>Duality</i>	0.159 ***	−0.084 ***	0.097 ***	−0.008	0.019 **	−0.219 ***	−0.064 ***	−0.167 ***	0.031 ***	−0.144 ***	0.113 ***	−0.104 ***	−0.208 ***	1	
<i>TMTPay</i>	−0.038 ***	−0.114 ***	−0.030 ***	0.016 *	0.026 ***	0.399 ***	0.252 ***	0.091 ***	0.004	−0.047 ***	0.012	−0.010	0.033 ***	0.004	1

Note: This table reports pairwise correlations among the variables. Variable definitions are provided in Appendix A. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.2. Baseline Regressions

Table 3 reports the results of multivariate fixed-effects regressions of default risk on managerial sentiment, as specified in Equation (10). Columns 1 and 2 reveal a positive association between emotional tone and $Z''Score$, indicating that firms with more positive managerial sentiment display lower default risk. These findings support Hypothesis 1, which posits that positive managerial sentiment mitigates default risk. Moreover, the coefficients on *EmotionTone1* and *EmotionTone2* are both statistically significant at the 1% level and economically meaningful. Holding all else constant, a one-standard-deviation increase in *EmotionTone1* leads to a 0.085 ($=5.301 \times 0.016$) increase in $Z''Score$, corresponding to 1.8% ($=0.085/4.701$) of the standard deviation of $Z''Score$. With respect to the control variables, *FirmAge*, *Leverage*, and *SOE* are significantly negatively associated with $Z''Score$, indicating that older firms, highly leveraged firms, and state-owned enterprises tend to exhibit higher default risk. *FirmSize*, *OwnConc*, *Duality*, and *TMTPay* are significantly positively associated with $Z''Score$, indicating that larger firms, firms with higher ownership concentration, firms in which the CEO also serves as board chair, and firms with higher executive compensation exhibit lower default risk.

Table 3. Baseline regressions.

	(1)	(2)	(3)	(4)	(5)	(6)
	$Z''Score$	$Z''Score$	$OScore$	$OScore$	$DistDefault$	$DistDefault$
<i>EmotionTone1</i>	5.301 *** (2.89)		−9.061 *** (−11.16)		2.886 ** (2.57)	
<i>EmotionTone2</i>		0.756 *** (2.85)		−1.300 *** (−11.72)		0.345 ** (2.29)
<i>FirmSize</i>	0.464 *** (5.75)	0.458 *** (5.66)	−0.510 *** (−17.37)	−0.499 *** (−17.01)	−0.862 *** (−17.39)	−0.864 *** (−17.42)
<i>FirmAge</i>	−5.349 *** (−4.74)	−5.320 *** (−4.70)	0.158 (0.85)	0.108 (0.58)	2.686 *** (9.52)	2.700 *** (9.55)
<i>Leverage</i>	−18.962 *** (−65.16)	−18.947 *** (−65.19)	10.265 *** (84.85)	10.239 *** (84.58)	−2.980 *** (−24.90)	−2.973 *** (−24.83)
<i>SaleGrow</i>	−0.070 (−1.06)	−0.075 (−1.15)	−0.421 *** (−16.10)	−0.412 *** (−15.78)	−0.067 * (−1.94)	−0.068 * (−1.94)
<i>SOE</i>	−0.106 * (−1.85)	−0.107 * (−1.87)	−0.012 (−0.46)	−0.010 (−0.40)	−0.550 *** (−8.80)	−0.551 *** (−8.81)
<i>TobinQ</i>	−0.020 (−0.54)	−0.021 (−0.58)	−0.125 *** (−9.90)	−0.123 *** (−9.71)	−0.068 *** (−6.82)	−0.069 *** (−6.87)
<i>OwnConc</i>	2.210 *** (5.56)	2.212 *** (5.57)	−0.711 *** (−4.36)	−0.715 *** (−4.39)	−2.749 *** (−7.52)	−2.747 *** (−7.51)
<i>BoardSize</i>	−0.028 (−0.97)	−0.028 (−0.98)	0.006 (0.58)	0.006 (0.62)	0.005 (0.36)	0.005 (0.36)
<i>Duality</i>	0.256 *** (2.83)	0.255 *** (2.82)	−0.056 (−1.62)	−0.054 (−1.57)	−0.088 ** (−2.18)	−0.089 ** (−2.19)
<i>TMTPay</i>	0.115 * (1.68)	0.114 * (1.65)	−0.217 *** (−7.69)	−0.214 *** (−7.60)	0.332 *** (8.24)	0.332 *** (8.27)
Constant	16.325 *** (4.31)	16.367 *** (4.33)	1.606 * (1.83)	1.531 * (1.75)	9.471 *** (7.24)	9.476 *** (7.25)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,137	13,137	13,137	13,137	13,137	13,137
Adjusted R^2	0.812	0.812	0.845	0.846	0.707	0.707

Note: This table reports the results of fixed-effects regressions of default risk on managerial sentiment. Variable definitions are provided in Appendix A. Heteroskedasticity-robust t -values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Columns 3 and 4 report the effect of managerial sentiment on $OScore$. As expected, a significantly negative relationship is documented between emotional tone and $OScore$,

indicating that firms with more positive managerial sentiment face lower default risk, consistent with Hypothesis 1. A one-standard-deviation increase in *EmotionTone1* leads to a 0.145 ($= -9.061 \times 0.016$) decline in *OScore*, which corresponds to a 6.7% ($= 0.145/2.154$) of the standard deviation of *OScore*.

Columns 5 and 6 report the effect of managerial sentiment on *DistDefault*. As expected, a positive association is observed between emotional tone and *DistDefault*. A larger *DistDefault* reflects a longer distance to default, implying that firms with more positive managerial sentiment exhibit lower default risk, consistent with Hypothesis 1. Again, a one-standard-deviation increase in *EmotionTone1* raises *DistDefault* by 0.046 ($= 2.886 \times 0.016$), corresponding to 2.3% ($= 0.046/2.022$) of the standard deviation of *DistDefault*. As for the control variables, only *Leverage*, *SOE*, and *TMTPay* exhibit consistent effects, implying that high-leverage firms, state-owned enterprise status, and lower executive compensation contribute to higher default risk.

4.3. Moderating Effect of Ownership Concentration

In this section, we examine whether ownership concentration moderates the relationship between managerial sentiment and default risk. Following J. Wu et al. (2025), we include an interaction term involving ownership concentration in the regression model:

$$\begin{aligned} Z''Score_{i,t} = & \beta_0 + \beta_1 EmotionTone1_{i,t} \times OwnConc_{i,t} + \beta_2 EmotionTone1_{i,t} \\ & + \beta_3 OwnConc_{i,t} + \beta_4 FirmSize_{i,t} + \beta_5 FirmAge_{i,t} + \beta_6 Leverage_{i,t} \\ & + \beta_7 SaleGrow_{i,t} + \beta_8 SOE_{i,t} + \beta_9 TobinQ_{i,t} + \beta_{10} BoardSize_{i,t} \\ & + \beta_{11} Duality_{i,t} + \beta_{12} TMTPay_{i,t} + YearFE + FirmFE + \varepsilon_{i,t} \end{aligned} \quad (11)$$

Table 4 presents the results on the moderating effects of ownership concentration. The interaction term coefficient is negative and statistically significant at the 5% level. As ownership concentration increases, the positive effect of *EmotionTone1* on *Z''Score* weakens, indicating that the mitigating effect of managerial sentiment on default risk is less pronounced when ownership concentration is higher. Furthermore, we follow K. Wang et al. (2024) to compute the annual median of *OwnConc* and divide firms into low- and high-ownership-concentration subsamples. Following Equation (10), we re-estimate fixed-effects regressions for these subsamples and report the results in Columns 2 and 3 of Table 4. The results indicate that the positive impact of *EmotionTone1* on *Z''Score* is significant in the low-ownership-concentration subsample but not in the high-ownership-concentration subsample. Overall, the results support Hypothesis 2 and are consistent with prior research on the moderating effects of ownership concentration (Buerter, 2021; J. Wu et al., 2025; K. Wang et al., 2024). Coefficients on control variables and adjusted R-squared values are consistent with those reported in the baseline regressions in Table 3.

Table 4. Moderating effect of ownership concentration.

	(1)	(2)	(3)
	<i>Z''Score</i>	Low Ownership Concentration <i>Z''Score</i>	High Ownership Concentration <i>Z''Score</i>
<i>EmotionTone1</i> × <i>OwnConc</i>	−26.220 ** (−2.42)		
<i>EmotionTone1</i>	9.314 *** (3.43)	8.186 *** (2.88)	2.075 (0.84)
<i>OwnConc</i>	3.158 *** (5.74)		
<i>FirmSize</i>	0.460 *** (5.69)	0.242 (1.56)	0.563 *** (5.74)

Table 4. Cont.

	(1)	(2) Low Ownership Concentration	(3) High Ownership Concentration
	<i>Z'' Score</i>	<i>Z'' Score</i>	<i>Z'' Score</i>
<i>FirmAge</i>	−5.352 *** (−4.74)	−7.503 *** (−4.60)	−4.692 ** (−2.57)
<i>Leverage</i>	−18.941 *** (−65.14)	−20.070 *** (−41.99)	−18.098 *** (−45.96)
<i>SaleGrow</i>	−0.070 (−1.07)	−0.169 (−1.36)	−0.044 (−0.60)
<i>SOE</i>	−0.107 * (−1.86)	0.048 (0.39)	−0.121 ** (−1.98)
<i>TobinQ</i>	−0.020 (−0.55)	0.001 (0.01)	−0.025 (−0.68)
<i>BoardSize</i>	−0.029 (−1.00)	−0.065 (−1.31)	0.006 (0.17)
<i>Duality</i>	0.254 *** (2.81)	0.246 * (1.94)	0.280 ** (2.00)
<i>TMTPay</i>	0.113 * (1.65)	0.303 *** (2.74)	−0.038 (−0.38)
Constant	16.310 *** (4.30)	25.887 *** (4.48)	14.078 ** (2.34)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Observations	13,137	6503	6483
Adjusted <i>R</i> ²	0.812	0.803	0.833

Note: This table reports the moderating effect of ownership concentration on the relationship between managerial sentiment and default risk. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.4. Moderating Effect of R&D Intensity

In this section, we examine whether R&D expenditure intensity (*RDExpense*) moderates the relationship between managerial sentiment and default risk. Following Han et al. (2022), we include an interaction term involving R&D intensity in the regression model:

$$\begin{aligned}
 Z'' Score_{i,t} = & \beta_0 + \beta_1 EmotionTone1_{i,t} \times RDExpense_{i,t} + \beta_2 EmotionTone1_{i,t} \\
 & + \beta_3 RDExpense_{i,t} + \beta_4 FirmSize_{i,t} + \beta_5 FirmAge_{i,t} + \beta_6 Leverage_{i,t} \\
 & + \beta_7 SaleGrow_{i,t} + \beta_8 SOE_{i,t} + \beta_9 TobinQ_{i,t} + \beta_{10} OwnConc_{i,t} \\
 & + \beta_{11} BoardSize_{i,t} + \beta_{12} Duality_{i,t} + \beta_{13} TMTPay_{i,t} + YearFE + FirmFE + \varepsilon_{i,t}
 \end{aligned} \quad (12)$$

The results are presented in Column 1 of Table 5. The coefficient on the interaction term between *EmotionTone1* and *RDExpense* is −73.270, which is statistically significant at the 5% level. This indicates that the positive effect of *EmotionTone1* on *Z'' Score* is attenuated by higher R&D intensity. Specifically, the mitigating effect of managerial sentiment on default risk weakens as R&D intensity increases. Furthermore, we compute the annual median R&D intensity and partition firms into low and high R&D intensity subsamples. We re-estimate the baseline regressions in Equation (10) for these two subsamples, and the results are reported in Columns 2 and 3. The results show that the mitigating effect of managerial sentiment on default risk is significant only when R&D intensity is lower, but not when R&D intensity is higher. Overall, the results support Hypothesis 3 and are consistent with the prior studies (Barakat et al., 2025; T. Q. Duong & Huang, 2025; Xu et al., 2017).

Table 5. Moderating effect of R&D expense intensity.

	(1)	(2)	(3)
	<i>Z'' Score</i>	Low R&D Expense Intensity <i>Z'' Score</i>	High R&D Expense Intensity <i>Z'' Score</i>
<i>EmotionTone1</i> × <i>RDExpense</i>	−73.270 ** (−2.31)		
<i>EmotionTone1</i>	6.060 ** (2.46)	5.457 ** (2.55)	−0.711 (−0.20)
<i>RDExpense</i>	−3.205 * (−1.81)		
<i>FirmSize</i>	0.721 *** (5.85)	0.377 *** (4.96)	0.620 *** (2.74)
<i>FirmAge</i>	−2.504 *** (−2.66)	−4.522 *** (−4.92)	−2.844 * (−1.80)
<i>Leverage</i>	−18.658 *** (−43.94)	−17.867 *** (−56.02)	−19.989 *** (−37.57)
<i>SaleGrow</i>	0.185 ** (2.48)	−0.091 (−1.36)	0.130 (1.42)
<i>SOE</i>	0.129 (1.60)	−0.002 (−0.03)	−0.168 (−1.46)
<i>TobinQ</i>	0.034 (1.26)	−0.146 *** (−3.28)	0.027 (0.75)
<i>OwnConc</i>	1.712 ** (2.36)	1.819 *** (4.36)	2.953 ** (2.24)
<i>BoardSize</i>	−0.062 * (−1.79)	−0.007 (−0.24)	−0.097 * (−1.80)
<i>Duality</i>	0.079 (0.89)	0.335 *** (3.16)	0.025 (0.20)
<i>TMTPay</i>	0.057 (0.78)	0.130 * (1.95)	0.188 (1.60)
Constant	3.474 (0.83)	15.121 *** (4.85)	5.681 (0.74)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Observations	6066	8425	4044
Adjusted <i>R</i> ²	0.928	0.834	0.900

Note: This table reports the moderating effect of R&D expense intensity on the relationship between managerial sentiment and default risk. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.5. Mediation Analysis

To better understand the mechanism through which managerial sentiment affects default risk, we employ a two-step regression approach to examine the mediating effect (X. Zhao et al., 2010):

$$\begin{aligned}
 \text{Mediator}_{i,t} = & \beta_0 + \beta_1 \text{EmotionTone1}_{i,t} + \beta_2 \text{FirmSize}_{i,t} + \beta_3 \text{FirmAge}_{i,t} \\
 & + \beta_4 \text{Leverage}_{i,t} + \beta_5 \text{SaleGrow}_{i,t} + \beta_6 \text{SOE}_{i,t} + \beta_7 \text{TobinQ}_{i,t} \\
 & + \beta_8 \text{OwnConc}_{i,t} + \beta_9 \text{BoardSize}_{i,t} + \beta_{10} \text{Duality}_{i,t} \\
 & + \beta_{11} \text{TMTPay}_{i,t} + \text{YearFE} + \text{FirmFE} + \varepsilon_{i,t}
 \end{aligned} \quad (13)$$

$$\begin{aligned}
 \text{Z'' Score}_{i,t} = & \beta_0 + \beta_1 \text{EmotionTone1}_{i,t} + \beta_2 \text{Mediator}_{i,t} + \beta_3 \text{FirmSize}_{i,t} \\
 & + \beta_4 \text{FirmAge}_{i,t} + \beta_5 \text{Leverage}_{i,t} + \beta_6 \text{SaleGrow}_{i,t} + \beta_7 \text{SOE}_{i,t} \\
 & + \beta_8 \text{TobinQ}_{i,t} + \beta_9 \text{OwnConc}_{i,t} + \beta_{10} \text{BoardSize}_{i,t} \\
 & + \beta_{11} \text{Duality}_{i,t} + \beta_{12} \text{TMTPay}_{i,t} + \text{YearFE} + \text{FirmFE} + \varepsilon_{i,t}
 \end{aligned} \quad (14)$$

where *Mediator* denotes financial constraint (*FinConstr*) or ESG ratings (*ESG*). Following Whited and Wu (2006), we proxy firms' financial constraints using the WW index obtained

from CSMAR, which incorporates firm cash flow, dividend payment status, leverage, firm size, industry sales growth, and firm sales growth. Higher values indicate more severe financial constraints. We measure firms' ESG ratings using the comprehensive ESG score obtained from Sino-Securities Index Information Service Co. Ltd., with higher scores indicating better ESG ratings.

Financial constraints and ESG ratings are chosen as mediators because of their empirical relevance to firm risk and real corporate outcomes, which are central to this relationship (Lai et al., 2025). Financial constraints directly affect a firm's liquidity position and borrowing capacity, rendering them a critical determinant of default risk. Managerial sentiment, as a nonfinancial signal, may ease financial constraints by enhancing investor confidence and improving access to external capital, thereby establishing financial constraints as a natural mediator in this setting. Similarly, ESG ratings capture the quality of a firm's environmental, sustainability, and governance practices, which support the sustainability of its long-term success and strengthen overall financial health, both of which are central to mitigating default risk. Managerial sentiment can enhance ESG credibility by promoting transparency and ethical conduct, thereby further reducing perceived risk.

Table 6 reports the results of the two-step mediation analysis following Equations (13) and (14). For financial constraints (*FinConstr*), Columns 1 and 2 reveal a direct effect of 5.161 and an indirect effect of 0.647 ($= -0.123 \times -5.263$), implying a mediating effect of 11.1% ($= 0.647 / (0.647 + 5.161)$). At the 1% significance level, *FinConstr* display a strong mediating influence. Similarly, in Columns 3 and 4, ESG rating (*ESG*) shows a direct effect of 5.027 and an indirect effect of 0.275 ($= 19.642 \times 0.014$), implying a mediating effect of 5.2% ($= 0.275 / (0.275 + 5.027)$). Overall, the results suggest that managerial sentiment reduces default risk through two distinct mediation channels: by alleviating financial constraints and by enhancing ESG ratings, with the financial-constraints channel playing a more pronounced mediating role than the ESG channel.

Table 6. Mediating effects of financial constraints and ESG ratings.

	(1)	(2)	(3)	(4)
	<i>FinConstr</i>	<i>Z'' Score</i>	<i>ESG</i>	<i>Z'' Score</i>
<i>EmotionTone1</i>	−0.123 *** (−4.64)	5.161 *** (2.69)	19.642 *** (5.57)	5.027 *** (2.74)
<i>FinConstr</i>		−5.263 *** (−6.84)		
<i>ESG</i>				0.014 ** (2.17)
<i>FirmSize</i>	−0.052 *** (−58.81)	0.060 (0.65)	1.532 *** (12.76)	0.443 *** (5.40)
<i>FirmAge</i>	−0.002 (−0.38)	−4.834 *** (−5.06)	−2.280 *** (−2.64)	−5.317 *** (−4.74)
<i>Leverage</i>	0.061 *** (18.65)	−17.708 *** (−58.13)	−5.366 *** (−12.30)	−18.887 *** (−64.84)
<i>SaleGrow</i>	−0.045 *** (−41.34)	−0.256 *** (−3.61)	−0.229 ** (−2.40)	−0.066 (−1.02)
<i>SOE</i>	0.002 * (1.90)	−0.068 (−1.18)	−0.462 *** (−3.39)	−0.099 * (−1.74)
<i>TobinQ</i>	−0.001 *** (−4.54)	−0.048 (−1.14)	0.026 (0.70)	−0.020 (−0.55)
<i>OwnConc</i>	−0.029 *** (−4.56)	1.821 *** (4.66)	1.133 (1.38)	2.194 *** (5.54)
<i>BoardSize</i>	−0.000 (−0.76)	−0.033 (−1.15)	−0.072 (−1.64)	−0.027 (−0.93)

Table 6. Cont.

	(1)	(2)	(3)	(4)
	<i>FinConstr</i>	<i>Z'' Score</i>	<i>ESG</i>	<i>Z'' Score</i>
<i>Duality</i>	−0.001 (−0.76)	0.301 *** (3.27)	−0.016 (−0.12)	0.257 *** (2.83)
<i>TMTPay</i>	−0.005 *** (−5.76)	0.124 * (1.90)	0.263 ** (2.11)	0.112 (1.63)
Constant	0.224 *** (8.10)	17.868 *** (5.02)	44.392 *** (12.15)	15.706 *** (4.26)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	11,454	11,454	13,137	13,137
Adjusted R ²	0.883	0.801	0.528	0.812

Note: This table reports fixed effects regression results examining the mediating channels of financial constraints and ESG ratings in the relationship between managerial sentiment and default risk. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.6. Subsample Analysis

In this section, we conduct subsample analyses based on industry competition and firm leverage. Following J. Hu et al. (2023), we employ the widely used Herfindahl–Hirschman Index (*HHI*) to proxy for industry competition, calculated as the sum of squared shares of each firm’s operating revenue relative to total industry revenue. A higher *HHI* value reflects a lower degree of industry competition. Our sample is partitioned into low-industry-competition (high *HHI*) and high-industry-competition (low *HHI*) subsamples, using the annual median *HHI* value. In addition, J. Zhang et al. (2023) emphasize the role of firm leverage in shaping corporate risk-taking. Firms are further divided into low-leverage and high-leverage subsamples according to the annual median leverage level. We then estimate separate regressions following Equation (10) for these four subsamples, and the results are reported in Table 7.

Table 7. Subsample analysis.

	(1)	(2)	(3)	(4)
	Low Industry Competition <i>Z'' Score</i>	High Industry Competition <i>Z'' Score</i>	Low Firm Leverage <i>Z'' Score</i>	High Firm Leverage <i>Z'' Score</i>
<i>EmotionTone1</i>	6.696 *** (3.09)	0.553 (0.16)	3.646 (0.95)	4.935 *** (4.81)
<i>FirmSize</i>	0.464 *** (4.56)	0.496 *** (3.34)	0.117 (0.60)	0.556 *** (10.22)
<i>FirmAge</i>	−2.454 *** (−3.36)	−10.746 *** (−3.87)	−7.415 *** (−3.14)	−0.087 (−0.35)
<i>Leverage</i>	−17.413 *** (−42.70)	−20.656 *** (−41.09)	−33.304 *** (−44.48)	−11.275 *** (−41.26)
<i>SaleGrow</i>	−0.056 (−0.68)	−0.120 (−0.98)	−0.270 * (−1.71)	0.196 *** (6.13)
<i>SOE</i>	−0.110 (−1.60)	−0.109 (−1.04)	−0.053 (−0.37)	−0.179 *** (−4.76)
<i>TobinQ</i>	0.071 (1.03)	−0.064 (−1.40)	0.053 (1.14)	−0.028 (−0.41)
<i>OwnConc</i>	1.891 *** (3.29)	1.980 *** (2.73)	2.445 *** (2.75)	1.503 *** (5.30)
<i>BoardSize</i>	−0.025 (−1.06)	−0.006 (−0.10)	−0.010 (−0.14)	−0.023 (−1.50)

Table 7. Cont.

	(1)	(2)	(3)	(4)
	Low Industry Competition <i>Z'' Score</i>	High Industry Competition <i>Z'' Score</i>	Low Firm Leverage <i>Z'' Score</i>	High Firm Leverage <i>Z'' Score</i>
<i>Duality</i>	0.092 (1.07)	0.442 *** (2.87)	0.475 *** (2.89)	0.075 (1.50)
<i>TMTPay</i>	0.071 (0.90)	0.299 ** (2.21)	0.288 ** (1.99)	0.259 *** (5.77)
Constant	7.395 ** (2.49)	29.670 *** (3.58)	30.650 *** (3.96)	−7.821 *** (−5.39)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	6345	6427	6398	6402
Adjusted <i>R</i> ²	0.847	0.791	0.748	0.839

Note: This table reports fixed effects regression results examining the relationship between managerial sentiment and default risk across different subsamples. Firms are classified into low and high industry competition subsamples each year based on the median Herfindahl index of operating revenue. Firms are also classified into low and high leverage subsamples each year based on the median leverage. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7 shows that the positive association between managerial sentiment and default risk is more pronounced among firms operating in low-competition industries and those with high leverage. Specifically, the coefficient on *EmotionTone1* is positive and statistically significant at the 1% level for firms in low-industry-competition environments and for highly leveraged firms, whereas it is insignificant in the corresponding high-industry-competition and low-leverage subsamples. When external monitoring from product market competition is limited, managerial communication becomes a more salient informational channel through which firms signal confidence about future prospects. Consequently, in low-competition environments, optimistic managerial tone may exert a stronger stabilizing effect on stakeholder expectations and risk assessments. In high-leverage settings, positive managerial sentiment helps alleviate investor and creditor concerns about firms' ability to service debt and manage downside risk, thereby reducing perceived default risk.

4.7. Alternative Measures of Managerial Sentiment

To further mitigate concerns related to extreme observations, we scale managerial sentiment by the annual cross-sectional mean. This transformation captures sentiment relative to the average firm in a given year and is less sensitive to outliers or common time trends. The first alternative measure, *EmotionTone3*, is defined as the ratio of a firm's *EmotionTone1* to the mean *EmotionTone1* observed across all firms in the same year:

$$EmotionTone3_{i,t} = \frac{EmotionTone1_{i,t}}{Mean_t(EmotionTone1_{i,t})} \quad (15)$$

Likewise, we define a second alternative measure, *EmotionTone4*, following a similar normalization approach based on *EmotionTone2*:

$$EmotionTone4_{i,t} = \frac{EmotionTone2_{i,t}}{Mean_t(EmotionTone2_{i,t})} \quad (16)$$

We re-estimate the baseline regression in Equation (10) using these two alternative sentiment measures, and the results are reported in Table 8. Consistent with expectations, the coefficients on the newly normalized sentiment measures are significantly positive for *Z'' Score* and *DistDefault*, and significantly negative for *OScore*. These findings confirm that

the negative relationship between positive managerial sentiment and default risk is robust to alternative sentiment constructions, mitigating concerns that our main results are driven by a particular measurement choice.

Table 8. Alternative measures of managerial sentiment.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Z''Score</i>	<i>Z''Score</i>	<i>OScore</i>	<i>OScore</i>	<i>DistDefault</i>	<i>DistDefault</i>
<i>EmotionTone3</i>	0.139 ** (2.55)		−0.254 *** (−10.10)		0.088 *** (2.63)	
<i>EmotionTone4</i>		0.141 ** (2.23)		−0.285 *** (−10.29)		0.088 ** (2.40)
<i>FirmSize</i>	0.462 *** (5.71)	0.458 *** (5.64)	−0.505 *** (−17.20)	−0.496 *** (−16.82)	−0.864 *** (−17.41)	−0.866 *** (−17.44)
<i>FirmAge</i>	−5.353 *** (−4.74)	−5.334 *** (−4.72)	0.167 (0.89)	0.131 (0.70)	2.682 *** (9.51)	2.694 *** (9.53)
<i>Leverage</i>	−18.961 *** (−65.14)	−18.953 *** (−65.14)	10.264 *** (84.69)	10.248 *** (84.44)	−2.980 *** (−24.90)	−2.975 *** (−24.85)
<i>SaleGrow</i>	−0.066 (−1.00)	−0.067 (−1.02)	−0.426 *** (−16.23)	−0.420 *** (−16.05)	−0.067 * (−1.93)	−0.067 * (−1.93)
<i>SOE</i>	−0.106 * (−1.85)	−0.107 * (−1.86)	−0.012 (−0.47)	−0.010 (−0.41)	−0.550 *** (−8.80)	−0.551 *** (−8.81)
<i>TobinQ</i>	−0.020 (−0.55)	−0.021 (−0.57)	−0.125 *** (−9.85)	−0.123 *** (−9.71)	−0.069 *** (−6.84)	−0.069 *** (−6.88)
<i>OwnConc</i>	2.215 *** (5.57)	2.221 *** (5.58)	−0.719 *** (−4.41)	−0.730 *** (−4.48)	−2.746 *** (−7.51)	−2.743 *** (−7.50)
<i>BoardSize</i>	−0.028 (−0.98)	−0.028 (−0.97)	0.006 (0.64)	0.007 (0.66)	0.005 (0.34)	0.005 (0.34)
<i>Duality</i>	0.256 *** (2.83)	0.256 *** (2.82)	−0.056 (−1.61)	−0.054 (−1.56)	−0.089 ** (−2.18)	−0.089 ** (−2.19)
<i>TMTPay</i>	0.119 * (1.72)	0.119 * (1.73)	−0.221 *** (−7.82)	−0.220 *** (−7.78)	0.333 *** (8.25)	0.333 *** (8.27)
<i>Constant</i>	16.374 *** (4.32)	16.408 *** (4.34)	1.496 * (1.71)	1.385 (1.58)	9.516 *** (7.27)	9.535 *** (7.29)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,137	13,137	13,137	13,137	13,137	13,137
Adjusted R ²	0.812	0.812	0.845	0.845	0.707	0.707

Note: This table reports the results of fixed-effects regressions of default risk on managerial sentiment, using two alternative managerial sentiment measures. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.8. Alternative Measure of Default Risk

Meles et al. (2023) employ the ZM-score (Zmijewski, 1984) to measure default risk. Following their approach, we use the ZM-score (*ZMScore*) as an alternative measure of default risk:

$$ZMScore = -4.336 - 4.513 \frac{NI}{TA} + 5.679 \frac{TL}{TA} + 0.004 \frac{CA}{CL} \quad (17)$$

where *NI* is net income, *TA* is total assets, *TL* is total debt, *CA* is current assets, and *CL* is current liabilities. Higher *ZMScore* values correspond to greater default risk. We re-estimate the baseline regression in Equation (10) using this alternative financial distress measure, and the results are reported in Table 9. As expected, the coefficients on *EmotionTone1* and *EmotionTone2* are both negative and statistically significant at the 1% level, indicating that positive managerial sentiment lowers default risk and supports Hypothesis 1.

Table 9. Alternative measure of default risk.

	(1)	(2)
	<i>ZMScore</i>	<i>ZMScore</i>
<i>EmotionTone1</i>	−2.798 *** (−11.88)	
<i>EmotionTone2</i>		−0.419 *** (−12.39)
<i>FirmSize</i>	−0.097 *** (−8.76)	−0.094 *** (−8.48)
<i>FirmAge</i>	−0.038 (−0.81)	−0.053 (−1.15)
<i>Leverage</i>	6.604 *** (147.51)	6.596 *** (147.98)
<i>SaleGrow</i>	−0.143 *** (−15.76)	−0.139 *** (−15.54)
<i>SOE</i>	0.018 ** (2.50)	0.018 ** (2.57)
<i>TobinQ</i>	−0.039 *** (−13.48)	−0.038 *** (−13.23)
<i>OwnConc</i>	−0.355 *** (−6.72)	−0.356 *** (−6.77)
<i>BoardSize</i>	0.001 (0.21)	0.001 (0.25)
<i>Duality</i>	−0.037 *** (−3.19)	−0.036 *** (−3.14)
<i>TMTPay</i>	−0.082 *** (−10.50)	−0.081 *** (−10.40)
Constant	−1.148 *** (−4.27)	−1.175 *** (−4.40)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	13,137	13,137
Adjusted R ²	0.966	0.966

Note: This table reports the results of fixed-effects regressions of default risk on managerial sentiment, using an alternative default risk measure. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

4.9. Two Stage Least Squares

Endogeneity concerns arise in the regression estimation of Equation (10). Firms with lower default risk may elicit more positive sentiment from managers, thereby reinforcing managerial sentiment. Alternatively, unobserved omitted factors may jointly influence both managerial sentiment and default risk, generating a spurious correlation between the two. To further address these endogeneity concerns, we employ a 2SLS regression with industry-median managerial sentiment as the instrumental variable, following J. Hu et al. (2023) and K. Wei et al. (2025):

$$\begin{aligned}
 \text{EmotionTone1}_{i,t} = & \beta_0 + \beta_1 \text{EmotionTone1Med}_{i,t} + \beta_2 \text{FirmSize}_{i,t} + \beta_3 \text{FirmAge}_{i,t} \\
 & + \beta_4 \text{Leverage}_{i,t} + \beta_5 \text{SaleGrow}_{i,t} + \beta_6 \text{SOE}_{i,t} + \beta_7 \text{TobinQ}_{i,t} \\
 & + \beta_8 \text{OwnConc}_{i,t} + \beta_9 \text{BoardSize}_{i,t} + \beta_{10} \text{Duality}_{i,t} \\
 & + \beta_{11} \text{TMTPay}_{i,t} + \text{YearFE} + \text{FirmFE} + \varepsilon_{i,t}
 \end{aligned} \quad (18)$$

$$\begin{aligned}
 Z'' \text{ Score}_{i,t} = & \beta_0 + \beta_1 \text{EmotionTone1Pred}_{i,t} + \beta_2 \text{FirmSize}_{i,t} + \beta_3 \text{FirmAge}_{i,t} \\
 & + \beta_4 \text{Leverage}_{i,t} + \beta_5 \text{SaleGrow}_{i,t} + \beta_6 \text{SOE}_{i,t} + \beta_7 \text{TobinQ}_{i,t} \\
 & + \beta_8 \text{OwnConc}_{i,t} + \beta_9 \text{BoardSize}_{i,t} + \beta_{10} \text{Duality}_{i,t} \\
 & + \beta_{11} \text{TMTPay}_{i,t} + \text{YearFE} + \text{FirmFE} + \varepsilon_{i,t}
 \end{aligned} \quad (19)$$

In the first stage in Equation (18), *EmotionTone1* is regressed on the industry-median *EmotionTone1Med*, which serves as the instrumental variable. In the second stage in Equation (19), *Z'' Score* is regressed on the predicted value (*EmotionTone1Pred*) obtained from the first stage. The rationale for this instrument is that firms within the same industry tend to exhibit similar *EmotionTone1* levels, implying that a firm's *EmotionTone1* is influenced by the industry median. However, the industry-median *EmotionTone1Med* is unlikely to directly affect an individual firm's default risk, which is largely determined by firm-specific characteristics. The 2SLS results are reported in Columns 1 and 2 of Table 10. Likewise, we repeat Equations (18) and (19) using *EmotionTone2* in place of *EmotionTone1* and report the results in Columns 3 and 4 of Table 10.

Table 10. Two-stage least squares regressions.

	(1)	(2)	(3)	(4)
	1st Stage <i>EmotionTone1</i>	2nd Stage <i>Z'' Score</i>	1st Stage <i>EmotionTone2</i>	2nd Stage <i>Z'' Score</i>
<i>EmotionTone1Pred</i>		33.225 *** (6.32)		
<i>EmotionTone1Med</i>	0.843 *** (39.34)			
<i>EmotionTone2Pred</i>				6.768 *** (10.84)
<i>EmotionTone2Med</i>			0.868 *** (44.60)	
<i>FirmSize</i>	0.000 *** (3.48)	0.197 *** (7.47)	0.006 *** (5.67)	0.186 *** (6.98)
<i>FirmAge</i>	−0.000 (−0.78)	−0.237 * (−1.90)	−0.013 *** (−3.88)	−0.149 (−1.19)
<i>Leverage</i>	−0.001 (−0.70)	−18.415 *** (−81.40)	−0.014 *** (−2.59)	−18.326 *** (−80.80)
<i>SaleGrow</i>	0.004 *** (10.31)	−0.050 (−0.78)	0.035 *** (12.27)	−0.186 *** (−2.65)
<i>SOE</i>	0.001 * (1.89)	−0.049 (−0.73)	0.002 (0.59)	−0.034 (−0.50)
<i>TobinQ</i>	0.000 *** (2.62)	0.179 *** (6.26)	0.002 ** (2.39)	0.169 *** (5.81)
<i>OwnConc</i>	0.002 (1.47)	0.618 *** (2.91)	−0.010 (−1.24)	0.842 *** (3.88)
<i>BoardSize</i>	0.000 *** (4.50)	−0.110 *** (−7.31)	0.002 *** (3.58)	−0.105 *** (−6.87)
<i>Duality</i>	0.000 (0.93)	0.370 *** (5.02)	0.006 *** (3.11)	0.323 *** (4.34)
<i>TMTPay</i>	0.001 *** (2.60)	0.234 *** (5.31)	0.008 *** (4.75)	0.169 *** (3.75)
Constant	−0.017 *** (−5.12)	4.993 *** (6.76)	−0.193 *** (−7.82)	5.017 *** (6.88)
Year FE	Yes	Yes	Yes	Yes
Observations	13,137	13,137	13,137	13,137
Adjusted R ²	0.256	0.610	0.323	0.602

Note: This table reports two-stage least squares regression results of default risk on managerial sentiment, using annual industry-median managerial sentiment as instruments. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

The first-stage result in Column 1 of Table 10, based on Equation (18), indicates that the coefficient on the industry-median *EmotionTone1Med* is 0.843 and statistically significant at the 1% level, alleviating concerns regarding weak instruments. In the second stage, consistent with Equation (19), the results in Column 2 reveal a statistically significant positive association between the predicted *EmotionTone1Pred* from the first stage and default risk, with a coefficient of 33.225, significant at the 1% level. Similarly, Columns 3 and 4 using *EmotionTone2* yield comparable results. This evidence supports the validity of the instrument and suggests that managerial sentiment affects corporate default risk, rather than the reverse.

4.10. Propensity Score Matching

To address concerns that the documented association between managerial sentiment and default risk may be driven by observable firm characteristics, we follow J. Wu et al. (2025) and Lai et al. (2025) to implement a PSM procedure. By matching firms with similar characteristics but different sentiment profiles, we seek to isolate the effect of managerial sentiment from confounding covariates. To facilitate the implementation of PSM, we transform the continuous measure of managerial sentiment into a binary treatment indicator, denoted as *EmotionTone1Dum* or *EmotionTone2Dum*. Specifically, we assign a value of one to firms whose emotion tone exceeds the annual mean emotion tone, and zero otherwise. This binary indicator captures relative variation in emotion tone across firms and over time. Propensity scores are estimated using a logit model that includes all baseline control variables, such as firm size, firm age, leverage, and others, ensuring that matched subsamples are comparable in observable characteristics aside from treatment status.

Table 11 reports the fixed-effects regression results after PSM, in which the subsamples exhibit comparable firm size, firm age, leverage, and other characteristics, yet differ in emotion tone levels. The coefficients on *EmotionTone1Dum* and *EmotionTone2Dum* remains significantly positive for *Z''Score* and significantly negative for *OScore*, consistent with the baseline regression results reported in Table 3. The adjusted *R*-squared are slightly lower. This finding mitigates endogeneity concerns that observable firm characteristics drive the negative relationship between managerial sentiment and default risk.

Table 11. Propensity score matching.

	(1)	(2)	(3)	(4)
	<i>Z''Score</i>	<i>Z''Score</i>	<i>OScore</i>	<i>OScore</i>
<i>EmotionTone1Dum</i>	0.092 * (1.79)		−0.098 *** (−5.12)	
<i>EmotionTone2Dum</i>		0.199 *** (3.74)		−0.110 *** (−5.63)
<i>FirmSize</i>	0.157 *** (6.23)	0.155 *** (6.15)	−0.542 *** (−55.75)	−0.542 *** (−55.68)
<i>FirmAge</i>	−0.631 *** (−4.88)	−0.618 *** (−4.75)	0.040 (1.19)	0.033 (1.00)
<i>Leverage</i>	−18.188 *** (−82.69)	−18.174 *** (−82.45)	10.201 *** (140.50)	10.196 *** (140.28)
<i>SaleGrow</i>	0.082 (1.28)	0.063 (0.98)	−0.458 *** (−14.83)	−0.452 *** (−14.66)
<i>SOE</i>	0.043 (0.64)	0.043 (0.65)	0.017 (0.62)	0.015 (0.54)
<i>TobinQ</i>	0.154 *** (5.48)	0.152 *** (5.41)	−0.193 *** (−17.67)	−0.192 *** (−17.65)
<i>OwnConc</i>	0.787 *** (3.73)	0.817 *** (3.85)	−0.994 *** (−12.43)	−1.007 *** (−12.59)

Table 11. Cont.

	(1)	(2)	(3)	(4)
	<i>Z'' Score</i>	<i>Z'' Score</i>	<i>OScore</i>	<i>OScore</i>
<i>BoardSize</i>	−0.069 *** (−4.76)	−0.069 *** (−4.73)	−0.011 * (−1.95)	−0.011 ** (−2.06)
<i>Duality</i>	0.311 *** (4.34)	0.308 *** (4.29)	0.048 ** (1.97)	0.050 ** (2.01)
<i>TMTPay</i>	0.163 *** (3.83)	0.156 *** (3.69)	−0.195 *** (−12.06)	−0.192 *** (−11.90)
Constant	8.673 *** (11.72)	8.704 *** (11.78)	2.432 *** (10.80)	2.423 *** (10.75)
Observations	13,137	13,137	13,137	13,137
Adjusted R ²	0.611	0.611	0.746	0.746

Note: This table reports the regression results of default risk on managerial sentiment, using the propensity score matched sample. Variable definitions are provided in Appendix A. Heteroskedasticity-robust *t*-values are reported in parentheses beneath the corresponding coefficients. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5. Discussion

This study offers new evidence that managerial sentiment is inversely related to corporate default risk in China. Beyond documenting this empirical relation, the results can be interpreted within established theories of signaling, behavioral finance, and information asymmetry, while simultaneously reflecting the distinctive institutional characteristics of the Chinese capital market.

One interpretation of this finding is grounded in signaling theory, which suggests that managers convey private information about firm prospects through non-financial disclosures (Spence, 1973). A more positive managerial tone in the MD&A section may signal managers' confidence in firms' future cash flows and debt-servicing capacity, thereby reducing investors' and creditors' perceptions of default risk. Prior research in accounting and finance shows that narrative tone in mandatory disclosures is informative to market participants when measured using finance-specific dictionaries and when disclosure incentives constrain purely strategic language (Loughran & McDonald, 2011; Campbell et al., 2020).

Beyond signaling considerations, the results are also consistent with behavioral finance theory, which emphasizes that managerial beliefs and perceptions influence corporate outcomes with real economic consequences. Managerial sentiment extracted from corporate disclosures may reflect managers' internal assessments of risk and uncertainty, shaping financial decisions related to liquidity management, financing, and risk exposure, factors that are directly linked to default risk. Empirical evidence suggests that managerial sentiment captures behavioral components that extend beyond rhetorical disclosure choices and are associated with meaningful variations in firm-level outcomes (Malmendier & Tate, 2005; Jiang et al., 2019).

In addition, the baseline findings can be interpreted through the lens of information asymmetry and disclosure theory. Narrative disclosures play an important role in reducing information friction between firms and external stakeholders when hard financial information is incomplete or delayed (Akerlof, 1970; Healy & Palepu, 2001). A more positive and coherent managerial narrative may improve the firm's information environment, reduce uncertainty faced by investors and creditors, and lower perceived distress risk. Consistent with this view, prior studies show that qualitative features of corporate reports affect how effectively markets process firm fundamentals (R. J. Bloomfield, 2002; F. Li, 2008). Taken together, these perspectives suggest that managerial sentiment embedded in corporate disclosures contains incremental information relevant for assessing default risk, beyond traditional financial indicators.

The results in Table 4 show that the mitigating effect of positive managerial sentiment on default risk weakens as ownership concentration rises. This finding aligns with corporate governance theory, which emphasizes the monitoring role of large shareholders in firms with concentrated ownership structures (Shleifer & Vishny, 1986), and with evidence that stronger monitoring lowers the marginal informativeness of corporate disclosures (Irani & Oesch, 2013). When ownership concentration is high, dominant shareholders possess stronger incentives and greater capacity to obtain firm-specific information through direct monitoring, thereby reducing their reliance on managerial tone in corporate disclosures. From an informational perspective, the evidence indicates a substitution effect between internal governance mechanisms and disclosure-based signals: as internal monitoring strengthens, the marginal informational value of managerial sentiment for assessing default risk diminishes. Overall, these results suggest that the effectiveness of managerial sentiment as a risk-reducing signal depends on firms' ownership structures.

The moderating effect of R&D expenditure intensity reflects the inherent dual nature of innovation investments. While R&D spending signals long-term growth opportunities, it also generates short-term financial uncertainty and heightens cash flow volatility. Our finding that greater R&D intensity weakens the impact of managerial sentiment on default risk suggests that investors discount narrative optimism when firms are heavily involved in risky, long-horizon innovation activities. In such cases, uncertainty surrounding R&D outcomes may dominate the informational content of managerial tone, thereby reducing its effectiveness as a signal of near-term financial stability.

The mediating roles of financial constraints and ESG ratings offer further insight into the channels through which managerial sentiment influences default risk. Positive managerial sentiment appears to ease financial constraints, potentially by strengthening investor confidence and improving firms' access to external capital. At the same time, optimistic managerial tone is associated with higher ESG ratings, which may reinforce perceptions of long-term sustainability, governance quality, and risk management. These channels are economically meaningful, as both financing capacity and ESG credibility play important roles in mitigating default risk.

Importantly, these findings should be interpreted in the context of the Chinese capital market, which differs in several respects from developed markets. China is characterized by relatively high information asymmetry, uneven analyst coverage, limited short-selling mechanisms, and less stringent legal enforcement of disclosure quality (Chan et al., 2008; C. Li, 2021). Moreover, the prevalence of controlling shareholders, state ownership, implicit government support, and soft budget constraints can obscure traditional accounting-based and market-based signals of financial distress (Walker et al., 2021; Megginson et al., 2014). Within this institutional environment, managerial narrative disclosures, particularly sentiment conveyed in the MD&A, may serve as a crucial supplementary source of firm-specific information. Our results indicate that managerial sentiment captures dimensions of risk assessment that are not fully reflected in conventional distress measures, thereby providing incremental insight into default risk in China.

Beyond the Chinese context, an important question concerns the extent to which the findings of this study generalize to other markets. Many emerging economies, such as India, Brazil, Russia, and several Southeast Asian markets, are characterized by relatively high information asymmetry, weaker investor protection, concentrated ownership structures, and less developed external monitoring mechanisms (La Porta et al., 1998; Fan et al., 2011). In such environments, narrative disclosures often play a disproportionately important role in conveying firm-specific information beyond standardized financial statements. Consistent with signaling and disclosure theories, managerial sentiment embedded in MD&A or comparable narrative sections may therefore serve as a valuable soft signal

of firms' internal risk assessments and future financial stability. Prior evidence from emerging markets suggests that qualitative disclosures and managerial communication are particularly informative when formal governance mechanisms and market discipline are less effective (Ball et al., 2000; Claessens & Yurtoglu, 2013). Consequently, the negative association between positive managerial sentiment and default risk documented in this study is likely to extend to other emerging markets with comparable institutional frictions.

By contrast, the role of managerial sentiment in shaping default risk may operate differently in more developed financial markets. In the U.S. and other advanced economies, stronger legal enforcement, more rigorous disclosure standards, extensive analyst coverage, and active institutional investors substantially reduce information asymmetry (Healy & Palepu, 2001; Leuz et al., 2003). Under these conditions, investors and creditors rely more heavily on hard information, such as audited financial statements, credit ratings, and market-based signals, potentially diminishing the incremental informational content of managerial sentiment. Moreover, in highly efficient markets, excessively optimistic managerial tone may be interpreted as strategic impression management rather than credible signaling, especially when it is not corroborated by fundamentals. This distinction suggests that while managerial sentiment remains informative across markets, its economic significance is likely stronger in emerging economies than in developed ones. Future cross-country research comparing emerging and developed markets could further clarify how institutional quality moderates the link between managerial sentiment and default risk, thereby enriching the behavioral corporate finance literature.

Overall, the discussion emphasizes that managerial sentiment is not simply a behavioral artifact but an economically meaningful signal whose informativeness depends on governance structures, investment strategies, and institutional context. These findings help reconcile mixed evidence in prior studies regarding the usefulness of textual disclosures (F. Li, 2008; Q. Zhao et al., 2023) and highlight why the Chinese market offers a compelling setting for examining the role of managerial sentiment in default risk assessment.

6. Conclusions

Using a dataset of 13,137 firm-year observations from publicly listed A-share firms in China over the 2010–2022 period, this study investigates the relationship between managerial sentiment and default risk. The results show that positive managerial sentiment significantly reduces default risk. However, this negative relationship is moderated by ownership concentration and R&D expenditure intensity, with the effect weakening at higher levels of both factors. Further analysis indicates that financing constraints and ESG ratings mediate this relationship, generating an indirect effect of managerial sentiment on default risk through these channels. Subsample analyses further show that the relationship is stronger in low-competition industries and among firms with high leverage. Robustness checks, including alternative measures of default risk and managerial sentiment, as well as 2SLS regression and PSM, confirm the robustness of these results.

The findings of this study have several practical implications for investors, creditors, corporate managers, and regulators, particularly within the context of emerging markets such as China. First, for investors and creditors, the results indicate that managerial sentiment embedded in narrative disclosures offers incremental information about default risk beyond traditional financial indicators. This insight is especially relevant in settings characterized by high information asymmetry and limited external monitoring, where qualitative disclosures can complement conventional risk assessment tools. Incorporating managerial sentiment into credit analysis and investment screening may therefore enhance early identification of financial distress.

Second, for corporate managers, the findings emphasize the importance of narrative disclosure quality. Managerial sentiment is not simply a stylistic element of corporate reports but instead conveys economically meaningful information regarding perceived financial stability and strategic confidence. Managers should therefore recognize that excessively pessimistic or inconsistent tone may intensify perceptions of default risk, whereas credible and transparent communication can help ease financing constraints and reinforce stakeholder confidence overall.

Third, the findings carry implications for regulators and policymakers. Given the influence of managerial sentiment on default risk perceptions, regulators may seek to place greater emphasis on clarity, consistency, and informativeness in narrative disclosures. Strengthening disclosure guidelines and enhancing oversight of MD&A reporting could improve market discipline and reduce reliance on implicit guarantees in the credit market.

This study also opens several avenues for future research. First, future work could more clearly distinguish between optimism and overconfidence in managerial sentiment. While overconfidence implies exaggerated certainty, optimism reflects more well-grounded confidence. This distinction raises a potential concern: could excessively positive managerial sentiment driven by overconfidence, if persistent, increase default risk over longer horizons than those examined in this study? This issue warrants further investigation.

Second, future research may examine the dynamic effects of managerial sentiment across longer horizons, including whether persistently optimistic tone forecasts shifts in default risk during economic downturns or periods of stress. Third, extending the analysis to additional emerging markets would permit cross-country comparisons and help evaluate whether the influence of managerial sentiment in default risk assessment is specific to China or broadly applicable to comparable institutional settings.

Finally, future studies could examine interactions between managerial sentiment and other qualitative disclosure dimensions, such as risk-factor disclosures or forward-looking statements. These extensions would further deepen understanding of how narrative disclosures shape corporate risk and financial stability.

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Appendix A

Table A1. Variable definitions.

Variable	Definition
<i>Z''Score</i>	An accounting-based measure of financial distress calculated following Altman et al. (1998). Higher values indicate lower financial distress risk.
<i>Oscore</i>	An accounting-based measure of financial distress calculated following Ohlson (1980). Higher values indicate higher financial distress risk.
<i>DistDefault</i>	A market-based measure of default risk constructed under the KMV distance-to-default framework. Higher values indicate lower financial distress risk.
<i>EmotionTone1</i>	The difference between the number of positive-tone words and the number of negative-tone words, scaled by the total number of words. A higher value indicates a more positive managerial emotional tone.
<i>EmotionTone2</i>	The difference between the number of positive-tone words and the number of negative-tone words, scaled by the sum of positive-tone and negative-tone words. A higher value indicates a more positive managerial emotional tone.
<i>FirmSize</i>	The natural logarithm of the firm's total assets.
<i>FirmAge</i>	The natural logarithm of one plus the number of years since the firm's establishment.
<i>Leverage</i>	The total liabilities divided by the total assets.
<i>SaleGrow</i>	The change in sales revenue relative to the previous year.
<i>SOE</i>	A dummy variable equal to 1 if the firm is a state-owned enterprise, and 0 otherwise.
<i>TobinQ</i>	The ratio of the sum of the market value of circulating shares, the number of non-circulating shares multiplied by book value per share, and the book value of liabilities to total assets.
<i>OwnConc</i>	The Herfindahl index of ownership concentration, calculated as the square of the shareholding ratio of the largest shareholder.
<i>BoardSize</i>	The number of board directors.
<i>Duality</i>	A dummy variable equal to 1 if the board chairman and CEO are the same person, and 0 otherwise.
<i>TMTPay</i>	The natural logarithm of the total compensation of the top three executives.
<i>RDExpense</i>	The R&D expenses divided by the operating revenue.
<i>FinConstr</i>	Whited and Wu's (2006) financial constraints index, which is obtained from CSMAR. Higher values indicate more severe financial constraints.
<i>ESG</i>	The comprehensive environmental, social, and governance (ESG) score from Sino-Securities Index Information Service Co. Ltd. (Shanghai, China). Higher values indicate better ESG ratings.
<i>HHI</i>	Herfindahl-Hirschman Index measuring industry competition based on operating revenue, defined as the sum of squared revenue shares of firms within each industry-year.
<i>EmotionTone3</i>	A yearly normalized measure of managerial emotional tone obtained by scaling <i>EmotionTone1</i> by its mean value within the same year.
<i>EmotionTone4</i>	A yearly normalized measure of managerial emotional tone obtained by scaling <i>EmotionTone2</i> by its mean value within the same year.
<i>ZMScore</i>	An accounting-based measure of financial distress calculated following Zmijewski (1984). Higher values indicate higher financial distress risk.

Notes

- ¹ "PwC's 27th Annual Global CEO Survey", PricewaterhouseCoopers, Available online: <https://www.pwc.com/gx/en/ceo-survey/2024/download/27th-ceo-survey.pdf> (accessed on 25 January 2026).
- ² "China Monthly Economic Indicators", Chinese National Bureau of Statistics, Available online: https://www.stats.gov.cn/zs/tjwh/tjkw/tjqk/zgjqq/202411/t20241111_1957356.html (accessed on 25 January 2026).
- ³ The China Securities Regulatory Commission applies special treatment status to financially distressed firms as an early warning signal to both the firm and investors.
- ⁴ CSMAR constructs a Chinese financial sentiment dictionary by integrating the CNKI sentiment dictionary with the Loughran and McDonald financial sentiment word lists. The English Loughran and McDonald word lists are translated into Chinese using Youdao Dictionary and Kingsoft PowerWord. When an English word corresponds to multiple Chinese translations, all candidate Chinese words are initially retained, after which manual screening is conducted to eliminate translations that do not

appropriately fit the linguistic or contextual usage in Chinese financial disclosures. The resulting dictionary consists of Chinese positive and negative sentiment words tailored to the context of corporate financial reports.

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