# Managerial Overconfidence and Stock Price Crash Risk: An Analysis of the Mediating Effect of Accounting Conservatism

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**ABSTRACT** Using A-share listed companies on the Shanghai and Shenzhen stock exchanges from 2012 to 2019 as the sample, this paper empirically examines the effect of managerial overconfidence on stock price crash risk. Investment expenditure and shareholding decisions are used as proxies for managerial overconfidence, and accounting conservatism is introduced as a mediating variable to analyze the mechanism linking the two. The results show that managerial overconfidence does indeed aggravate stock price crash risk. The mechanism is that overconfident managers reduce the conservatism of accounting information processing in order to conceal adverse information, thereby increasing the likelihood of a stock price crash. Accounting conservatism plays a partial mediating role in this process. The results remain valid after robustness tests.

**INDEX TERMS** overconfidence; stock price crash risk; accounting conservatism; mediating effect

## I. INTRODUCTION

A stock price crash refers to a sharp drop in the price of a listed company's stock caused by massive sell-offs. China's securities market experienced large-scale stock price declines, that is, stock price crashes, in 2011, 2013, 2015, and 2017. In 2015, China's A-share market suffered one of the most severe crashes in its history: thousands of stocks hit their daily limit-down level, and the major index fell from 5,116 points to 3,467 points. Stock price crashes not only cause investors to lose substantial wealth, but also undermine investor confidence, while stock market fluctuations can in turn affect the real economy. For this reason, reducing stock price crash risk has long been a major concern in academic research.

Managers are entrusted with operating firms, and their behavior naturally has a substantial influence on corporate operations. For a long time, academic research was conducted on the premise that managers behave as rational agents. In reality, however, this is rarely the case. Firms and managers are affected by many factors, and managers can hardly be fully rational. In 1980, managerial overconfidence was shown to be widespread among executives of listed firms, and similar conclusions have also been reached in China [1-3]. Overconfidence causes managers to place excessive trust in their own experience and ability, leading to mistakes in business decision-making. An important question, then, is whether such overconfidence increases stock price crash risk. Existing studies have shown that executive overconfidence raises corporate stock price crash risk [4], and Zeng Aimin et al. [5] further argue that this effect becomes stronger as executive power increases. Zhang Duolei et al. [6] and Geng Deke et al. [7] also confirm this relationship and suggest that emphasizing accounting information quality can effectively reduce stock price crash risk.

Accounting conservatism stresses asymmetric recognition of expenses and losses versus revenues and gains. By delaying the recognition of good news and accelerating the disclosure of bad news, accounting conservatism improves accounting information quality and alleviates information opacity between firms and investors. On the one hand, overconfident managers tend to overestimate their own ability and knowledge, display a more optimistic attitude toward risk, and prefer aggressive accounting policies, thereby reducing accounting information quality and negatively affecting accounting conservatism [8]. On the other hand, accounting conservatism requires losses to be recognized as early as possible, so that adverse information is disclosed in a timely and effective manner and can help guard against stock price crash risk [6,9]. Accounting conservatism restrains managers from concealing adverse financial news and reduces the effect of the sudden release of large amounts of bad news on stock prices. This raises the question of whether managerial overconfidence aggravates stock price crash risk by lowering accounting conservatism and thereby concealing adverse news. In other words, does accounting conservatism play a mediating role between managerial overconfidence and stock price crash risk? This is the central issue examined in this paper. The purpose is to clarify the path through which managerial overconfidence affects stock price crash risk and thereby provide more practical suggestions for reducing crash risk from a behavioral finance perspective.

## II. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

### A. MANAGERIAL OVERCONFIDENCE AND STOCK PRICE CRASH RISK

Cognitive psychology defines overconfidence as a cognitive bias whereby individuals believe that the accuracy of their knowledge, the magnitude of their ability, the amount of information they possess, or the truthfulness of that information exceeds reality. This bias has been shown to be widespread in human personality [10-11]. In environments that revere authority, executive overconfidence is even more pronounced, and studies show that managers tend to be more overconfident than the general public [12-13]. Overconfidence leads individuals to over-rely on their own ability and knowledge, making it easier to misjudge project success and risk [1].

Based on prior research, the influence of overconfidence on executive behavior mainly takes two forms. First, overconfidence leads managers to overestimate their own ability and experience, thereby increasing the risk of investment decision failure. Existing studies argue that overconfident executives are more likely to engage in overinvestment [14-15], overestimate the success probability of corporate expansion, and thereby make firms more prone to financial distress [16]. Yu Minggui et al. [17] argue that overconfident managers have a stronger preference for risk. Second, when facing adverse news, overconfident executives still tend to trust their own judgment excessively and believe that conditions will improve in the future, so they choose to ignore and conceal adverse information. Schrand et al. [18] suggest that managers confronted with operating difficulties often remain optimistic and believe that such difficulties are temporary and that firm performance will improve in the future, leading them to embellish financial reports. Kim et al. [19] similarly argue that overconfident CEOs ignore negative feedback and instead release more optimistic signals.

Under information asymmetry between executives and shareholders, executives may conceal bad news for motives such as obtaining high compensation or building private empires, thereby exacerbating information asymmetry. Once conditions deteriorate to the point that managers are no longer able to conceal bad news, the accumulated bad news erupts into the capital market, causing the firm's stock price to fall sharply. This is stock price crash risk [20-21].

When making investment and financing decisions, executives may misjudge risk because of this cognitive bias and thereby increase the probability of project failure [16]. When adverse financial news emerges, overconfident managers continue to trust their own judgment, believe future conditions will improve, and choose to ignore the negative news and continue investing. To preserve compensation and reputation, they are motivated to conceal adverse information. Under information asymmetry, the firm's adverse financial information is repeatedly suppressed until it is suddenly released in full to the capital market, at which point investors may dump the firm's stock and trigger a crash.

Based on the above analysis, this paper proposes Hypothesis 1:

**H1:** Managerial overconfidence aggravates stock price crash risk.

### B. MANAGERIAL OVERCONFIDENCE AND ACCOUNTING CONSERVATISM

Accounting conservatism requires asymmetric recognition of expenses and losses relative to revenues, thereby improving the authenticity of accounting profits. It is regarded as an important accounting principle. A key role of accounting conservatism is to alleviate agency problems and reduce losses caused by managerial opportunism, such as on-the-job consumption and overinvestment driven by compensation incentives [22]. Financial statements are one of the major channels through which managers are evaluated, so managers have incentives to embellish financial information. However, because accounting conservatism imposes stricter requirements for recognizing losses and expenses than for recognizing revenues, it produces more prudent and truthful business results, effectively constrains managerial self-interest, reduces agency costs [22], and improves investment efficiency [23].

Overconfident managers place excessive confidence in their own ability and knowledge and are prone to misjudging risk. For the sake of reputation and compensation, they have incentives to conceal adverse financial information. Accounting conservatism, however, enhances accounting transparency and reduces managers' incentives to embellish financial information. In other words, accounting conservatism weakens the ability of overconfident executives to hide bad news, allowing directors and investors to learn of their misjudgments earlier. In order to avoid dismissal and preserve their reputation, managers may stop investing in inefficient projects, thereby reducing the losses caused by overconfidence. The interaction between the two suggests that managerial overconfidence requires the use of aggressive accounting policies, such as early revenue recognition and delayed recognition of expenses and losses, to conceal managerial behavior. Based on this reasoning, Hypothesis 2 is proposed:

**H2:** Managerial overconfidence reduces corporate accounting conservatism.

### C. THE MEDIATING ROLE OF ACCOUNTING CONSERVATISM

According to information hoarding theory, stock price crashes occur because, for certain reasons, large amounts of bad news are suddenly released, leading to sustained stock price declines [19]. Accounting conservatism emphasizes asymmetry in the recognition of losses and expenses relative to revenues, which leads to more timely recognition of adverse financial information. As a result, adverse financial information is gradually released into the capital market. By improving accounting information quality, conservatism prevents the sudden large-scale release of bad news that would otherwise trigger a stock price crash.

Accounting conservatism also supervises managerial behavior. Managers who wish to avoid dismissal may abandon speculative projects with negative net present value, thereby reducing the generation of bad news at the source and lowering the probability of stock price crashes. Therefore, properly controlling the quality of corporate accounting information can prevent some crashes. However, whether externally disclosed accounting information truly reflects the firm's operating performance remains open to question. As the logic behind Hypothesis 2 indicates, overconfident managers need to use aggressive accounting policies, such as accelerating revenue recognition and delaying the recognition of expenses and losses, to embellish financial information and cloak their own behavior. Without conservative accounting information to monitor crash risk, the probability of stock price crashes increases substantially.

In summary, this paper argues that reducing accounting conservatism is an important channel through which managerial overconfidence affects stock price crash risk, and therefore proposes Hypothesis 3:

**H3:** Accounting conservatism plays a mediating role in the relationship between managerial overconfidence and stock price crash risk.

## III. RESEARCH DESIGN

### A. SAMPLE SELECTION

This paper uses financial data for A-share listed firms in Shanghai and Shenzhen from 2012 to 2019. Because the independent variables and control variables are lagged by one period, the effective sample period covers seven years. Following standard empirical practice, the sample is screened as follows:

1. Firms designated `ST` or `*ST` are excluded.
2. Firms in the financial and insurance industries are excluded according to the 2012 CSRC industry classification standard.
3. Firms with fewer than 30 trading weeks in a year are excluded.
4. Firms with missing data are excluded.

The final sample contains 14,805 firm-year observations. All data are obtained from the CSMAR database.

### B. VARIABLE DEFINITIONS

#### 1) Stock Price Crash Risk

Stock price crash risk is measured by two indicators computed from firm-specific weekly returns `W`: the negative conditional skewness coefficient (`Ncskew`) and the down-to-up volatility ratio (`Duvol`). The calculation proceeds as follows.

First, firm-specific weekly returns are estimated after controlling for market factors:

$$R_{i,t} = \alpha_i + \beta_1 R_{m,t-2} + \beta_2 R_{m,t-1} + \beta_3 R_{m,t} + \beta_4 R_{m,t+1} + \beta_5 R_{m,t+2} + \varepsilon_{i,t}$$

Second, the firm's weekly stock return is computed as:

$$W_{i,t} = \ln(1 + \varepsilon_{i,t})$$

Third, `Ncskew` and `Duvol` are calculated using `W`:

$$Ncskew_{i,t} = -\frac{n(n-1)^{3/2} \sum W_{i,t}^3}{(n-1)(n-2)(\sum W_{i,t}^2)^{3/2}}$$

$$Duvol_{i,t} = \log\left(\frac{(n_d - 1)\sum_{down} W_{i,t}^2}{(n_u - 1)\sum_{up} W_{i,t}^2}\right)$$

#### 2) Managerial Overconfidence

Existing studies measure managerial overconfidence using several proxies, including managers' personal characteristics, business climate indices, merger frequency, earnings forecasts, capital expenditures, shareholding decisions, and relative pay ratios. Because relatively few Chinese listed companies disclose earnings forecasts, that measure yields too few observations for robust empirical testing. In addition, forecasts may exceed actual earnings for reasons such as bond financing rather than managerial overconfidence. Measures based on managers' gender, education, or major are overly subjective. Business climate indices remain controversial as a proxy, and merger activity may reflect long-term corporate strategy rather than overconfidence alone.

Given the lack of consensus and considering data availability, this paper follows Yang Zheng et al. [8] and measures overconfidence with investment expenditure. Specifically, the ratio of investment expenditure to total assets is used to measure a firm's investment expenditure level. If a firm's investment expenditure level is above the median of its industry, executives are regarded as believing that the firm's future development will exceed the industry norm, and `Overc1` is assigned a value of 1; otherwise, it is assigned a value of 0.

In the robustness test, this paper follows Hao Ying et al. [24] and uses the shareholding decision measure Overc2 as an alternative proxy. When the annual return on the firm's stock is lower than the aggregate market annual return and non-dividend, rights issue, and additional issuance factors are excluded, a manager who still increases shareholdings rather than investing elsewhere or buying financial products to diversify risk is viewed as highly confident in the firm's future and in his or her own operations. Such a manager is treated as overconfident. Managers who increase holdings are assigned Overc2 = 1, while those who keep holdings unchanged or reduce holdings are assigned Overc2 = 0.

### 3) Accounting Conservatism

Accounting conservatism has a long history as an accounting principle. The earliest widely used measure was Basu's reverse-regression model proposed in 1997. However, the Basu model measures conservatism only at the aggregate level and cannot capture firm-year variation. Khan and Watts therefore augmented the earnings-return relation with firm size (Size), market-to-book ratio (MB), and leverage (Lev) and proposed the improved Basu model, namely the C_SCORE model.

Step 1: estimate the Basu model:

$$\frac{EPS_{i,t}}{P_i} = \mu_0 + \mu_1 D_{i,t} + \mu_2 R_{i,t} + \mu_3 D_{i,t} \times R_{i,t} + \varepsilon_{i,t}$$

Step 2: expand the coefficients:

$$G\_SCORE = \mu_2 = \rho_0 + \rho_1 Size + \rho_2 MB + \rho_3 Lev$$

$$C\_SCORE = \mu_3 = \sigma_0 + \sigma_1 Size + \sigma_2 MB + \sigma_3 Lev$$

Step 3: substitute these coefficients into the first formula and compute the extended Basu model. The size of C_SCORE is the measure of accounting conservatism used in this paper:

$$\frac{EPS_{i,t}}{P_i} = \mu_0 + \mu_1 D_{i,t} R_{i,t} (\rho_0 + \rho_1 Size + \rho_2 MB + \rho_3 Lev) + D_{i,t} R_{i,t} (\sigma_0 + \sigma_1 Size + \sigma_2 MB + \sigma_3 Lev) + \varepsilon_{i,t}$$

### 4) Control Variables

Following Zeng Aimin et al. [5] and Jiang Fuxiu et al. [1], this paper includes the following control variables. The standard deviation of firm-specific weekly returns captures fluctuations in W, and the mean of weekly firm-specific returns reflects the level of the firm's stock price. These two variables capture both stock price level and volatility and are closely linked to stock price crashes. In addition, corporate financial risk (leverage), firm size, investors' expectations regarding the firm's future development potential (market-to-book ratio), profitability (return on assets), stock liquidity (average monthly excess turnover), cash flow, growth capacity (revenue growth), and corporate development stage (investment expenditure relative to revenue) may also affect stock price crash risk. Firm growth, market-to-book ratio, investment intensity, and firm size may also influence accounting conservatism.

**Table 1. Definitions of Main Variables**

| Variable Type | Variable Name | Symbol | Definition |
|---|---|---|---|
| Dependent variable | Stock price crash risk | Ncskew | Negative conditional skewness coefficient |
| Dependent variable | Stock price crash risk | Duvol | Down-to-up volatility ratio |
| Explanatory variable | Managerial overconfidence | Overc1 | Equals 1 if investment expenditure as a share of total assets is above the industry median; otherwise 0 |
| Explanatory variable | Managerial overconfidence | Overc2 | Equals 1 if the firm's annual stock return is below the aggregate market return, non-dividend and rights-issue factors are excluded, and managerial shareholding increases relative to the previous year; otherwise 0 |
| Mediating variable | Accounting conservatism | C_score | Extended Basu model measure |
| Control variable | Standard deviation of weekly firm-specific returns | Sigma | Standard deviation of the firm's weekly firm-specific returns in the current year |

| Variable Type | Variable Name | Symbol | Definition |
|---|---|---|---|
| Control variable | Mean weekly firm-specific return | Ret | Mean weekly firm-specific return in the current year |
| Control variable | Leverage | Lev | Year-end liabilities divided by year-end total assets |
| Control variable | Return on assets | Roa | Year-end net profit divided by average total assets at the beginning and end of the year |
| Control variable | Firm size | Size | Logarithm of total assets |
| Control variable | Market-to-book ratio | Bm | Average total assets at the beginning and end of the year divided by total market value of equity |
| Control variable | Average monthly excess turnover | Turnover | Difference between current-year average monthly turnover and previous-year average monthly turnover |
| Control variable | Revenue growth | Growth | Current-year increase in operating revenue divided by previous-year operating revenue |
| Control variable | Sales-to-investment ratio | Invest | Year-end investment expenditure divided by operating revenue |
| Control variable | Cash flow | Cfo | Net cash flow from operating activities divided by total assets |

### C. MODEL SPECIFICATION

#### 1) Effect of Managerial Overconfidence on Stock Price Crash Risk

Following Zeng Aimin et al. [5] and Geng Deke et al. [7], Model 1 includes leverage, accounting information transparency, market-to-book ratio, and other control variables:

$$\begin{aligned} CRASHRISK_{i,t} = {} & \alpha_0 + \alpha_1 Overc1_{i,t-1} + \alpha_2 Roa_{i,t-1} + \alpha_3 Size_{i,t-1} \\ & + \alpha_4 Bm_{i,t-1} + \alpha_5 Turnover_{i,t-1} + \alpha_6 Lev_{i,t-1} \\ & + \alpha_7 Ret_{i,t-1} + \alpha_8 Sigma_{i,t-1} + \sum Year + \sum Ind + \varepsilon_{i,t} \end{aligned}$$

#### 2) Effect of Managerial Overconfidence on Accounting Conservatism

The model for managerial overconfidence and accounting conservatism includes operating risk, firm size, market-to-book ratio, and the sales-to-investment ratio as controls:

$$\begin{aligned} C\_score = {} & \beta_0 + \beta_1 Overc1 + \beta_2 Growth + \beta_3 Size + \beta_4 Bm \\ & + \beta_5 Invest + \beta_6 Cfo + \beta_7 Roa + \sum Year + \sum Ind + \varepsilon_{i,t} \end{aligned}$$

#### 3) Mediating Effect of Accounting Conservatism

Following the stepwise testing approach, and conditional on the first two hypotheses holding, Model 3 adds accounting conservatism as the mediating variable and introduces operating risk and the sales-to-investment ratio as controls:

$$\begin{aligned} CRASHRISK_{i,t} = {} & \mu_0 + \mu_1 Overc1_{i,t-1} + \mu_2 C\_score_{i,t-1} + \mu_3 Roa_{i,t-1} \\ & + \mu_4 Size_{i,t-1} + \mu_5 Bm_{i,t-1} + \mu_6 Turnover_{i,t-1} + \mu_7 Lev_{i,t-1} \\ & + \mu_8 Cfo_{i,t-1} + \mu_9 Ret_{i,t-1} + \mu_{10} Sigma_{i,t-1} \\ & + \mu_{11} Growth_{i,t-1} + \mu_{12} Invest_{i,t-1} + \sum Year + \sum Ind + \varepsilon_{i,t} \end{aligned}$$

## IV. EMPIRICAL RESULTS

### A. DESCRIPTIVE ANALYSIS

Table 2 shows that the means of Overc1 and Overc2 are 0.498 and 0.479, respectively. Both measures indicate that nearly half of the listed firms in the sample exhibit overconfidence, confirming that overconfidence is widespread among executives. The means of Ncskew and Duvol are both nonzero, indicating that most firms face some possibility of a stock price crash. Their standard deviations are 0.704 and 0.474, respectively, showing that crash risk differs substantially across listed firms. The mean of accounting conservatism C_score is 0.0448, indicating that most listed firms use relatively conservative accounting policies, while the standard deviation of 0.0835 suggests meaningful variation in conservatism across firms. Average leverage is 0.426, meaning that Chinese listed firms have an average financial leverage level of about 40%. Mean return on assets is 0.0406,

indicating an average profitability of about 4%. The mean market-to-book ratio is 0.626, which implies that market value is about 1.6 times total assets, and its standard deviation of 0.252 indicates considerable dispersion across firms.

**Table 2. Descriptive Statistics**

| Variable | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Ncskew | 14805 | -0.298 | 0.704 | -5.171 | 5.087 |
| Duvol | 14805 | -0.197 | 0.474 | -2.223 | 2.373 |
| Overc1 | 14805 | 0.479 | 0.500 | 0 | 1 |
| Overc2 | 14805 | 0.498 | 0.500 | 0 | 1 |
| C_score | 14805 | 0.0448 | 0.0835 | -0.372 | 0.538 |
| Ret | 14805 | 0.0026 | 0.00953 | -0.0395 | 0.0742 |
| Sigma | 14805 | 0.061 | 0.0237 | 0.0121 | 0.223 |
| Growth | 14805 | 40.10 | 159.2 | -428.0 | 7099 |
| Cfo | 14805 | 0.0472 | 0.0724 | -0.762 | 0.876 |
| Invest | 14805 | 0 | 3.32e-10 | -2.88e-08 | 1.47e-08 |
| Lev | 14805 | 0.426 | 0.219 | 0.00797 | 8.612 |
| Roa | 14805 | 0.0406 | 0.0704 | -1.859 | 0.675 |
| Size | 14805 | 22.26 | 1.316 | 18.29 | 28.50 |
| Bm | 14805 | 0.626 | 0.252 | 0.0116 | 6.546 |
| Turnover | 14805 | -11.12 | 49.18 | -387.5 | 298.1 |

### *B. CORRELATION ANALYSIS*

The correlation analysis shows that the correlation coefficient between Ncskew and Duvol is greater than 0.5, indicating that the two can substitute for each other in measuring stock price crash risk. The correlation coefficients among the remaining variables are all below 0.5, suggesting no serious multicollinearity. The correlation coefficients of Ncskew and Duvol with Overc1, as well as the correlation coefficient of C_score with Overc1, are all significant at the 1% level, providing preliminary support for Hypotheses 1 and 2.

### *C. REGRESSION ANALYSIS*

#### 1) Effect of Managerial Overconfidence on Stock Price Crash Risk

Model 1 in Table 3 reports the regression results for Hypothesis 1. After controlling for other factors, Overc1 is positively associated with Ncskew at the 1% level, with a coefficient of 0.0963. Overc1 also positively affects Duvol at the 1% level, with a coefficient of 0.0597. These results indicate that managerial overconfidence indeed increases stock price crash risk, supporting Hypothesis 1.

Among the control variables, except for return on assets and leverage, all other controls significantly affect crash risk. Ret is positively associated with both Ncskew and Duvol at the 1% level, implying that larger firm-specific returns are more likely to trigger stock price crashes. Sigma, Size, Bm, and Turnover are all significantly negatively associated with Ncskew and Duvol, indicating that these variables negatively affect crash risk.

#### 2) Effect of Managerial Overconfidence on Accounting Conservatism

Model 2 in Table 3 shows that, after controlling for other variables, the regression coefficient of Overc1 on C_score is -0.0074 and significant at the 1% level, confirming Hypothesis 2. That is, managerial overconfidence does reduce the level of accounting conservatism, suggesting that overconfident managers need aggressive accounting policies to cover up their behavior.

Among the remaining variables, Bm is positively correlated with C_score, indicating that stronger investor expectations regarding a firm's future development are associated with higher accounting conservatism. Size, Growth, Invest, and Cfo are significantly negatively associated with C_score, indicating that firms with larger total assets, faster growth, higher investment expenditure, and stronger cash flows tend to adopt less conservative accounting treatment.

#### 3) Mediating Effect of Accounting Conservatism

As shown in Model 3 of Table 3, the regression coefficient of accounting conservatism C_score on Ncskew is -0.7680 and significant at the 1% level. The regression coefficient of managerial overconfidence on Ncskew is 0.096 and also significant at

the 1% level. Compared with Model 1, where the coefficient of Overc1 on Ncskew is 0.0963, the coefficient falls slightly after adding the mediating variable.

Similarly, C_score is negatively associated with Duvol, with a coefficient of -0.4457 that is significant at the 1% level. After adding C_score, Overc1 still positively affects Duvol at the 1% level, but the coefficient decreases from 0.0597 in Model 1 to 0.0589. According to the stepwise mediating effect test proposed by Wen Zhonglin et al. [25], these results show that accounting conservatism has a significant mediating effect, specifically a partial mediating effect, in the impact of managerial overconfidence on stock price crash risk. The evidence indicates that one important path through which managerial overconfidence increases crash risk is by reducing accounting conservatism and suppressing adverse financial information until it is suddenly released into the capital market.

**Table 3. Regression Results**

**Table 3. Regression Results**

| Variable | Model 1 | | | | |
|---|---|---|---|---|---|
| Ncskew | Model 1 | | | | |
| Duvol | Model 2 | | | | |
| C_score | Model 3 | | | | |
| Ncskew | Model 3 | | | | |
| Duvol | | | | | |
| Overc1 | 0.0963*** | 0.0597*** | -0.0074*** | 0.0960*** | 0.0589*** |
| | (7.64) | (7.07) | (-7.22) | (7.70) | (7.09) |
| C_score | | | | -0.7680*** | -0.4457*** |
| | | | | (-3.02) | (-2.61) |
| Ret | 9.3242*** | 6.5170*** | | 9.1742*** | 6.4337*** |
| | (10.73) | (11.19) | | (10.55) | (11.03) |
| Sigma | -0.7338* | -0.6941*** | | -0.6841* | -0.6754*** |
| | (-1.93) | (-2.73) | | (-1.80) | (-2.65) |
| Lev | -0.0094 | -0.0080 | 0.1847** | | 0.1038** |
| | (-0.25) | (-0.32) | (2.48) | | (2.08) |
| Roa | 0.1070 | 0.0325 | 0.0689 | | 0.0237 |
| | (1.04) | (0.47) | (0.64) | | (0.33) |
| Growth | | | -0.0000*** | 0.0001*** | 0.0001*** |
| | | | (-6.98) | (3.43) | (3.25) |
| Invest | | | -1.43e+07*** | 3.70e+07** | 2.78e+07** |
| | | | (-4.13) | (2.12) | (2.37) |
| Size | -0.0172** | -0.0282*** | -0.0462*** | -0.0599*** | -0.0528*** |
| | (-2.41) | (-5.90) | (-96.41) | (-3.81) | (-5.00) |
| Bm | -0.1399*** | -0.0453* | 0.0444*** | -0.1285*** | -0.0400 |
| | (-3.84) | (-1.85) | (17.49) | (-3.50) | (-1.62) |
| Turnover | -0.0004*** | -0.0003*** | | -0.0004*** | -0.0003*** |
| | (-3.11) | (-3.28) | | (-3.25) | (-3.38) |
| Cfo | | | -0.0940*** | 0.0719 | 0.0023 |
| | | | (-13.87) | (0.82) | (0.04) |
| Constant | 0.1544 | 0.4426*** | 1.0209*** | 1.0237*** | 0.9455*** |
| | (1.01) | (4.31) | (95.88) | (3.14) | (4.33) |
| Industry | Controlled | Controlled | Controlled | Controlled | Controlled |
| Year | Controlled | Controlled | Controlled | Controlled | Controlled |
| N | 14805 | 14805 | 14805 | 14805 | 14805 |
| Adj.-R2 | 0.0627 | 0.0688 | 0.5881 | 0.0632 | 0.0691 |

Note: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The values in parentheses are t statistics.

### D. ROBUSTNESS ANALYSIS

This paper conducts a robustness test by replacing the measure of managerial overconfidence. The purpose is to examine whether the results remain consistent under the same model specification and with the control variables unchanged. As noted above, the alternative measure uses managers' shareholding decisions: when the annual return on the firm's stock is lower than the aggregate market return, and non-dividend and rights-issue factors are excluded, a manager who still increases holdings rather than diversifying into other firms or financial products is regarded as highly confident in the firm's future and in his or her own management ability, and thus overconfident. The robustness test results are reported in Table 4.

After replacing the proxy for managerial overconfidence, all the hypotheses remain valid. In the robustness version of Model 1, the coefficient of Overc2 on Ncskew is 0.0571 and significant at the 1% level. In Model 3, the coefficient of Overc2 on Ncskew is 0.0561 and also significant at the 1% level. After adding the mediating variable C_score, the correlation coefficient decreases slightly. In Model 1, the coefficient of Overc2 on Duvol is 0.0293 and significant at the 1% level; in Model 3, the coefficient of Overc2 on Duvol is 0.0277 and also significant at the 1% level, a reduction of 0.0016. Because the coefficients on Overc2 decrease in both cases after the mediating variable is added, the results again support a partial mediating role of accounting conservatism.

Model 2 shows that the regression coefficient of C_score on Overc2 is -0.0018 and significant at the 1% level, broadly consistent with the results using Overc1. The robustness test therefore shows that all hypotheses remain supported after changing the measure of managerial overconfidence.

**Table 4. Robustness Test Results with Alternative Overconfidence Measure**

| Variable | Model 1 | | | | |
|---|---|---|---|---|---|
| Ncskew | Model 1 | | | | |
| Duvol | Model 2 | | | | |
| C_score | Model 3 | | | | |
| Ncskew | Model 3 | | | | |
| Duvol | | | | | |
| Overc2 | 0.0571*** | 0.0293*** | -0.0018** | 0.0561** | 0.0277*** |
| | (4.97) | (3.80) | (-2.20) | (4.99) | (3.85) |
| C_score | | | | -0.7601*** | -0.4393** |
| | | | | (-2.98) | (-2.57) |
| Ret | 9.4728*** | 6.6189*** | | 9.3298*** | 6.5390*** |
| | (10.89) | (11.35) | | (10.72) | (11.20) |
| Sigma | -0.5716 | -0.5885** | | -0.5341 | -0.5773** |
| | (-1.51) | (-2.32) | | (-1.41) | (-2.27) |
| Lev | -0.0389 | -0.0266 | 0.1520** | | 0.0831* |
| | (-1.03) | (-1.05) | (2.05) | | (1.67) |
| Roa | 0.1166 | 0.0432 | 0.0954 | | 0.0436 |
| | (1.13) | (0.63) | (0.89) | | (0.61) |
| Growth | | | -0.0000*** | 0.0001*** | 0.0001*** |
| | | | (-6.40) | (3.05) | (2.90) |
| Invest | | | -7.08e+06*** | 2.83e+07 | 2.36e+07** |
| | | | (-5.84) | (1.60) | (1.99) |
| Size | -0.0264*** | -0.0338*** | -0.0438*** | -0.0685*** | -0.0578*** |
| | (-3.74) | (-7.13) | (-106.46) | (-4.35) | (-5.48) |
| Bm | -0.1198*** | -0.0328 | 0.0363*** | -0.1100*** | -0.0284 |
| | (-3.29) | (-1.34) | (16.31) | (-3.00) | (-1.16) |
| Turnover | -0.0004*** | -0.0003*** | | -0.0005*** | -0.0003*** |
| | (-3.24) | (-3.48) | | (-3.36) | (-3.56) |
| Cfo | | | -0.1063*** | 0.0222 | -0.0257 |
| | | | (-18.63) | (0.25) | (-0.44) |
| Constant | 0.3683** | 0.5746*** | 0.9856*** | 1.2278*** | 1.0694*** |
| | (2.44) | (5.68) | (110.44) | (3.78) | (4.91) |
| Industry | Controlled | Controlled | Controlled | Controlled | Controlled |

| Variable | Model 1 | | | | |
|---|---|---|---|---|---|
| Ncskew | Model 1 | | | | |
| Duvol | Model 2 | | | | |
| C_score | Model 3 | | | | |
| Ncskew | Model 3 | | | | |
| Duvol | | | | | |
| Year | Controlled | Controlled | Controlled | Controlled | Controlled |
| N | 14805 | 14805 | 14805 | 14805 | 14805 |
| Adj.-R2 | 0.0605 | 0.0666 | 0.5856 | 0.0610 | 0.0669 |

## V. CONCLUSIONS AND RECOMMENDATIONS

Using data on A-share listed firms from 2012 to 2019, this paper systematically demonstrates from a behavioral finance perspective that managerial overconfidence affects corporate stock price crash risk and introduces accounting conservatism to analyze the mechanism. The empirical results show that managerial overconfidence increases stock price crash risk; that overconfident managers reduce the conservatism of accounting treatment in order to cover up their own behavior; and that accounting conservatism plays a partial mediating role in the effect of managerial overconfidence on stock price crashes. Reducing accounting conservatism is therefore one of the important channels through which managerial overconfidence affects stock price crash risk.

In practice, managers must use their own knowledge and experience to make what they believe to be the most appropriate decisions in urgent situations, so some degree of confidence is necessary and overconfidence does not produce only negative effects. To reduce its effect on stock price crash risk, the paper proposes three main approaches.

First, different firms have different needs for senior managerial talent. Under the guidance of the board of directors and shareholders, human resource departments should select executives who suit the firm's own development needs after considering factors such as corporate goals, operating conditions, internal and external governance environments, and the composition of the senior management team. Traditional recruitment processes focus on work experience, communication ability, education, gender, and age, but they do not adequately recognize the impact of executives' psychological traits on their behavior and thus on the firm's future development. The recruitment process should therefore pay greater attention to overconfidence tendencies.

Second, firms should increase psychological assessment for executives. Psychological assessment can use questionnaires to identify applicants' views of themselves and their attribution of past achievements, thereby helping determine their level of confidence. For hired managers, firms should establish psychological profile files for senior executives and regularly assess overconfidence so as to track changes in executives' confidence levels. Firms may also organize reflective communication sessions in which managers compare self-perception with others' evaluations in order to reduce overconfidence-related cognitive bias.

Third, directors and shareholders can require firms to adopt more conservative accounting policies, pay close attention to changes in accounting treatment, and promptly investigate the reasons behind those changes in order to supervise managers. This can not only effectively constrain managers and reduce agency behavior, but also reduce the extent to which executives' cognitive biases intensify stock price crash risk.

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