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# Firm performance feedback and organizational impression management: The moderating role of CEO overconfidence

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## Abstract
We propose that while positive performance feedback is positively related to firm sentiment, negative performance feedback is negatively associated with the firm sentiment. Additionally, overconfident Chief Executive Officers (CEOs) will improve the positive relationship between positive performance feedback and firm sentiment and reduce the negative relationship between negative performance feedback and firm sentiment. Using 7,182 firm-year observations for the 2004–2017 period, we show that positive performance feedback positively affects firm sentiment, and negative performance feedback negatively influences firm sentiment. We also found that higher levels of CEO overconfidence will minimize the negative impact of negative performance feedback on firm sentiment. Our research extends the current discourse on organizational impression management (proxied by firm sentiment) and CEO overconfidence research as we provide a nuanced relationship between firm performance feedback and organizational impression management. Our findings have theoretical and practical implications for corporate governance leaders and shareholders.

**Keywords:** behavioral theory of the firm; performance feedback; firm sentiment; organizational impression management; CEO overconfidence

## Introduction

Firm stakeholders such as customers, investors, employees, analysts, and the public tend to form their evaluations on press releases, annual reports, quarterly earnings calls, and corporate disclosures as they often involve information on firms' external environment, financial standing, future growth, impending conditions, etc. Although narrative avenues are created to inform the firm stakeholders, they may serve another purpose for the firm decision-makers: organizational impression management (OIM). OIM is any activity purposefully formulated and implemented to influence an audience's view of the organization (Elsbach, Sutton, & Principe, 1998). OIM (sometimes proxied by 'firm tone' or 'firm sentiment' in various contexts and disciplines) has increasingly garnered the attention of scholars from across the business domains. Organizations are paying increasing attention to OIM strategies. They regularly engage in wide-ranging impression management efforts, expecting that such actions would help the firm attain the social approvals and endorsements it needs from economic, social, governmental, nongovernmental stakeholders, etc. (Bansal & Clelland, 2004;

Bass, Pfarrer, Milosevic, & Titus, 2023; Elsbach & Kramer, 1996; Elsbach & Sutton, 1992; Hayward & Fitza, 2017; Kotiloglu, Chen, & Lechler, 2021; Nagy, Pollack, Rutherford, & Lohrke, 2012; Saraf, Dasgupta, & Blettner, 2021). Scholars have examined various OIM outcomes, such as the effects of such maneuverings on the firm's customer relations (Hayward & Fitza, 2017; Parker & Schmitz, 2022; Zhang, 2020), talent attraction and recruitment (Yu, 2019), cost of debt (He, Lepone, & Leung, 2013; Wickert, Scherer, & Spence, 2016; Zolotoy, O'Sullivan, & Klein, 2019), and innovation (Saraf, Dasgupta, & Blettner, 2021), among others. For example, several scholars suggest that the sentiments in firm communications help alleviate the information asymmetry between corporate stakeholders and firm managers and provide a more accurate picture of prospective firm performance (e.g., Davis, Piger, & Sedor, 2012; Patelli & Pedrini, 2014).

The far-reaching implications of OIM tools and actions have increased interest in why firms engage in such actions. Although prior research has vastly focused on the outcomes of such strategies, we still need to learn more about how OIM is affected by firm performance feedback. Firm performance feedback is a crucial indicator of how well the firm has financially accomplished what it aimed to accomplish. Performing above or below aspiration is vital for perception management. Nonetheless, literature still needs to determine whether firms will translate such positive/negative feedback into their tone and impression management tactics. 'Firm performance feedback' refers to providing performance evaluation results to the assessed object (the firm itself). This feedback mechanism is a crucial element in performance evaluation and management. We aim to investigate the actual performance outcomes and the processes and mechanisms by which firms receive, interpret, and respond to performance evaluation feedback. By distinguishing 'firm performance feedback' as a separate construct from 'objective firm performance', our study explores how the feedback received by firms impacts subsequent actions, decision-making processes, and overall performance improvement efforts. Understanding this feedback loop is essential in comprehending how firms actively engage with their performance assessment and strive for continual improvement.

Additionally, CEOs play a crucial role in their firms' conference calls as they are most likely the ones who will answer the questions and speak on behalf of the firm (Boudt & Thewissen, 2019). CEO characteristics have been shown to influence a firm's tone, and they are the ones who are likely to set the stage for the firm's future tone. In particular, CEO personality traits have been shown to affect how firms respond to feedback (Schumacher, Keck, & Tang, 2020). For example, Schumacher, Keck, and Tang (2020) found that firm managers can manipulate the perceptions about firm performance feedback and related firm risk-taking through the lenses of their biases and overconfidence.

Hence, in this study, we build upon the limited empirical work on the relationship between the firm negative and positive performance feedback and OIM (proxied by firm sentiment). Our study's scope for the baseline hypothesis (i.e., performance feedback – firm sentiment relationship) is limited to organizational-level impression management proxied by firm sentiment, not CEO- or individual-level impression management. Although the CEOs' sentiment during the quarterly earnings call affects firms' sentiment, the unit of analysis in this study is the firms, not the CEOs or other executives of the firms.

We further theorize that CEO overconfidence will affect how firms respond to firm performance feedback, as manifested in their sentiment in the conference calls. We measure the moderating effect of CEO overconfidence on firm sentiment and performance feedback to explore the contingencies through individual-level analysis. Drawing from the behavioral theory of the firm (Argote & Greve, 2007; Cyert & March, 1963) and OIM research and utilizing a large panel dataset of 7,182 firm-year observations within 13 years, our study's contributions to research are threefold. First, our study contributes to the literature on the predictors of OIM. While there have been many studies examining the outcomes of OIM (e.g., Yu, 2019; Zhang, 2020; Zolotoy, O'Sullivan, & Klein, 2019), there are only a handful of studies examining the antecedents of OIM (e.g., Bass et al., 2023; Boudt & Thewissen, 2019; Goel & Madadian, 2023; Jaafar, Halim, Ismail, & Ahmad, 2018; Yang & Liu, 2017) in varying contexts and across various disciplines including strategic management, economics, finance, and accounting. Our study is unique in its use of data and context as we examine firm sentiment as the proxy

for OIM. Our findings corroborate the existing research on overall firm performance feedback and OIM. Second, our study contributes to performance feedback research as we explore the outcomes of this construct on OIM while examining a contingency factor. Although we study a unique context, our findings that firms tend to overemphasize the positive news and attenuate the negative ones to firm stakeholders (e.g., Boudt & Thewissen, 2019; Zaharopoulos & Kwok, 2017; Zhang, 2020) are consistent with the performance feedback and self-enhancement views in the business management literature (e.g., Jordan & Audia, 2012). Finally, our study also contributes to the literature on CEO overconfidence as we examine the effect of this CEO trait in the context of firm performance feedback and OIM, measured as 'firm sentiment'. Firm sentiment represents an increase in positive tone in corporate communications to shareholders. We used CEO overconfidence as a firm-level contingent variable as CEOs are regarded as the 'face' of the company and influence the narrative relayed to the outside stakeholders. Following recent research on CEO confidence measures (Kang, Zhu, & Zhang, 2021), we captured how CEOs overestimate their worth and sensemaking when they form the discourse on performance feedback. Our findings corroborate the research that overconfident CEOs will adjust the interpretation of performance feedback (e.g., Schumacher et al., 2020) in their firms' favor. Thus, our study uniquely contextualizes the effect of CEO overconfidence on performance feedback and the OIM relationship.

## Theory and hypotheses development

### OIM and firm sentiment

Organizational representatives often leverage annual reports, shareholder meetings/conference calls, press releases, and corporate disclosures/documents to affect internal and external firm stakeholders' perceptions of their firms (Bolino, Kacmar, Turnley, & Gilstrap, 2008; Brown, 1997; Ginzel, Kramer, & Sutton, 1992). Organizational-level impression management is any activity purposefully formulated and implemented to influence an audience's view of the organization (Elsbach, Sutton, & Principe, 1998). Mohamed, Gardner, and Paolillo (1999) seminal taxonomy of OIM includes direct or indirect and either assertive or defensive impression management tactics. While in-direct tactics include ways to manage the perceptions of audiences through the firm's association with other organizations, direct tactics are concerned with how firms utilize various information (e.g., firm accomplishments, characteristics, abilities, etc.) to generate a positive sentiment about their actions (Mohamed, Gardner, & Paolillo, 1999). Additionally, while defensive tactics are used when a firm's reputation and survivability are in jeopardy, assertive tactics tend to be proactive. They are used to influence firm stakeholders' perceptions. It is important to note that this study's focus aligns with the directive-assertive impression management tactics as we seek to explore whether (and how) performance feedback influences firm impression management tactics through firm sentiment.

Past research has used 'sentiment' in understanding various organizational outcomes (Clatworthy & Jones, 2001; Thomas, 1997). For example, strategic leaders can shape the expectations of firm stakeholders by deliberately including positive-only information or disclosures in their narratives to signal positive sentiment. Specifically, they can choose to highlight the firm data that support leaders' narratives while withholding or minimizing the negative news information (Boudt & Thewissen, 2019). For example, Boudt and Thewissen (2019) states that using positive and negative sentiments in CEO letters is another way of managing impressions. Huang, Zhao, Niu, Ashford, and Lee (2014) supported the argument that strategic leaders tend to influence how investors perceive a stock by promoting high value before important events. Furthermore, using sentiment analysis, the authors found a significant positive relationship between the use of abnormal accruals in earnings management and qualitative impression management. The use of firm sentiment as a proxy for OIM stems from the understanding that OIM encompasses various tactics employed by organizations to shape the perception of stakeholders positively. In this context, firm sentiment refers to the overall sentiment the company conveys in its communications and interactions with stakeholders, which may include direct and indirect methods. In this sense, the overall sentiment counts the frequency of mentions of positive words, deducts the frequency of negative words, and then divides by the

length of the transcript. For our analysis, we multiply the resulting measure by 100,000. This is to capture the firm's overall intended sentiment rather than focus on positive vs. negative sentiments. This helps indirectly capture the intended message the firm is trying to communicate to the external stakeholders and analysts, perhaps without compromising their honesty and integrity. Although OIM entails several tactics, firm sentiment is mainly a major one often sensed and analyzed by external stakeholders, including investors, customers, employees, and the public. The goal of impression management is to shape perceptions and influence behavior. Firm sentiment, reflecting the collective impression of the firm, provides a practical and observable outcome of these efforts. It allows researchers to assess whether OIM strategies translate into tangible changes in how the firm is perceived and evaluated.

### Positive performance feedback and firm sentiment

The behavioral theory of the firm proposed by Cyert and March (1963) provides a comprehensive framework for understanding organizations' behavior and decision-making processes. This theory emphasizes the importance of bounded rationality, satisficing, individual behavior, and organizational learning in shaping the behavior and performance of organizations (Cyert & March, 1963). The core tenet of this theory is that strategic leaders adopt an aspiration level to evaluate firm performance (Argote & Greve, 2007). Specifically, research suggests that strategic leaders assess firm performance feedback as part of their decision-making process (March & Shapira, 1992; Schimmer & Brauer, 2012). As suggested by Lim and McCann (2014), this 'backward-looking' approach or benchmarking performance against firm aspirations has been widely studied in various contexts. For example, the effect of positive and/or negative performance feedback (or attainment discrepancies, see Lant, 1992) on learning, achievement, and performance management (Lucas & Klangboonkrong, 2023), organizational learning (Audia & Greve, 2021), entering new markets (Ref & Shapira, 2017), mergers & acquisitions (e.g., Iyer & Miller, 2008), on research and development intensity (e.g., Chen, 2008; Chen & Miller, 2007), risk-taking (e.g., Chen, 2008), and organizational change (e.g., Greve, 1998) has generally been supported.

Although performance feedback has been examined in several contexts, its effect on OIM (proxied by firm sentiment) has been minimally explored (e.g., Clatworthy & Jones, 2001; Goel & Madadian, 2023). For example, Goel and Madadian (2023) examined peer-based performance in firms' decision-making processes by benchmarking earnings/cash flows against other firms. The authors further explored whether peer-based performance comparison (i.e., the comparison of earnings/cash flows of a firm with its peers) affects disclosure tone. They found that firms with performance below the peer-based comparison are involved in greater downward tone in their earnings-related narrative disclosures, and the extent of this negativity increases the further performance falls below the benchmark. Although this study provides invaluable insights into the literature, it differs from ours in several ways. First, we use historical aspiration levels to focus on positive and negative performance feedback. Second, our study examines whether and how a firm's sentiment (i.e., positive firm tone) inflates or deflates based on the firm's below or above-performance feedback (historical aspiration level). Finally, we explore the top management implications of this relationship by examining the moderating role of CEO overconfidence.

Past research shows that while profitable companies tend to discuss their positive results, less profitable companies are inclined to mainly discuss changes in their board of directors (Clatworthy & Jones, 2001). Additionally, it is common practice that corporate disclosures contain active and passive verb choices as part of OIM tactics. For example, Thomas (1997), analyzing CEO letters, found that while writers distance themselves from the message using passive voices, active voices represent success. Similarly, scholars found that adopting passive constructions signals the text as more neutral in tone and can be used by writers to dissociate themselves from the text (Sydserff & Weetman, 2002). Finally, in their novel study, Zaharopoulos and Kwok (2017) sought to understand OIM tactics used by US law firms on Twitter. Utilizing textual analysis of about 10,000 tweets, scholars evaluated how

law firms differ from each other in their use of sentiment. They found that law firms with higher revenues displayed higher levels of optimism and certainty. It is evident that firms tend to use substantive and symbolic responses to enhance social performance and manage stakeholder expectations. Given that we measure 'firm sentiment' as representing an increase in positive tone in corporate communications to shareholders, our study's use of 'firm sentiment' as an OIM proxy is consistent with previous research. Kotiloglu, Chen, and Lechler (2021), in their meta-analytic review involving 113 empirical studies, found that considering different feedback conditions is essential, and further research must develop a more comprehensive understanding of organizational responses to performance feedback.

Heeding the call for further research and building on and extending past research on performance feedback – OIM relationship, we propose that firms with positive performance feedback (proxied by historical aspiration) will engage in a strategic narrative using a positive tone in firm sentiment. Hence, we propose the following hypotheses:

**Hypothesis 1:**   Positive performance feedback is positively related to firm sentiment.

### Negative performance feedback and firm sentiment

Simon (1947) suggests that '[d]ecision making is the heart of administration … [t]he vocabulary of administrative theory must be derived from the logic and psychology of human choice' (p. xlvi). Firm choices and actions (represented by decision-makers) can involve reactive and deliberate decision-making processes, often searching for a solution to a short-term or long-term problem. In line with this argument, the core tenet of the behavioral theory of the firm is that performance below aspiration requires a search for solutions (Cyert & March, 1963; Jordan & Audia, 2012). Past literature on performance feedback examines this inclination of low-profitable firms to expect less and strive more (e.g., Greve, 2003). Hence, performance feedback and its influence on firm choices and outcomes play an important role in the behavioral theory of the firm research (Cyert & March, 1963; Lim & McCann, 2014; Lucas & Klangboonkrong, 2023; March & Shapira, 1992; Ref & Shapira, 2017). Consistent with this theoretical foundation, we propose that firms adjust their narrative structures and outlets to influence firm stakeholders through sentiments in documents/disclosures based on their performance feedback.

In our Hypothesis 1 discussion section, we argued that positive performance feedback is positively related to firm sentiment. In contrast, we propose in this section that negative performance feedback will lead to firms adopting a more dissociative tone in their sentiments, leading to decreased or deflated firm sentiment (rather than a negative sentiment). It is essential to highlight that, in this study, we propose a deflated firm sentiment rather than a negative firm tone; hence, our arguments are consistent with the behavioral theory of firm research (Jordan & Audia, 2012) and OIM (Jaafar et al., 2018; Yang & Liu, 2017). For example, past and recent research suggests that firms tend to use impression management tactics strategically in the event of negative performance feedback. For example, Jordan and Audia (2012) propose that decision-makers tend to enhance their self-image by assessing performance as satisfactory, arguing that low performance leads to increased search, change, and risk-taking. The authors argue that by revising the satisfactory performance goal, firms can reduce the extent of search, change, and risk-taking triggered by low performance.

Thomas (1997) finds that a firm's use of the pronoun '*we*' declines as it experiences performance declines. The following quotes are from Thomas's (1997) sentiment analysis of a sample firm (i.e., Cross & Trecker, Corp.): 'Fiscal year was very disappointing, but *we* believe that *our* basic position as a supplier of advanced manufacturing technology has never been stronger.' 'Fiscal 1988 represented a setback in our timetable for returning Cross & Trecker to profitability' (Thomas, 1997, p. 35). These quotes are revealing examples of how decision-makers behave diplomatically in selecting the narrative avenues to discuss financial performance (Davis & Tama-sweet, 2012). Examining the sentiment and market return events, Yang, Liu, Chen, and Hawkes (2018) found a significant link between positive returns and positive sentiment, as well as negative returns and negative sentiment.

Based on the arguments above, we suggest that firms with negative performance feedback (proxied by historical aspiration gap (HAG) if HAG < 0) will engage in a strategic narrative using decreased firm sentiment. Hence, we propose the following hypotheses:

**Hypothesis 2:**   Negative performance feedback is negatively related to firm sentiment.

### The moderating role of CEO overconfidence

The baseline hypotheses above shed essential light on the relationship between performance feedback and OIM. However, it is imperative that a richer understanding of performance feedback's effect on organizational behaviors requires consideration of moderating contexts. Past work has examined theoretical explanations of the effects of performance feedback on firm behaviors by exploring contingency factors. For example, Davidson, Jiraporn, Kim, and Nemec (2004) found that individuals holding dual roles as 'CEO–Chairperson' of firms are more likely to manage the impressions about corporate earnings than when they only hold CEO roles. These scholars also show that such impression management tactics are most likely to occur following periods of poor firm performance.

Similarly, Boudt and Thewissen (2019) show that strategic leadership is inclined to disclose information in such a way that the audience of the CEO letter has a more positive perception of the underlying narrative. Specifically, the scholars anticipate that the CEOs accomplish such objectives by including the most negative tones at the beginning of the text. They further argue that according to the recency theory and peak-end rule, shareholders would recall such adverse sentiments less once they read the text (Boudt & Thewissen, 2019).

Given that CEOs are at the forefront of a firm and the face of the entire organization, they have an immense responsibility to convey the right message to internal and external stakeholders in their letters to investors and earnings conference calls. However, how can they strike the right balance between an optimistic and pessimistic sentiment and avoid losing the trust of firm stakeholders? In their past study, Pearson, Hansen, and Gordon (1979) suggest that CEO letters must be consistent with prior knowledge to help the audience comprehend while being transparent and upfront about the negative news. Furthermore, Amernic, Craig, and Tourish (2007) propose that CEO letters can serve multiple purposes, from defining performance measures and articulating the business model, strategy, and vision to maintaining confidence in the firm and functioning as accountability reports. All the purposes can be opportunities for OIM tactics. Hence, it is plausible that CEOs craft and relay the information to firm stakeholders.

Since all CEOs are not created equal, we can anticipate that CEOs with varying characteristics may craft and discuss firm information differently. One such different characteristic (and the contingency in our study) is CEO overconfidence. Malmendier and Tate (2005) argue that CEO overconfidence is defined as top corporate leaders' persistent overestimation of their capabilities and superior decision-making skills compared to others. In a different context, Schumacher et al. (2020) found that managerial biases, in the form of overconfidence, adjust the interpretation of performance feedback and, in turn, shape a firm's risk-taking in response to it. Chen, Crossland, and Luo (2015) show that firms run by overconfident CEOs tend to be less responsive to corrective feedback in improving management forecast accuracy. Behavioral theorists study cognitive biases, such as confirmation bias, overconfidence, and anchoring, to understand how these biases affect decision-making processes and lead to suboptimal outcomes (Ahmad, Shah, & Abbass, 2021). For example, analyzing data from 224 publicly traded high-tech firms in the United States, Zhang, Yang, Yuan, and Fan (2024) find that below-aspiration performance and slack both contribute to emphasizing exploration over exploitation in alliance portfolios. Furthermore, CEO overconfidence intensifies the positive roles of below-aspiration levels and 'slack' in the preference for exploration alliances.

Driven by this logic and informed by the existing literature, we argue that overconfident CEOs will seek to enhance the firm's positive sentiment regardless of whether the firm experiences positive or negative performance feedback. Although the scholars have yet to focus on CEO overconfidence in

the context of our study, Schleicher and Walker (2010), using the annual reports of UK companies, show that companies are inclined to use biased sentiment in their communications when faced with a looming financial decline. In addition, Arslan-Ayaydin, Boudt, and Thewissen (2016) found that equity-based incentives lead strategic leaders to hype their stock and option portfolios' value using overly optimistic sentiments in their earnings press releases. Finally, research shows that strategic leaders in organizations sometimes exhibit high levels of narcissism and overconfidence in the event of performance decline (Jordan & Audia, 2012).

This section explores an essential but understudied contingency – CEO overconfidence: How do firms with overconfident CEOs leverage positive and negative performance feedback in their impression management (proxied by firm sentiment)? We used the CEO's stock options practice to measure 'CEO overconfidence'. Although we acknowledge that objective measures of CEO overconfidence may lack representation of behavioral traits, we are strained by the absence of primary data for this variable. However, primarily relying on objective data, past and recent literature found strong evidence between CEO overconfidence and CEO stock options practice (Dezsö & Ross, 2012; Kang, Zhu, & Zhang, 2021; Lee, Hwang, & Chen, 2017; Malmendier & Tate, 2005). To mitigate the potential bias and improve the robustness of our results, we have also used two alternative measures of CEO confidence in our analysis.

We propose that overconfident CEOs will overestimate their persuasion skills and craft a more positive firm sentiment regardless of whether their firm faces positive or negative performance feedback. Hence, we propose the following moderating hypotheses:

**Hypothesis 3:**   CEO overconfidence will enhance the positive relationship between positive performance feedback and firm sentiment.

**Hypothesis 4:**   CEO overconfidence will reduce the negative relationship between negative performance feedback and firm sentiment.

## Data and methodology

### *Sample and data sources*

Compustat North America Fundamental Annual – the corporate financial information source – generated our sample. We keep firms with non-missing values of total assets, net sales, and number of employees. Between the 2002 and 2021 fiscal years, firm sentiment data come from Hassan, Hollander, Van Lent, and Tahoun (2019). Next, we collect data on CEO characteristics and compensation between fiscal years 1992 and 2017 using the ExecuComp database. GMI (GMI Ratings, formerly known as Corporate Library, offers annual historical data captures for each proxy year beginning in 2001) is the source of corporate governance features covering the 2004–2018. One-year lag of our dependent variable is included as a control in all regression models. Also, we drop any firm-year observation with missing information on any used variable. Combining all these factors results in an unbalanced panel of 7,182 firm-year observations with 1,300 individual firms for 2005–2017.

### *Measures*

#### *Dependent variable – firm sentiment*

Hassan et al.'s (2019) research is the source of the firm sentiment variable. The measure of the variable is taken directly from the authors' publicly available database. The authors gather transcripts of 178,173 quarterly earnings conference calls held between financial analysts and senior management of 7,357 publicly listed US companies from Thomson Reuters' StreetEvents over the 2002–2021 fiscal period. First, the authors create training libraries consisting of bigrams and two-word combinations based on closeness to positive words (good, great, etc.) and negative words (loss, difficult, etc.). Next,

the authors count positive and negative tone words. Finally, the measure of overall corporate sentiment is the difference between the frequency of positive words and that of negative words scaled by the length of the transcript and multiplied by 100,000:

$$Sentiment_{it} = \frac{\sum_b^{B_{it}} S(b)}{B_{it}}$$

where $i$ and $t$ denote an individual firm and fiscal quarter, respectively. $b$ is bigrams in transcripts, $b = 1, \ldots, B_{it}$. The function $S(b)$ equals $+1$ or $-1$, or 0 if $b$ reflects positive sentiment or negative sentiment or otherwise, respectively. In this paper, sentiment for an individual firm is the natural logarithm of average overall sentiment in a particular year (Choi, Chung, & Wang, 2022). A higher score indicates greater firm sentiment. More specifically, poorer and better (compared to last year) firm performances deflate and inflate firm sentiment.

### *Independent variables – Historical negative performance feedback (HNPF) and historical positive performance feedback (HPPF)*
We follow several scholars (Lim & McCann, 2014; Miller & Chen, 2004) and their performance measure 'historical aspiration' to operationalize our 'performance feedback' variable. Return on Assets (ROA), net income divided by total assets, proxies for performance feedback. HAG is the difference between the current year's ROA and that of the previous year:

$$HAG_t = ROA_t - ROA_{t-1}.$$

Thus, HNPF equals the absolute value of the HAG if HAG $< 0$ and 0 otherwise, and HPPF equals the value of HAG if HAG $> 0$ and 0 otherwise. Organizations typically employ target benchmarks to navigate strategic choices, a practice that is particularly relevant to guiding subsequent strategic endeavors (Bromiley & Washburn, 2011; Chen & Miller, 2007; Cyert & March, 1963; Greve, 2003; Yu, Minniti, & Nason, 2019). These benchmarks, or aspiration levels, are established by evaluating the gap between desired targets and actual outcomes (Argote & Greve, 2007). Aspiration levels comprise a desired objective and a benchmark for comparison, which serve as metrics for assessing organizational performance (Shinkle, 2012). Most research grounded in behavioral theory has concentrated on benchmarks based on historical (own) and industry-wide (peer) performance. Historical performance reflects a firm's track record and is often considered one of the most reliable indicators of future performance (Vidal & Mitchell, 2015). The premise is that past success can create a positive feedback loop, enhancing investor confidence, employee morale, and customer trust. Firms learn from their historical performances, adapting their strategies and operations accordingly. This learning curve indicates a firm's ability to evolve and improve, making it an essential component of sustainable growth. As firms adjust and refine their approach based on what has worked in the past, they are more likely to foster a positive sentiment among stakeholders, which can be predictive of continued growth. Historical performance provides a baseline against which current performance is measured. By setting benchmarks, firms can create specific growth targets, fostering a culture of continuous improvement. When historical performance is used effectively as a benchmark, it can signal to the market and internal stakeholders that the firm is on a growth trajectory, positively influencing sentiment. When historical performance is positive, it contributes to a positive sentiment, which can increase stock prices and increase the firm's market value. This elevated sentiment can lead to growth as the firm benefits from better financing conditions, increased investment, and customer loyalty. As robustness checks of our conclusions, three alternative measures are utilized – another form of historical performance feedback (HPF) and two forms of social performance feedback (SPF). Following existing literature, the SPF measures are based on industry median and mean (Greve, 2003; Schumacher et al., 2020). In the post hoc analysis section, investigations involving these measures have been shown in more detail.

## Moderator variable – CEO overconfidence

A CEO's stock options practice is the basis for the overconfidence measure (Kang, Zhu, & Zhang, 2021). Overconfident CEOs hold more unexercised exercisable options (Malmendier & Tate, 2005, 2008). Thus, we obtain overconfidence by dividing the estimated value of in-the-money unexercised exercisable options by a CEO's total current compensation (Dezsö & Ross, 2012; Lee, Hwang, & Chen, 2017). We use two alternative overconfidence measures to reflect upon the robustness of our findings. Following existing research, the alternative measures are based on compensation gaps (Chen et al., 2015; Hayward & Hambrick, 1997). The first alternative CEO overconfidence measure is calculated as a CEO's current compensation scaled by that of the second highest-paid top executive of the firm (Kang, Zhu, & Zhang, 2021). The second alternative measure is computed as a CEO's current compensation scaled by the average current compensation of other top executives of the firm (Kang, Zhu, & Zhang, 2021). Based on these measures, the post hoc analysis section presents a more detailed analysis. Due to high skewness, natural logarithmic transformation is applied to all overconfidence measures for normalizing their distributions.

## Control variables

We select our control variables following the scholars who conduct research in this area (e.g., Al-Shammari et al., 2022a; Borgholthaus, Iyer, & O'Brien, 2021; Kang, Zhu, & Zhang, 2021; Lim & McCann, 2014; Miller & Chen, 2004; Vidal & Mitchell, 2015). Sentiment may follow a trend. Hence, a firm's value of sentiment from the immediate past year is included as a control variable. We also control for CEO age (natural logarithm of biological age), tenure (natural logarithm of the number of years as a CEO at a firm), gender (dummy variable equals 1 if female and 0 otherwise), duality (dummy variable equals 1 if a CEO is also the chairperson), ownership (natural logarithm of shareholding excluding options), and CEO change (a dummy variable equals to 1 if a firm has experienced a change in CEO in a year and 0 otherwise). Corporate governance features include board gender diversity (proportion of women board of directors), outsider (natural logarithm of the proportion of independent directors), and board size (natural logarithm of the total number of board of directors). As firm characteristics, we include family (dummy variable equals 1 if a firm is a family-owned firm and 0 otherwise), age (natural logarithm of the number of years since a firm appears for the first time in Compustat), size (natural logarithm of net sales), Tobin's Q (market-to-book ratio), Altman's Z score ((1.2 × working capital scaled by total assets) + (1.4 × retained earnings scaled by total assets) + (3.3 × pretax income scaled by total assets) + (0.6 × market value of equity scaled by total liability) + (1.0 × sales scaled by total assets)), slack (natural logarithm of cash and short-term investments), leverage (natural logarithm of total debts scaled by total assets), and growth potential (natural logarithm of capital expenditures scaled by total assets). The industry is defined at the two-digit Standard Industrial Classification (SIC) level. Industry-specific effects have been accounted for by including industry regulatory status (dummy variable equals 1 for firms belonging to either the financial sector or utilities sector and 0 otherwise, like Kasznik and Lev (1995), median ROA of all other firms, and the natural logarithm of the median sentiment of all other firms. All models control for time-fixed effects through the inclusion of year dummies.

## Analytical methods

The inclusion of lagged dependent variables creates an autocorrelation issue. Both measures of performance feedback suffer from endogenous bias because a firm's sentiment may also influence negative performance feedback and positive performance feedback. This situation is further worsened by the lack of relevant and robust external instruments to address the reverse causality problem. Time-invariant firm fixed effects are correlated with right-hand-side variables. Lastly, our unbalanced panel has a greater cross-section dimension (1,300 firms) than the time-series aspect (14 years). In such cases, Arellano and Bond's (1991) dynamic panel estimation technique is recommended because

it takes care of fixed effects and endogeneity of covariates (even with multiple endogenous variables), evades Nickell bias, and is applicable to unbalanced and short-wide panels with one dynamic regress and (Arellano & Bond, 1991; Mileva, 2007; Nickell, 1981; Roodman, 2009a). Consequently, we employ the system generalized method-of-moments (GMM) method to assess the dynamic firm sentiment-performance feedback relationship (Roodman, 2009b). To be more precise, we measure the following equation to establish the causational relation:

$$Y_{it} = \beta_0 + \beta_1 HNPF_{it} + \beta_2 HPPF_{it} + \beta_3 HNPF_{it} * M_{it} + \beta_4 HPPF_{it} * M_{it} + \beta_5 Y_{it-1} + \beta_6 X_{it} + \varepsilon_{it}$$

where $i$ and $t$ stand for firms and years, respectively, $Y$ denotes firm sentiment, *HNPF*, *HPPF*, and $M$ signify historical negative performance feedback, historical positive performance feedback, and overconfidence, respectively, $X$ includes all controls including the moderator variable and lagged sentiment, and $\varepsilon$ is regression coefficients and error terms, respectively. We set $\beta_3 = 0 = \beta_4$ to test the first two hypotheses.

CEO age, firm age, CEO gender, CEO change, board size, family ownership status, regulated industry status, median ROA, median sentiment, and year dummies are assumed to be strictly exogenous or self-instrumented. To avoid instrument proliferation, all other variables are instrumented by their respective second lag only (Roodman, 2009a). All models include two-step and robust options. Statistically weak second-order serial autocorrelation (AR2) and statistically insignificant Hansen tests with *p*-values well under 1.000 (ranging between .10 and .30) should prove the validity of the models (Roodman, 2009a, b).

## Results

Table 1 reports descriptive statistics of the key variables. The total number of firm-year observations is 7,182 after combining all databases. Firm sentiment, negative performance feedback, positive performance feedback, and CEO overconfidence have mean values of 6.67, 0.02, 0.02, and 1.31, respectively. Although both performance feedbacks have the same mean, positive performance feedback has a slightly higher standard deviation than negative feedback. CEO overconfidence has the highest variation out of the variables (2.05). We note that a typical firm with historical positive or negative performance feedback has 6.76 or 6.57 sentiments, respectively, in the bottom panel of the table. The t-stat (13.409) proves a statistically significant difference between the averages. In other words, this preliminary evidence suggests that sentiment improves with increasing HPF.

Table 2 reports pairwise correlation coefficients among the primary variables. Negative feedback is negatively and statistically significantly correlated to firm sentiment. Positive feedback is positively correlated to firm sentiment, though statistically non-significant. As expected, both feedbacks are strongly negatively correlated. Overconfidence, previous year's sentiment, CEO change, gender diversity, outsiders, board size, size, Tobin's Q, Alman's Z, slack, median ROA, and median sentiment have strong positive correlation coefficients with firm sentiment. In contrast, CEO age, CEO tenure, a firm's growth prospect, and firms belonging to regulated industries produce strong negative coefficients with sentiment. Besides, the un-tabulated mean various inflation factor (VIF) of 1.53 and the highest VIF of 2.97 on size reflect the absence of severe multicollinearity issues.

Table 3 presents the results of our hypotheses tests. Following Lim and McCann (2014) and Schumacher et al. (2020), we employ Arellano and Bond's (1991) dynamic panel estimation technique in all our models. Model 1 is the baseline specification containing all control and moderator variables. According to the model, firm sentiment increases with CEO overconfidence ($\beta = 0.03$, $p < .10$), previous firm sentiment ($\beta = 0.27$, $p < .001$), size ($\beta = 0.07$, $p < .10$), Tobin's Q ($\beta = 0.18$, $p < .05$), and median sentiment ($\beta = 0.22$, $p < .001$). In contrast, firm sentiment decreases ($\beta = -0.08$, $p < .05$) and regulated industry status ($\beta = -0.13$, $p < .05$). All statistics confirm the validity of the model.

**Table 1.** Descriptive statistics

| Variable | N | M | SD | Min. | P25 | P50 | P75 | Max. |
|---|---|---|---|---|---|---|---|---|
| Firm sentiment | 7,182 | 6.67 | 0.61 | 0.73 | 6.41 | 6.78 | 7.07 | 7.84 |
| Historical negative performance feedback | 7,182 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.67 |
| Historical positive performance feedback | 7,182 | 0.02 | 0.06 | 0.00 | 0.00 | 0.00 | 0.02 | 1.76 |
| Overconfidence | 7,182 | 1.31 | 2.05 | −11.78 | 0.19 | 1.46 | 2.56 | 20.39 |
| Sentiment$_{t-1}$ | 7,182 | 6.65 | 0.62 | 0.73 | 6.37 | 6.76 | 7.05 | 7.93 |
| CEO age | 7,182 | 4.02 | 0.12 | 3.47 | 3.95 | 4.03 | 4.09 | 4.48 |
| CEO tenure | 7,182 | 1.84 | 0.79 | 0.00 | 1.39 | 1.95 | 2.4 | 3.91 |
| Female | 7,182 | 0.03 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Duality | 7,182 | 0.49 | 0.50 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Ownership | 7,182 | 5.68 | 1.57 | −6.91 | 4.8 | 5.64 | 6.55 | 14.01 |
| CEO change | 7,182 | 0.08 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Gender diversity | 7,182 | 0.14 | 0.10 | 0.00 | 0.08 | 0.13 | 0.20 | 0.57 |
| Outsiders | 7,182 | −0.30 | 0.24 | −2.40 | −0.41 | −0.25 | −0.13 | 0.00 |
| Board size | 7,182 | 2.22 | 0.23 | 1.39 | 2.08 | 2.2 | 2.4 | 3.53 |
| Family | 7,182 | 0.07 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Firm age | 7,182 | 3.31 | 0.60 | 1.39 | 2.83 | 3.3 | 3.87 | 4.22 |
| Size | 7,182 | 7.92 | 1.50 | 2.68 | 6.85 | 7.8 | 8.88 | 13.09 |
| Tobin's Q | 7,182 | 0.29 | 0.56 | −2.12 | −0.09 | 0.25 | 0.62 | 3.00 |
| Altman's Z | 7,182 | 1.17 | 0.69 | −4.68 | 0.82 | 1.24 | 1.60 | 3.81 |
| Slack | 7,182 | 5.42 | 1.84 | −4.61 | 4.27 | 5.45 | 6.63 | 11.1 |
| Leverage | 7,182 | −1.87 | 1.45 | −13.09 | −2.05 | −1.45 | −1.07 | 1.33 |
| Growth | 7,182 | −3.43 | 0.92 | −12.51 | −3.98 | −3.39 | −2.82 | −0.58 |
| Regulated | 7,182 | 0.09 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Median ROA | 7,182 | 0.06 | 0.02 | −0.29 | 0.04 | 0.06 | 0.07 | 0.39 |
| Median sentiment | 7,182 | 6.69 | 0.30 | 3.95 | 6.57 | 6.74 | 6.88 | 7.50 |
| Mean sentiment if HPF > 0 | Mean sentiment if HPF otherwise | | | | | | Difference (*t*-stat) | |
| 6.76 | 6.57 | | | | | | 0.19 (13.409) | |

*Note*: HPF = historical performance feedback.

We test our baseline hypotheses, which propose that HPPF increases firm sentiment and HNPF decreases firm sentiment in Model 2. In support of the hypotheses, HNPF and HPPF yield significantly negative ($\beta = -1.38$, $p < .05$) and significantly positive ($\beta = 0.83$, $p < .05$) coefficients, respectively. The inclusion of the absolute values makes our interpretation of empirical findings simpler. The negative coefficient on HNPF means worse current performance than the previous year, reducing firm sentiment. Similarly, a positive coefficient on HPPF signifies a rise in sentiment should a firm perform better than the last year. In summary, this means that poorer and better corporate performances (compared to the last year) have deflating and inflating effects on firm sentiment, respectively. Again, all statistics prove the validity of the model.

We use Model 3 to test the third and fourth hypotheses, predicting that the corporate sentiment-inflating effect of HPPF accelerates with CEO overconfidence and the corporate sentiment-deflating effect of HNPF decelerates with CEO overconfidence, respectively. In other words, the hypotheses predict that the relationship between sentiment and performance feedback is positively moderated by CEO overconfidence. The interaction coefficients offer evidence of partial support to the hypotheses

**Table 2.** Pairwise correlation coefficients

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Firm sentiment | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. HNPF | -.12* | | | | | | | | | | | | | | | | | | | | | | | |
| 3. HPPF | .01 | -.13* | | | | | | | | | | | | | | | | | | | | | | |
| 4. Overconfidence | .11* | -.05* | -.03 | | | | | | | | | | | | | | | | | | | | | |
| 5. Sentiment$_{t-1}$ | .60* | -.03* | -.08* | .12* | | | | | | | | | | | | | | | | | | | | |
| 6. CEO age | -.06* | -.01 | -.04* | .05* | -.06* | | | | | | | | | | | | | | | | | | | |
| 7. CEO tenure | -.09* | .03 | -.04* | .20* | -.07* | .37* | | | | | | | | | | | | | | | | | | |
| 8. Female | .02 | -.01 | -.01 | -.03 | .01 | -.05* | -.10* | | | | | | | | | | | | | | | | | |
| 9. Duality | -.02 | -.03 | -.04* | .10* | -.02 | .25* | .31* | -.03* | | | | | | | | | | | | | | | | |
| 10. Ownership | .00 | .01 | -.02 | .20* | .01 | .23* | .43* | -.06* | .19* | | | | | | | | | | | | | | | |
| 11. CEO change | .04* | -.02 | .03 | -.14* | .01 | -.14* | -.56* | .05* | -.15* | -.18* | | | | | | | | | | | | | | |
| 12. Gender div. | .14* | -.05* | -.05* | .05* | .13* | .03* | -.12* | .22* | .08* | -.01 | .02 | | | | | | | | | | | | | |
| 13. Outsiders | .04* | -.01 | .01 | .02 | .02 | .04* | -.01 | .01 | .13* | -.05* | -.04* | .18* | | | | | | | | | | | | |
| 14. Board size | .10* | -.09* | -.09* | .09* | .10* | .04* | -.17* | .01 | .02 | .02 | .06* | .31* | .09* | | | | | | | | | | | |
| 15. Family | .00 | -.01 | -.01 | -.03* | .00 | -.01 | .05* | .00 | -.08* | .12* | -.01 | .04* | -.21* | .04* | | | | | | | | | | |
| 16. Firm age | .01 | -.08* | -.06* | -.02 | .02 | .14* | -.08* | .02 | .12* | -.01 | .03 | .24* | .15* | .39* | .02 | | | | | | | | | |
| 17. Size | .13* | -.12* | -.13* | .20* | .15* | .12* | -.10* | .01 | .14* | .18* | .04* | .34* | .12* | .59* | .00 | .40* | | | | | | | | |
| 18. Tobin's Q | .17* | -.04* | .06* | .41* | .16* | -.05* | .01 | .00 | -.04* | .01 | -.01 | .07* | .01 | -.03* | -.04* | -.10* | -.06* | | | | | | | |
| 19. Altman's Z | .10* | -.08* | .00 | .19* | .12* | -.02 | .06* | -.01 | -.03 | -.04* | .00 | -.04* | -.01 | -.17* | .00 | -.13* | -.10* | .53* | | | | | | |
| 20. Slack | .12* | -.03 | -.01 | .25* | .12* | .03* | -.07* | .00 | .06* | .14* | .03* | .23* | .13* | .39* | -.08* | .22* | .65* | .04* | .02 | | | | | |
| 21. Leverage | .00 | -.03 | -.05* | .02 | -.01 | .05* | -.04* | -.02 | .06* | .03 | .00 | .13* | .04* | .23* | .03 | .18* | .24* | -.05* | -.49* | .02 | | | | |
| 22. Growth | -.10* | -.03* | -.07* | -.03 | -.06* | .06* | -.01 | .01 | .07* | .03* | .01 | .01 | -.03 | .08* | .00 | .08* | .13* | .05* | .00 | -.12* | .04* | | | |
| 23. Regulated | -.15* | -.05* | -.04* | -.03 | -.15* | .00 | -.03* | .00 | .01 | -.01 | .00 | .09* | .07* | .11* | -.06* | .09* | .05* | -.14* | -.31* | .00 | .11* | .02 | | |
| 24. Md. ROA | .12* | -.05* | .01 | .07* | .08* | .00 | .00 | .02 | .01 | .00 | .00 | .03 | -.01 | -.02 | .04* | -.03 | -.01 | .16* | .23* | .00 | -.09* | .01 | -.31* | |
| 25. Md. Sentiment | .32* | -.06* | -.01 | .09* | .24* | .01 | .00 | .07* | -.04* | .04* | .02 | .15* | -.03 | .00 | .08* | -.01 | .02 | .20* | .15* | .03 | -.03 | -.10* | -.38* | .31* |

*Note: N = 7,182, \* p < .01, HNPF = historical negative performance feedback, HPPF = historical positive performance feedback, Gender div. = gender diversity, Md. ROA = median ROA, Md. sentiment = median sentiment.*

**Table 3.** System GMM estimates for firm sentiment and historical performance feedback

| Variables | (1) Firm sentiment | (2) Firm sentiment | (3) Firm sentiment |
|---|---|---|---|
| HNPF | | −1.38* (0.53) | −2.15*** (0.61) |
| HPPF | | 0.83* (0.36) | 0.95+ (0.56) |
| HNPF × overconfidence | | | 0.49** (0.18) |
| HPPF × overconfidence | | | −0.06 (0.20) |
| Overconfidence | 0.03+ (0.02) | 0.02 (0.02) | 0.00 (0.02) |
| Firm Sentiment$_{t-1}$ | 0.27*** (0.04) | 0.28*** (0.04) | 0.29*** (0.04) |
| CEO age | −0.20 (0.12) | −0.16 (0.12) | −0.22+ (0.12) |
| CEO tenure | −0.04 (0.04) | −0.02 (0.04) | 0.02 (0.04) |
| Female | −0.05 (0.06) | −0.07 (0.06) | −0.07 (0.06) |
| Duality | −0.03 (0.05) | −0.05 (0.05) | −0.06 (0.05) |
| Ownership | −0.00 (0.03) | −0.01 (0.02) | −0.01 (0.02) |
| CEO change | −0.01 (0.05) | −0.01 (0.05) | 0.03 (0.04) |
| Gender diversity | 0.18 (0.30) | 0.24 (0.27) | 0.29 (0.27) |
| Outsiders | −0.13 (0.09) | −0.13 (0.08) | −0.06 (0.09) |
| Board size | 0.10 (0.10) | 0.12 (0.09) | 0.11 (0.10) |
| Family | −0.05 (0.05) | −0.05 (0.05) | −0.05 (0.05) |
| Firm age | −0.02 (0.03) | −0.03 (0.03) | −0.03 (0.03) |
| Size | 0.07+ (0.04) | 0.04 (0.04) | 0.04 (0.04) |
| Tobin's Q | 0.18* (0.08) | 0.13* (0.07) | 0.14* (0.07) |
| | (0.07) | (0.06) | (0.06) |
| Slack | −0.04 (0.03) | −0.01 (0.03) | −0.01 (0.02) |
| Leverage | −0.03 (0.02) | −0.02 (0.02) | −0.02 (0.02) |
| Growth | −0.08* (0.03) | −0.05 (0.03) | −0.06* (0.03) |
| Regulated | −0.13* (0.06) | −0.13* (0.06) | −0.13* (0.06) |
| Median ROA | 0.37 (0.45) | 0.37 (0.44) | 0.37 (0.43) |
| Median sentiment | 0.22*** (0.05) | 0.22*** (0.04) | 0.21*** (0.04) |
| Constant | 3.33*** (0.56) | 3.34*** (0.57) | 3.54*** (0.57) |
| Year dummies | Yes | Yes | Yes |
| Observations | 7,182 | 7,182 | 7,182 |
| Number of firms | 1,300 | 1,300 | 1,300 |
| Number of instruments | 307 | 351 | 395 |
| Wald chi-squared (degree of freedom) | 925.6 (35) | 997.3 (37) | 998.9 (40) |
| *p*-value of Wald | .000 | .000 | .000 |
| *p*-value of AR (1) | .000 | .000 | .000 |
| *p*-value of AR (2) | .134 | .114 | .118 |
| *p*-value of Hansen | .159 | .276 | .308 |
| *p*-value of difference in Hansen test | .150 | .300 | .299 |

*Note*: HNPF = historical negative performance feedback, HPPF = historical positive performance feedback, robust standard errors in parentheses, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$.
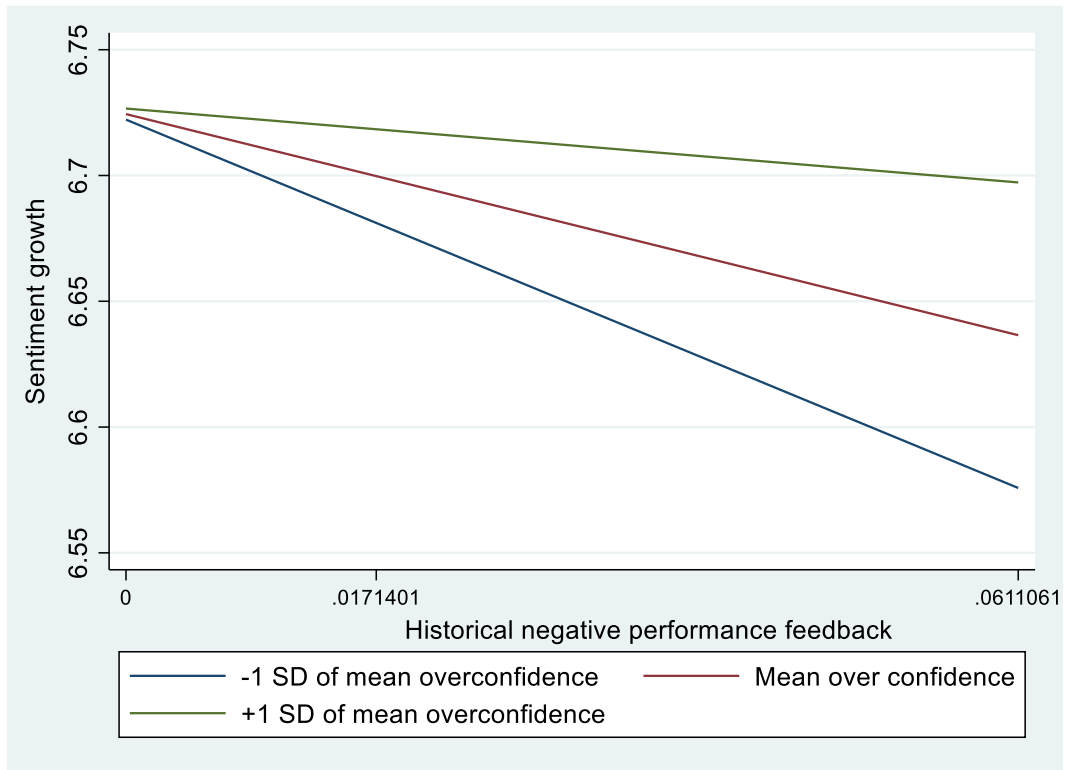
**Figure 1.** The moderating effect of CEO overconfidence on firm sentiment – historical negative performance feedback relationship.

because the coefficient on HNPF × overconfidence is positive and significant ($\beta = 0.49$, $p < .01$), but that of HPPF × overconfidence is not statistically significant ($\beta = -0.06$, na). Similar to the previous models, all statistics also prove the validity of Model 3.

We plot the significant moderation effect of overconfidence in the sentiment-HNPF relationship in Fig. 1. As expected, the figure suggests that the same level of HNPF has different impacts on sentiment based on overconfidence level – an overconfident CEO can reduce the negative association between sentiment and HNPF. When CEO overconfidence is the least (blue solid line; −1 SD of mean overconfidence), HNPF has the highest adverse effect on corporate sentiment. At the same time, the same performance feedback has the least negative impact on firm sentiment in the case of the highest CEO overconfidence (green solid line; +1 SD of mean overconfidence). The results of simple slope analysis support this interpretation; the lines associated with the lowest (−1 SD of mean overconfidence) and highest overconfidence (+1 SD of mean overconfidence) have the steepest and flattest slopes, respectively, implying a reduction in adverse effect on sentiment of negative feedback with rising overconfidence level. For example, one unit change in negative performance feedback changes sentiment by −2.51 units for 1 standard deviation below the mean CEO overconfidence (−0.74) or −1.51 units for the mean CEO overconfidence (1.31) or −0.51 units for 1 standard deviation above the mean CEO overconfidence (3.35).

Results yielded by several control variables are worth discussing. All control variables produce consistent coefficients across the models in Table 3. Out of these control variables, a firm's previous year's sentiment and median sentiment appear significantly positive ($p < .001$). Besides, Tobin's Q also appears to increase firm sentiment ($p < .05$). In contrast, growth and regulated industry status

produce a statistically strong negative coefficient ($p < .05$) with respect to firm sentiment, indicating a dampening effect of sentiment and regulations on corporate sentiment.

### Post hoc analysis

We supplement our findings with multiple supplementary post hoc analyses to provide further implications and robustness of our results. First, we investigate the impact threshold of a confounding variable to ensure that omitted variables are not causing the firm sentiment-feedback relationships (Frank, 2000). As per our expectation and according to the test, an omitted variable must produce a minimum correlation coefficient of 0.265 (−0.265) with sentiment (HNPF) to alter the inference. Again, the same test reveals that a minimum of 0.133 correlation between an omitted variable and sentiment or HPPF is required to alter the hypothesis. In Table 1, there are hardly any non-sentiment variables (i.e., variables other than sentiment$_{t-1}$ and median sentiment, as it is obvious that sentiment is strongly related to a firm's own past and industry sentiment), that yield a 0.265 correlation with the dependent variable. Also, only two non-sentiment variables (gender diversity and Tobin's Q) produce a correlation greater than 0.133 with sentiment. Similarly, there is no single variable that yields a correlation greater than −0.265 or 0.133 with HNPF or HPPF, respectively. So, we conclude that endogeneity due to omitted variables is not a severe concern here.

Second, we find consistent support for our hypotheses, especially the first two, when alternative measures of HPF and overconfidence are used, signifying the robustness of our conclusions to alternate measures of the independent and moderator variables. To do so, we recalculate ROA as income before extraordinary items relative to total assets (Al-Shammari et al., 2022b). This ultimately gives us alternative measures of HNPF and HPPF. We rerun our regressions with alternative measures of HNPF and HPPF and report in Model 1 and Model 2 of Table 4. HNPF still produces a statistically significant negative coefficient ($\beta = -1.45$, $p < .05$) in Model 1. HPPF is positive, though statistically weak ($\beta = 0.48$, na). Similarly, HNPF × overconfidence yields a powerful positive coefficient ($\beta = 0.50$, $p < .05$) in Model 2. Following Kang, Zhu, and Zhang (2021), we adopt two alternative measures of CEO overconfidence – the CEO's cash payment relative to either that of the second highest-paid top executive or the average cash compensation of other top executives of a firm – because overconfident CEOs favor a larger compensation gap. Both measures produce identical results, which are presented in Model 3 and Model 4 of Table 4. HNPF and HPPF continue to produce strong negative and positive associations with sentiment ($\beta = -1.64$, $p < .01$ and $\beta = 0.71$, $p < .10$), respectively, even after inclusion of either of the alternative measures of overconfidence in Model 3. HNPF × overconfidence (either of the alternative measures of overconfidence) shows a significant relation ($\beta = 1.70$, $p < .10$) with sentiment in Model 4, whereas HPPF × overconfidence (either of the alternative measures of overconfidence) signifies a weak positive link to sentiment ($\beta = 1.51$, na). Overall, the outcomes reflect consistent support for our forecasts.

Third, as an alternative measure, we construct SPF and report the results in Table 5 compared to that of HPF in Table 2. We build SPF in two different ways – first, we follow Miller and Chen (2004) and Lim and McCann (2014), but we exclude information on a focal firm's ROA in calculating industry median ROA like Schumacher et al. (2020):

$$SPF_t = ROA_t - \text{industry median ROA of other firms}_{t-1}$$

and second, we follow Borgholthaus, Iyer, and O'Brien (2021), Greve (2003), and Gaba and Joseph (2013) and compute another measure of SPF as follows:

$$SPF_t = ROA_t - \text{industry mean ROA of other firms}_{t-1}.$$

Similar to HNPF and HPPF, we create social negative performance feedback (equals the absolute value of SPF if SPF < 0 and 0 otherwise) and social positive performance feedback (equals SPF if

**Table 4.** System GMM estimates using alternate measures of historical performance feedback and CEO overconfidence

| Variables | (1) Firm sentiment | (2) Firm sentiment | (3) Firm sentiment | (4) Firm sentiment |
|---|---|---|---|---|
| HNPF | −1.45* (0.61) | −2.39** (0.75) | −1.64** (0.58) | −2.78** (1.02) |
| HPPF | 0.48 (0.47) | 0.84 (0.63) | 0.71+ (0.40) | −0.34 (0.92) |
| HNPF × overconfidence | | 0.50* (0.20) | | 1.70+ (0.96) |
| HPPF × overconfidence | | −0.14 (0.19) | | 1.51 (1.15) |
| Controls | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes |
| Observations | 7,182 | 7,182 | 7,182 | 7,182 |
| Number of firms | 1,300 | 1,300 | 1,300 | 1,300 |
| Number of instruments | 351 | 395 | 351 | 395 |
| Wald chi-squared (degree of freedom) | 948.3 (37) | 1001 (40) | 940 (37) | 1036 (40) |
| *p*-value of Wald | .000 | .000 | .000 | .000 |
| *p*-value of AR (1) | .000 | .000 | .000 | .000 |
| *p*-value of AR (2) | .113 | .107 | .108 | .108 |
| *p*-value of Hansen | .136 | .218 | .230 | .295 |
| *p*-value of difference in Hansen test | .216 | .225 | .101 | .158 |

*Note*: HNPF = historical negative performance feedback, HPPF = historical positive performance feedback, robust standard errors in parentheses, HNPF and HPPF use income before expenditures in Model 1 and Model 2, overconfidence = CEO's cash compensation relative to either that of the second highest-paid top executive or the average cash compensation of other top executives of the firm in Model 3 and Model 4, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .1$.

**Table 5.** System GMM estimates for firm sentiment and social performance feedback

| Variables | (1) Firm sentiment | (2) Firm sentiment |
|---|---|---|
| SNPF | −1.03*** (0.28) | −0.93*** (0.28) |
| SPPF | 0.07 (0.28) | 0.26 (0.26) |
| Controls | Yes | Yes |
| Year dummies | Yes | Yes |
| Observations | 7,182 | 7,182 |
| Number of firms | 1,300 | 1,300 |
| Number of instruments | 309 | 309 |
| Wald chi-squared (degree of freedom) | 1007 (37) | 1018 (37) |
| *p*-value of Wald | .000 | .000 |
| *p*-value of AR (1) | .000 | .000 |
| *p*-value of AR (2) | .131 | .132 |
| *p*-value of Hansen | .205 | .220 |
| *p*-value of difference in Hansen test | .172 | .190 |

*Note*: SNPF = social negative performance feedback, SPPF = social positive performance feedback, robust standard errors in parentheses, performance feedback using industry median and mean in Model 1 and Model 2, respectively, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$.

SPF > 0 and 0 otherwise). After replacing HPF with SPF, we reran both hypotheses, tested regressions, and noticed that only social negative performance feedbacks showed a significant relationship with sentiment. Hence, we report only the first regression results in Table 5. We include the first type

**Table 6.** Double-selection lasso linear estimates for firm sentiment and historical performance feedback

| Variables | (1)<br>Firm sentiment |
|---|---|
| Historical negative performance feedback | −0.98*** (0.15) |
| Historical positive performance feedback | 0.35** (0.11) |
| Observations | 7,182 |
| Number of potential control variables | 35 |
| Number of selected control variables | 16 |
| Chi-squared (degree of freedom) | 62.92 (2) |
| *p*-value of Chi | .000 |

*Note*: Robust standard errors in parentheses, \*\*\*$p < .001$, \*\*$p < .01$, \*$p < .05$, +$p < .10$.

of SPF in Model 1 and the second in Model 2. Social negative performance feedback yields statistically significant negative coefficients in both Model 1 ($\beta = -1.04$, $p < .001$) and Model 2 ($\beta = -0.93$, $p < .001$), like HNPF in Table 2. This implies that similar to HNPF, social negative performance feedback also has corporate sentiment-dampening effects. Although social positive performance feedback produces positive coefficients with respect to sentiment, they are statistically insignificant in both models. Results suggest that HPF is more important than SPF in influencing corporate sentiment. This finding is consistent with Gaba and Joseph's (2013) study.

Fourth, we re-estimate the original hypotheses testing regressions with alternative measures of firm size (natural logarithm of either total assets or number of employees), slack resources (natural logarithm of cash and short-term investments scaled by either total assets or total current liabilities or total liabilities or natural logarithm of total current assets scaled by total current liabilities or summation of $z$-score of working capital scaled by sales and $z$-score of cash and short-term investments scaled by total current liabilities), and leverage (natural logarithm of total liabilities scaled by total assets). Similar outcomes are observed generally. The results are available upon request.

Fifth, we notice that there are 35 covariates, including CEO overconfidence and year dummies, in the primary hypotheses testing regression, and overfitting a model with too many control variables is a well-known issue because it makes results useless in case of out-of-sample inference through the inclusion of sample-specific noise (Belloni, Chernozhukov, & Hansen, 2014). In such circumstances, the least absolute shrinkage & selection operator technique is recommended as it minimizes the sum of the squared residuals plus a penalty term and picks the best-suited right-hand-side variables in the process of selecting coefficients (Belloni, Chernozhukov, & Hansen, 2014; Tibshirani, 1996). Hence, we employ double-selection least absolute shrinkage & selection operator to re-estimate the relationship between sentiment and HPF and report the results in Table 6 (Kang, Zhu, & Zhang, 2021). The coefficient on HNPF is statistically significant and negative ($\beta = -0.98$, $p < .001$) in Model 1. Also, consistent with Table 2, HPPF produces a statistically significant and positive coefficient ($\beta = 0.35$, $p < .01$) in the model. The findings reaffirm our initial conclusions – positive sentiment-HPPF and negative sentiment-HNPF relationships – supporting our hypotheses further.

Sixth, we employ the hierarchical regression to test the moderation effect in Table 7. Model 2 in the table yields similar results to that of Model 3 in Table 3 with one exception: HPPF × overconfidence is statistically significant, and HNPF × overconfidence is statistically insignificant. The technique ultimately uses linear regression, which may cause this difference between the results in the tables. $R^2$ in Model 2 has increased by 0.01, which is statistically significant at 0.1% level ($p = .000$). Hence, we conclude that there is a statistically significant improvement in Model 2 compared to Model 1. In other words, this is evidence of significant moderation effects.

Seventh, we examine the impact of sentiment and CEO overconfidence on corporate financial performance, ROA, in Table 8. According to Model 1, a unit increase in sentiment raises the annual

**Table 7.** Hierarchical regression estimates for firm sentiment and historical performance feedback

| Variables | (1) Firm sentiment | (2) Firm sentiment |
|---|---|---|
| HNPF | | −1.00*** (0.15) |
| HPPF | | 0.35*** (0.11) |
| HNPF × overconfidence | | −0.00 (0.00) |
| HPPF × overconfidence | | −0.00* (0.00) |
| Constant | 1.81*** (0.29) | 1.90*** (0.29) |
| Controls | Yes | Yes |
| Year dummies | Yes | Yes |
| Observations | 7,182 | 7,182 |
| $R^2$ | 0.43 | 0.44 |
| $R^2$ change | | 0.01 |
| F (df) change | | 22.06 (4, 7143) |
| p | | .000 |

*Note*: HNPF = historical negative performance feedback, HPPF = historical positive performance feedback, robust standard errors in parentheses, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$.

**Table 8.** Impact of sentiment and overconfidence on corporate financial performance

| Variables | (1) ROA | (2) ROA |
|---|---|---|
| Sentiment | 0.01** (0.00) | 0.01** (0.00) |
| Overconfidence | 0.00 (0.00) | 0.02* (0.01) |
| Sentiment × overconfidence | | −0.00* (0.00) |
| Controls | Yes | Yes |
| Year dummies | Yes | Yes |
| Observations | 7,298 | 7,298 |
| Number of firms | 1,307 | 1,307 |
| Number of instruments | 329 | 351 |
| Wald chi-squared (degree of freedom) | 467.5 (36) | 559.6 (37) |
| p-value of Wald | .000 | .000 |
| p-value of AR (1) | .000 | .000 |
| p-value of AR (2) | .346 | .469 |
| p-value of Hansen | .340 | .313 |
| p-value of difference in Hansen test | .855 | .827 |

*Note*: Robust standard errors in parentheses, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .1$.

difference in ROA ($\beta = 0.01, p < .01$). However, CEO overconfidence yields a statistically insignificant effect on ROA in the same model. The statistically strong association in Model 1 is negatively and significantly moderated by CEO overconfidence in Model 2 ($\beta = -0.00, p < .05$). This implies that an increase in the change in ROA with an increase in sentiment is lower when CEO overconfidence is higher.

Eighth, we observe the relationship between sentiment. ROA and CEO overconfidence in Table 9. An increase in ROA boosts sentiment ($\beta = 0.98, p < .05$). However, neither CEO overconfidence nor its moderation in the sentiment-ROA relationship could affect sentiment statistically significantly.

**Table 9.**  Impact of corporate financial performance on firm sentiment

| Variables | (1) Sentiment | (2) Sentiment |
|---|---|---|
| ROA | 0.98* (0.43) | 0.44 (0.45) |
| Overconfidence | 0.01 (0.02) | 0.01 (0.02) |
| ROA × overconfidence |  | 0.13 (0.15) |
| Controls | Yes | Yes |
| Year dummies | Yes | Yes |
| Observations | 7,186 | 7,186 |
| Number of firms | 1,300 | 1,300 |
| Number of instruments | 329 | 351 |
| Wald chi-squared | 900.5 | 926.6 |
| *p*-value of Wald | .000 | .000 |
| *p*-value of AR (1) | .000 | .000 |
| *p*-value of AR (2) | .124 | .127 |
| *p*-value of Hansen | .268 | .244 |
| *p*-value of difference in Hansen test | .380 | .309 |

*Note*: Robust standard errors in parentheses, \*\*\*$p < .001$, \*\*$p < .01$, \*$p < .05$, $+p < .1$.

## Discussion and implications

Firm stakeholders tend to base their firm evaluations on press releases, annual reports, quarterly earnings calls, and corporate disclosures as they often involve information on firms' external environment, financial standing, future growth, impending conditions, etc. Although these narrative outlets are created to inform the firm stakeholders, they may serve another purpose for the firm actors: OIM. Through these documents or conference calls, firm leaders seize the opportunity to paint a corporate picture consistent with their expectations and perspectives. Intrigued by these organizational phenomena, we explore whether and how performance feedback predicts OIM (proxied by firm sentiment). We also examine the moderating role of CEO overconfidence on the performance feedback – OIM relationship.

Overall, the results of our empirical analyses corroborated our hypotheses and revealed a nuanced relationship between positive (and negative) performance feedback and organizational impression (proxied by firm sentiment). Specifically, consistent with our predictions, positive performance feedback (proxied by better than previous year firm ROA) positively affects how firm sentiment is communicated to firm stakeholders. Although our study's scope and context are unique, this finding is consistent with the existing literature on OIM tactics that firms tend to overemphasize the positive news and attenuate the negative ones to firm stakeholders (e.g., Zhang, 2020; Boudt & Thewissen, 2019; Zaharopoulos & Kwok, 2017). We also show that negative performance feedback (proxied by poorer than previous year firm ROA) negatively influences how firm sentiment is communicated to firm stakeholders. We argue that our findings on the negative performance feedback – firm sentiment relationship is consistent with the existing evidence of the behavioral of the firm research (Jordan & Audia, 2012) and OIM (Jaafar et al., 2018; Yang & Liu, 2017). For example, low-performance feedback can influence the tone of voluntary disclosures, such as accounting narratives (Jaafar et al., 2018). Firms with low performance may minimize the disclosure of negative information and emphasize positive information through various dissemination techniques (Yang & Liu, 2017). It is also essential to note that by using firm sentiment – representing an increase in positive tone in corporate communications to shareholders – we examine a distinct proxy of OIM compared to past studies. For example, a study by Talbot and Boiral (2015) used six 'neutralization techniques', including self-proclaimed excellence, promotion of a systemic view, denial and minimization, denouncing

unfair treatment and deceptive appearances, economic and technological blackmail, and blaming others as proxies to organizational level impression management tactics. Further, past and recent work on OIM used various proxies, such as the use of corporate apologies (Zhou & Xu, 2023), presentational enhancement and obfuscation (Cüre, Esen & Çalışkan, 2020), cover images of inflight magazines (Martikainen & Adriani, 2023), corporate accounting narratives (Jaafar et al., 2018), and corporate stories (Spear & Roper, 2013) among others. Jaafar et al. (2018) argued that firms with a greater tendency to engage in fraudulent financial activities have a higher motivation to use accounting narratives in their annual reports as an impression management strategy. Although Jaafar et al.'s (2018) use of annual report narratives is like our firm sentiment construct, they specifically focused on accounting narratives while we emphasized the overall tone of the annual reports. Additionally, studies specifically examining 'sentiment' focus on various contexts such as firm behavior (Buchheim, Dovern, Krolage, & Link, 2022), investor sentiment (Seok, Cho, & Ryu, 2019), and firm-level political risk (Hassan et al., 2019), among others. However, to the best of our knowledge, our study is the first to examine firm sentiment as an OIM proxy in the context of performance feedback.

Our final set of predictions is about the moderating role of CEO overconfidence on the performance feedback – firm sentiment relationship. Higher levels of CEO overconfidence will reduce the negative impact of negative performance feedback on firm sentiment, meaning that firms' display of positive sentiment will increase. Specifically, overconfident CEOs are found to downplay the negative performance feedback in their sentiments to firm stakeholders. This finding is consistent with past research on OIM tactics by firm actors (Arslan-Ayaydin et al., 2016; Boudt & Thewissen, 2019; Huang et al., 2014; Schleicher & Walker, 2010). For example, Arslan-Ayaydin et al. (2016) find that managers inflate the sentiment of earnings press releases to overestimate the value of their stock and option portfolios. Another recent study by Boudt and Thewissen (2019) shows that CEOs tend to share corporate information so that the readers of the CEO letters will have a favorable impression of the underlying narrative. However, our study extends this research (and stands out from these and other fascinating works) by unpacking the role of CEO characteristics (i.e., CEO overconfidence) on the performance feedback – firm sentiment relationship. Finally, our results support that overconfident CEOs will rely on their persuasion skills and deliver a more positive firm sentiment regardless of whether their firm experiences negative performance feedback. This study also extends the CEO overconfidence literature.

In addition to the scholarly implications, the findings of this study have several implications for corporate governance leaders and shareholders. Consistent with our findings, the literature has established that firm executives/managers engage in OIM tactics, especially if they need more confidence in their skills. Our findings suggest that overconfident CEOs minimize the negative effects of negative performance feedback on firm sentiment as they tactfully deliver the bad news to stakeholders. However, they must be cautious in delivering adverse news to firm stakeholders. For example, Boudt and Thewissen (2019) eloquently state that '… the objective of avoiding negative sentiment in the key positions of a text has to be balanced off with the constraint of providing a realistic view on the firm's achievement … CEOs have to be more conscious of the words they choose in discharging their accountability to stakeholders' (p. 81). In addition, our findings, particularly the CEO overconfidence results, can arm the board of directors with research-backed knowledge as they perform their oversight, advisory, and monitoring duties. Equipped with the finding that overconfident CEOs will downplay negative performance feedback in firm sentiments, boards, and shareholders must be more vigilant in their fiduciary duties as they appraise CEO disclosures in the wake of past and future adverse events (i.e., negative performance in our case).

## Limitations and future research directions

Although our study has several contributions to organizational management literature and practice, it has limitations. However, these limitations will provide avenues for further research. We used an established measure of performance feedback following several scholars (Lim & McCann, 2014;

Miller & Chen, 2004), where we compared a firm's current ROA to its prior year's ROA (i.e., historical aspiration – HAG). However, it may also provide intriguing findings if future research explores whether firm sentiment changes when firms benchmark their performance to the industry average. In addition, future research can utilize different firm performance measures such as return on equity and Tobin's q and their historical aspiration levels. Although it is beyond the scope of this study, another future research area may be to examine the relationship between shareholder reactions to firm sentiments.

Regarding the research settings, we used the US firms and their sentiments during quarterly earning calls. Hence, the generalizability of our findings to firms in different countries could be limited, especially when there is a considerable cultural distance. For example, the cultural distance between the US and China is more significant as China scores high on collectivism and the US scores high on individualism (Xiumei & Jinying, 2011).

Including the moderating role of CEO overconfidence nuances the contributions of our study as we examine the relationship between performance feedback and OIM (proxied by firm sentiment). However, we acknowledge that this relationship can be further explored using various relevant contingencies. For example, given a variety of stereotypes women leaders experience in their daily corporate lives where they feel the need to be more alert about what (and how) they say, it would be interesting to examine if their communication tactics affect firm sentiments. Moreover, the use of stock options as a measure of CEO overconfidence is subject to systematic measurement error as it reflects the power balance between CEOs and those setting their compensation and other indicators of managerial discretion. Therefore, future research may consider using an alternative measure that focuses more on objective measures using a text analysis approach to capture the CEO overconfidence.

**Conflicts of interest.** The authors declare that they have no conflict of interest.

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