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Just Diverse Among Themselves: How Does Negative Performance Feedback Affect Boards' Expertise vs. Ascriptive Diversity?

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Abstract. We investigate how negative performance feedback affects board diversity, which is instrumental in shaping a firm's strategic change. When a firm underperforms compared with its aspiration, its board is motivated to promptly address the underperformance. The board needs to not only help search for strategic alternatives but also quickly build consensus around its strategic reorientation. These two motivations lead the board to value two dimensions of diversity among its members differently. On the one hand, to understand the problem of underperformance and find a solution, the board is motivated to seek new expertise, avoiding redundancy in the pool of expertise already represented in the boardroom. This results in a higher level of diversity in director expertise. On the other hand, the urgent need to build consensus prompts the board to value trust and solidarity and to avoid potential conflict among directors. Because people perceive others with similar ascriptive backgrounds as trustworthy, changes in the board of an underperforming firm are likely to yield a lower level of diversity in its members' ascriptive backgrounds. These changes in board are affected by the committee chairs of the board whose power and influence are significant in the boardroom. Analyses of the boards of 733 U.S. listed manufacturing firms show that when a firm underperforms compared with its aspirations, it increases the board expertise diversity, but decreases the board ascriptive diversity. When chairs on the board are gender or racial minorities, the negative association between underperformance and the board ascriptive diversity is weakened.

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Keywords: board diversity • gender and racial underrepresentation • performance feedback • behavioral theory of the firm • expertise diversity • ascriptive diversity

Introduction

Negative performance feedback constitutes a powerful motivation for firms to initiate strategic changes. The extant literature on the behavioral theory of the firm (Cyert and March 1963) shows that underperforming firms seek to identify alternatives to their strategies in such areas as corporate investments (Audia and Greve 2006, Arrfelt et al. 2013), innovation (Greve 2003, Chen and Miller 2007), acquisitions (Moliterno and Wiersema 2007, Iyer and Miller 2008, Kuusela et al. 2017), and alliances (Baum et al. 2005). Boards of directors are deeply involved in these strategic changes. Specifically, the board draws on its

collective experience and background to help top management teams to formulate the firm's new strategy, providing insights, sharing experiences, and offering legitimacy to the new direction (Goodstein et al. 1994, Westphal and Fredrickson 2001, Zhang and Greve 2019). As the board has the fiduciary responsibility to act in the interest of shareholders (Fich and Shivdasani 2007, Ertimur et al. 2010, Rowley et al. 2017), it observes and monitors the firm's performance in relation to its aspiration, which is informed by the firm's past performance and the performance of industry peers. When the firm's performance falls short of its aspiration, the firm and its board

face a significant threat, prompting a problemistic search to identify the sources of its underperformance and propose strategic alternatives to recover (see Posen et al. 2018 for a review). At the same time, members of the board strive to build consensus on the sources of and remedies for the firm's underperformance so that the firm can implement strategic changes (Ertimur et al. 2010).

In this regard, negative performance feedback motivates boards to respond to these challenges—one on identifying the problem and its solutions and another on urgently building consensus around the proposals. Nevertheless, performance feedback literature has overlooked the impact of negative performance feedback on the board itself, despite the original view of Cyert and March (1963) and a resounding call by Argote and Greve (2007, p. 344) who lamented “[t]he internal processes and structures of the firm that were described so richly in the Cyert and March book are not developed in depth in many contemporary approaches to organizations. ... many decisions in organization are made by standing groups such as ... boards of directors.” In this paper, we depart from prior work on performance feedback focusing on strategic change at the firm level and start to develop a theory on how the board—as a group of key players involved in strategic change processes—changes in response to negative performance feedback.

Prior research has highlighted two important dimensions where the board can change: one regarding the pool of expertise developed through directors' experience throughout their careers and the other ascriptive background, such as gender and race/ethnicity. We propose that negative performance feedback motivates boards to undergo different changes along these two dimensions. First, to identify the problem and its solutions, boards would be motivated to keep the perspectives shared in the boardroom fresh and nonredundant. The motivation to acquire new expertise is echoed by John L. Flannery, General Electric's (GE) chief executive officer (CEO), who, as a part of the strategic change process to address poor firm performance relative to the Dow Jones Industrial Average, announced a change in its board, highlighting: “we make a significant change in the board. New experts with fresh perspectives would continue to help move GE forward” (McGregor 2018). Therefore, we expect negative performance feedback to be positively associated with the diversity of the expertise among the board members.

Second, when there is an urgent need to build consensus, boards are motivated both to value people whom their members can easily trust and to avoid potential conflict in the boardroom. Directors tend to trust other directors who share similar ascriptive backgrounds, which helps them to coordinate with

one another, exchange favors, and develop solidarity (Williams and O'Reilly 1998, McPherson et al. 2001, Mannix and Neale 2005). However, when directors are ascriptively different from each other, their ascriptive differences can create salient, but less permeable, boundaries that are closely associated with intergroup bias (Hogg and Terry 2000, Li and Hambrick 2005). Given the enhanced need for trust and solidarity in the process of problemistic search, the board of an underperforming firm is more likely to value directors with similar ascriptive backgrounds. This is the case even in the face of growing institutional pressure to invite directors with underrepresented ascriptive backgrounds into the boardroom (Erhardt et al. 2003, Adams and Ferreira 2009, Miller and Triana 2009, Post and Byron 2015) as the negative performance put the primary emphasis on performance-related goals over other external and normative goals (Greve 2008, Rowley et al. 2017). In light of this, we expect negative performance feedback to be negatively associated with the level of diversity in the ascriptive backgrounds of board members. For example, when GE overhauled the makeup of its board, a disproportionate number of directors with minority ascriptive backgrounds left, including Andrea Jung, one of the five female directors and the only Asian director. After the change, the percentage of women and racial minorities on the GE board significantly decreased (Gryta and Lublin 2018).

We further extend our theory by considering the role of power in the boardroom (Pfeffer 1981, Golden and Zajac 2001, Triana et al. 2014). The chairs of important committees can exert formal and informal influence on the inner workings of a board (Garg et al. 2018). They also play an integral role in the director invitation and reappointment process (Lorsch and MacIver 1989, Withers et al. 2012b, Adams 2017). When the pressure to change the board is imminent, the chairs can wield their power to alter the boards' political dynamics. Chairs whose expertise or ascriptive background differ from the rest of the board members may intervene in the process, for example, by delegitimizing the expertise of other directors who had been engaged with the strategic direction that brought about the firm's underperformance, or by preventing directors with dissimilar ascriptive backgrounds from being overlooked.

We test our predictions using data on the boards of 733 U.S. listed firms in the manufacturing industries between 1998 and 2013. Our results show that firms' underperformance is positively associated with expertise diversity but negatively associated with ascriptive diversity. Specifically, our analyses show that the diversity in industry experience and board experience increases with negative performance feedback, whereas gender and racial diversity decrease

with negative performance feedback. We also find that the negative association between underperformance and ascriptive diversity is mitigated when ascriptive minority directors (women or racial minority directors) are committee chairs of the board.

By joining the two well-established literatures on performance feedback and board diversity that have largely evolved separately, our study offers important theoretical and practical implications. First, our theory and findings suggest that boards do not remain static during problemistic search. Negative performance feedback affects the dynamics of the board in terms of what it values and how it changes its member composition. In particular, we uncover the intricate, multifaceted nature of board diversity by showing that a factor internal to the firm (negative performance feedback) may make boards become diverse on one dimension (expertise diversity), but homogenous on the other (ascriptive diversity). More broadly, our work also reveals one way by which the underrepresentation of women and racial minority groups in upper echelons can be exacerbated, despite the societal call to rectify this issue (Erhardt et al. 2003, Adams and Ferreira 2009, Miller and Triana 2009, Post and Byron 2015). Unless the chairs of the board are from underrepresented groups, when the firm performance fails to meet aspiration levels, the grand challenge of addressing the underrepresentation of women and racial minorities is not easily rectified because directors from ascriptive minority groups are easily overlooked.

Theory and Hypotheses

Problemistic Search and Changes on the Board

The behavioral theory of the firm has been a powerful framework to help understand how firms undergo strategic changes. Its core tenet, set out by Cyert and March (1963), is that firms set aspirations taking their industry peers and past performance levels into account, and their performance compared with their aspirations affords an opportunity to reevaluate their strategic directions. Led by Greve (1998) and others (see Posen et al. 2018 for a review), empirical studies have found that when firms fall short of their aspiration, they face a significant threat and pressure to quickly address their underperformance—to the extent that other organizational goals are overlooked (Greve 2008, Rowley et al. 2017). To remedy their predicament, underperforming firms embark on problemistic search and make strategic changes.

The corporate governance literature has demonstrated that boards of directors are closely involved in the strategic reorientation process in several ways (see Goodstein et al. 1994 for a review). First, a board of

directors, as a group, monitors and evaluates strategic decisions and their effect on firm performance (Boivie et al. 2021). This was apparent in our focused interviews with the directors serving at large U.S. public firms.¹ For instance, when asked about the role of the board when the firm receives negative performance feedback, a director of a U.S. technology firm noted, “what I am trying to do as a director is to think whether this [negative performance] is because [the firm] stayed in the past. ... Boards should have assessed better and then we needed to see whether we cut that business or put more money in.” Similarly, another director of a firm in the pharmaceutical industry noted, “we needed to decide whether [the firm] will take a reverse M&A or not when we realized the performance is dramatically falling.” The board’s role is not limited to being a group that evaluates the future strategic directions; the board is also a responsible body that helped shaping the past strategic directions that led to the firm’s current performance outcome. Hence, negative performance feedback raises questions about the contribution of the existing board members and opens an opportunity for the board to make changes. When we asked what would change if the firm faced a performance downfall, a different director serving on two listed firms pointed out that the board itself is not exempt from change, “when there is an extreme downturn ... you need to set a new direction. Everything is possible, you can be a completely new company, or you can think of merger, or you can change the board of course.”

Change is likely to be related to the different roles that a board plays in a firm’s problemistic search. First, the board identifies the sources of the firm’s underperformance and aids top management teams to seek alternative strategic options to rectify the issues (Zhang and Greve 2019). At the same time, during problemistic search the board must promptly build consensus among its members on the sources of the problem and the viable strategic remedies. This consensus is necessary for the firm to react quickly and recover within a short time span; without consensus, the boards’ analyses and suggestions could be in disarray, raising questions about the viability of the board—to the extent that organizational goals that are not related with the performance are overlooked (Greve 2008, Rowley et al. 2017). These challenges—one related to analyzing the problem and finding solutions and the other to building prompt consensus about the sources and the remedies of underperformance—motivate the board to seek fresh, nonredundant perspectives while avoiding changes that could undermine trust and solidarity among its members. In the following, we theorize how these two motivations can lead the board to recalibrate differently along two different

dimensions of diversity in the boardroom: director expertise and director ascriptive background.

Problemistic Search and Boards' Expertise Diversity

Expertise revolves around the craft or knowledge of a person and is developed through their experience in specific domains or in relevant fields. Directors, for example, can develop expertise in the functional roles they have experienced in their careers, or the industry in which they have been involved. Directors can also develop expertise in directorial roles through multiple board appointments at different firms (Golden and Zajac 2001, Westphal and Fredrickson 2001, Zhang and Greve 2019). When directors have the expertise, their opinions are seen as reliable and legitimate and thus can influence fellow directors (Pfeffer 1973, Goodstein et al. 1994, Sandefur 2015). This is to be expected as directors draw on their expertise to assess and propose strategic plans, thereby influencing the strategic orientation of the firm (Forbes and Milliken 1999, Desai 2016). As Eisenhardt et al. (1997, p. 48) noted, executives “who have grown up in sales and marketing typically see opportunities and issues from vantage points that differ from those who have primarily engineering experience.” Thus, director expertise is often an important criterion when a board is formed as the expertise of individual directors contributes to the board’s collective human and social capital (Hillman et al. 2000, Haynes and Hillman 2010, Johnson et al. 2013).

Responding to the challenges in problemistic search—identifying the problem and searching for strategic alternatives—the board is motivated to change through several routes. First, the board is compelled to seek alternative perspectives. The search for a fresh perspective has cognitive value (Pitcher and Smith 2001, Carpenter et al. 2004). Directors with different expertise can complement the expertise of others in collective problem solving because different areas of expertise can widen the breadth of a group’s cognitive landscape (Walsh 1995, Hambrick et al. 1996, Finkelstein et al. 2009), thereby providing different perspectives about the firm’s current issues (Dearborn and Simon 1958, Walsh 1988, Waller et al. 1995). Furthermore, new expertise could be sought if the intended strategic change requires expertise that is not represented in the boardroom. Seeking new perspectives is also an intuitive and natural response of a group needing to recover from underperformance. For example, Døjbak Håkonsson et al. (2016) showed that teams facing unsatisfactory performance tend to explore new options rather than exploit old choices. They also showed exploring new options restores positive morale among team members.

The motivation of boards to seek new perspectives in response to underperformance also resonates with field cases and our interviewees. For instance, in aligning the strategic orientation of its board in the new business area of international banking, Revolut, a leading London-based fintech firm, hired directors with traditional banking experience different from that of the existing directors (Megaw 2020). As reported, “Revolut being staffed mainly by technology specialists, has attempted to drastically increase the amount of financial services experience among its top ranks including two more non-executives last year.” This need for new perspectives is also echoed by a long-time chair of a large U.S. manufacturing firm we interviewed; “they [referring to the directors with finance backgrounds on the board in the time of underperformance] did not have it [new perspectives]. ... We started to search for people with more scientific backgrounds, I mean scientists basically.” Inviting new directors with different, but relevant expertise for a proposed strategic alternative was also on the agenda. When asked about what directors considered to recalibrate the pool of expertise on the board, another director noted that “We needed [new directors’ name] who can bring knowledge, credibility and [his/her] local networks.”

Avoiding redundancy in the current pool of expertise among their members is equally important. Insofar as the pool of existing expertise can be seen as closely associated with the firm’s underperformance, existing directors with expertise that is heavily represented in the boardroom can lose their influence during discussions about potential strategic change (Zhang and Greve 2019). For example, they may be less likely to be consulted. In addition, bearing the burden of the firm’s underperformance, these directors may fail to gain legitimacy to propose and guide strategic change. This diminished role is discouraging for the directors, who may lose their interest in and commitment to the board (e.g., Westphal and Khanna 2003, Withers et al. 2012a), increasing the likelihood of their departure from the board.

These motivations suggest that when a firm underperforms, boards will increase the diversity of the expertise among directors—by inviting new directors with different expertise, having existing directors seek new expertise, or having existing directors with redundant expertise leave. It is important to note that changes in board expertise may not necessarily address the exact sources of the firm’s underperformance, nor do they always generate solutions pertinent to the corresponding problem sources. In a recent review, Posen et al. (2018) pointed out that problemistic search often does not target the problematic task itself. Instead, the search is more likely to be experimental. This

is especially true for board changes, given that possible sources and solutions of a firm's underperformance are often ambiguous. Hence, the motivation to seek diversity in the expertise of directors could be more exploratory. Taken together, we hypothesize the following.

Hypothesis 1. *Negative performance feedback is associated with an increase in the diversity of expertise among the directors of the board.*

Problemistic Search and Boards' Ascriptive Diversity

Identifying the sources of underperformance and seeking alternative strategic options are not the only challenges that the boards of underperforming firms need to address. Equally important is reaching a consensus among the board members on the sources of the problem and the viable strategic alternatives to rectify it (Daily and Dalton 1994, Hillman et al. 2000, Khurana 2004, Rowley et al. 2017). This consensus in the boardroom needs to be built quickly because the board is expected to devise and communicate its strategic change plan to firm constituents (Rowley et al. 2017). As one director responded in our interview, "when you have the bad news [*poor performance*], things are simple. You don't delay and go and fix it."

The motivation to build a prompt consensus affects what the board values in its members. Trust becomes particularly important because the board is under great pressure to rectify the firm's underperformance, yet the sources and the solutions to the problem are often ambiguous. To navigate around this ambiguity in the firm's underperformance, board members need to communicate and exchange ideas. If trust is lacking, however, communication among the members can be prolonged, which is a detriment to the board's action. In alignment with the need to build consensus, one director who served as a long-time chair of his board pointed out "when a firm does not go well, it is very important directors use the 'same language.' Otherwise, you cannot do anything ... I did not have time to persuade them. We had to trust what others said and moved immediately." Another director highlighted the importance of shared values among board members by saying, "we need to share the value and common understanding of what you want [the firm] to be ..."

In general, people trust and perceive solidarity with those who have similar backgrounds. Differences in member backgrounds can create boundaries that divide the group into subgroups, with some being seen as ingroup (us) and some as outgroup (them) (Tajfel 1982). Any attributes—for example, an individual's expertise—can create boundaries. Nevertheless, ascriptive backgrounds, such as gender and race, are known as two of, if not the most, powerful attributes

that people use to categorize others because their boundaries are visible and, more importantly, perceived to be fixed (Messick and Mackie 1989, Hamilton et al. 1994, Kurzban et al. 2001) and relatively impermeable (Bettencourt et al. 2001). Furthermore, the chasm between ascriptively different groups runs deep, with different social norms and values rooted in the sociocultural history of a society (Tajfel 1970, Turner and Tajfel 1986) making their boundaries salient and persistent.

These boundaries from ascriptive differences have nontrivial consequences. People are likely to perceive outgroup members as not only inferior in terms of competence but also less trustworthy compared with those who are part of the ingroup (Mikulincer and Shaver 2001, Park and Westphal 2013). In particular, the presence of threatening situations only intensifies this intergroup bias—people's tendency to show ingroup favoritism and outgroup discrimination gets enhanced (Stephan and Stephan 2000, Hogg 2014).

Directors are not special in this regard. Negative performance feedback presents a threat to the board because the firm's underperformance directly influences the directors' remuneration, status, reputation, and future career prospects (Lorsch and MacIver 1989, Yermack 2004, Harrison et al. 2018). In light of these factors, directors of underperforming firms may engage in behavior that intensifies ingroup favoritism and outgroup derogation in attributing the accountability for the underperformance (e.g., Park and Westphal 2013). Moreover, in exploring new strategic directions, directors may agree more easily with fellow directors who share similar ascriptive backgrounds, which can then result in the views of ascriptively different directors being undervalued or even ignored. These tendencies, whether implicit or explicit, can make directors view fellow directors with different ascriptive backgrounds as a source of intergroup conflict and bias. This is more apparent when the board is motivated to build consensus; the views of directors whose ascriptive backgrounds are similar to existing directors is easily trusted, whereas ascriptively different directors' opinions could be easily contested.

It is noteworthy that there is growing institutional pressure to have ascriptive minority directors on a board (Deloitte 2019). However, this external pressure could be disregarded when the firm underperforms. Prior work in performance feedback theory suggests that in times of performance downfall, firms prioritize traditional performance goals (e.g., maximizing profits) over other organizational goals, especially those that are externally induced (Greve 2008, Rowley et al. 2017). This implies that rectifying underperformance becomes more urgent than acquiescing to institutional pressures to gain legitimacy. When the two goals clash, boards prioritize performance goals over their

conformity to the growing social pressure at least until the underperformance is rectified. Solal and Snellman's (2019) recent study indeed suggests that prioritizing performance-related goals could be helpful for underperforming firms. They showed that appointing female directors and achieving greater female representation on the board gives the impression that the firm values its performance goal less, leading to negative reactions from the stock market. Thus, in pursuing the first-order goal of addressing the firm's underperformance, the board may refrain from changes that can potentially cause disruptions in the boardroom and shareholders' concerns, even when social forces demand more ascriptively diverse boards.

In sum, when responding to negative performance feedback, the board values directors with similar ascriptive backgrounds more than those who are ascriptively different, leading to decreasing ascriptive diversity in the board.

Hypothesis 2. *Negative performance feedback is associated with a decrease in ascriptive diversity among the directors of the board.*

The Role of Expertise and Ascriptive Minority Chairs

Our theory suggests that group dynamics play an important role in the process of changing a board in response to negative performance feedback. In this regard, changes can also be influenced by power dynamics in the boardroom. In particular, prior research suggests that social interactions among group members are affected by powerful figures in the group who have the authority and legitimacy to promote change (Fiol et al. 2001, Van der Vegt et al. 2010). Corporate governance scholars have suggested that this power is assumed by the chairs of key board committees (Finkelstein 1992). Indeed, the formal position of a committee chair bestows a director with the legitimacy and authority to influence the key decisions of a board (Hambrick 1981, Finkelstein 1992, Triana et al. 2014). Furthermore, a committee chair adds visibility and prestige, which signal who are the more valued members of the board to both internal and external firm constituents (Garg et al. 2018).

We argue that chair expertise and ascriptive background also affect the process of board change in response to negative performance feedback. When a director whose expertise is dissimilar to the rest of the board occupies committee chairs (which we call an *expertise minority chair*), the underperforming firm will be more motivated to increase expertise diversity of its board. This is because the current firm performance outcomes are likely to be associated with the past strategic choices made by the majority of directors, whose

expertise was better represented in the boardroom and thus would have dominated the boardroom discussion (Zhang and Greve 2019). In the face of negative performance feedback, however, this dynamic would undermine the power and influence of the groups of majority directors who presided over the past strategic choices that proved unsuccessful. This association then results in the expertise of those majority directors being less valued, opening an opportunity for expertise minority chairs to exert greater influence in the boardroom. In contrast, chairs whose expertise is highly similar to that of the other existing directors (that is, expertise majority chairs) may be less aggressive in seeking new expertise to preserve the status quo. These possibilities suggest that compared with a board led by expertise majority chairs, a board with expertise minority chairs may seek diverse expertise more aggressively in response to negative performance feedback.

A similar board reconfiguration emerges when ascriptive minority directors, such as women and racial minorities, occupy committee chairs (which we call *ascriptive minority chairs*). Ascriptive minority chairs are more likely to subvert the tendency to avoid diversity in members' ascriptive backgrounds. There are two reasons. First, ascriptive minority chairs might have an interest in reshaping the board to enhance the representation of directors with ascriptive minority backgrounds. The decrease in diversity of ascriptive background during the firm's performance downfall implies that ascriptive minority chairs may lose their fellow minorities or even have their seats in the boardroom challenged. Therefore, ascriptive minority chairs would be motivated to exert their power and influence to resist this possibility. Second, people tend to highlight their similarities to powerful figures, whereas discounting their differences. This tendency is more pronounced for prominent social identification markers such as a person's ascriptive background (Cialdini et al. 1976, Abrams and Hogg 2006). The same mechanism is also at play when directors view fellow directors or board chairs with ascriptive minority backgrounds. When ascriptive minorities occupy committee chairs, directors may try to avoid highlighting ascriptive differences with the chair or other ascriptive minority directors in the boardroom. As a result, ascriptive minority directors are less likely to be affected by intergroup bias, even when the need to build consensus is paramount. Taken together, we propose two hypotheses predicting the contingent effects of having chairs with dissimilar expertise on the board (expertise diversity) and having chairs with ascriptive minority backgrounds on the board (ascriptive diversity).

Hypothesis 3(a). *When expertise minority directors are committee chairs, the increase in the expertise diversity of*

the board following negative performance feedback will be strengthened.

Hypothesis 3(b). *When ascriptive minority directors are committee chairs, the decrease in the ascriptive diversity of the board following negative performance feedback will be mitigated.*

Data and Method

Data and Sample

To test our hypotheses, we compiled panel data composed of firm-year observations from multiple sources. Our primary source of data is ISS/RiskMetrics, which is widely used in board research (e.g., Chu and Davis 2016).² We obtained directors' functional experience from BoardEx. From ISS/RiskMetrics, we obtained a list of directors and their ascriptive backgrounds, including gender and race. Information on directors in the source data, however, was often incomplete. To overcome this shortcoming, we followed a recent study (Bernile et al. 2018) and used a machine-learning algorithm provided by NamSor (<https://www.namsor.com/>), which uses individuals' full names to estimate their probable racial/ethnic background (Santamaria and Mihaljevic 2018). Using estimates from Namsor's estimates, we filled in the missing information and also verified the race/ethnicity information provided by ISS/RiskMetrics. Whenever a discrepancy between the information provided by ISS/RiskMetrics and NamSor's estimates arose, we independently searched the director's name for text descriptions and photographs to determine their racial background.³ We used the Execucomp database to obtain and corroborate information on the CEOs. All other firm-specific information, including financial performance, was retrieved from the Compustat database. For comparability in our sample firms, we focused on manufacturing industries (Standard Industry Codes [SIC] from 20 to 39, inclusive). Our estimation sample includes firm-year observations from 1998 until 2013. This yielded a total of 6,672 firm/board-year observations from 733 different firms.

Dependent Variables

Board Expertise Diversity. Board expertise diversity was captured as a composite of diversity scores from three different dimensions: industry experience, functional background, and board experience. Industry experience diversity captures the dissimilarity between a director's industry experience compared with that of other directors on the same board. To measure this, each director's industry experience was represented by a vector, where each entry represents whether the director holds a directorship in a given industry. Based on this vector, we used cosine similarity to measure the similarity of industry experience

for a pair of directors on the board (see Askin and Mauskapf 2017, Lee and Gargiulo 2021 for the use of cosine similarity). We did not use the Herfindahl index, which is sensitive to the presence of a few directors who have an extensive amount of experience for the following reason. A firm can, for example, appear to have a board with diverse experience when it is composed of a single director who has extensive experience in many different industries and multiple directors who have specialized experience in a single industry. In this case, the Herfindahl index may erroneously capture an individual director's diverse experience, instead of capturing the overall level of diversity among multiple directors on the board. This issue can be avoided with cosine similarity, which measures the pairwise similarity in directors' experiences.

Formally speaking, industry experience diversity was calculated as follows. Let q be a vector that represents whether the director holds a board seat in an industry, s , which is represented as a major industry division based on SIC codes.⁴ For directors m and n on the same board, cosine similarity of director industry experience is measured as follows:

$$\theta_{m,n} = \frac{\sum_s q_{m,s} \cdot q_{n,s}}{\sqrt{\sum_s q_{m,s}^2} \sqrt{\sum_s q_{n,s}^2}}$$

We then took the average of the pairwise similarity in director industry experience for all pairs of directors on the board of firm i and reverse code it. That is,

$$\text{Industry experience diversity}_i = 1 - \frac{1}{N_i(N_i - 1)} \sum_{i, m \neq n} \theta_{m,n}$$

where N_i is the number of directors on the board. This metric varies from 0 to 1, with a higher number indicating a higher level of diversity.

Functional experience diversity was measured similarly to industry experience diversity by capturing how dissimilar a director's functional experience is compared with other directors. We followed Burton and Beckman (2007) and categorized director functional experience into the following seven categories: experiences in (1) sales, (2) support (e.g., human resources, accounting, planning), (3) manufacturing and operations, (4) research and development (R&D), (5) finance, (6) founding, and (7) chief executive officer (CEO). To gather this information, we used the job role description of directors in BoardEx. Table 1 shows the list of words we used to categorize directors' functional experiences.⁵

Using this categorization, each director's functional experience was represented as a vector, w , where each element captures the number of job titles that the director held in one of the seven functional categories,

Table 1. Categorizing Directors' Functional Background by Types

Functional background categories	Related terms
Sales	Sales, marketing, customer, advertise, brand
Support	Human resource, personnel, strategic planning and development, accounting, audit, control, public/investor relations, communications, information technology, advisory, consultant, legal, counsel
Manufacturing and operation	Operation, production, purchase/procurement, plant manager
Research and development	Research and development, product development, technology officer, engineering
Finance	Finance, treasurer, bank officer, tax, investment, financial analyst
Founder	Founder
Executive	Chief executive officer

k. We then calculated the pairwise similarity between two directors' functional experience, using cosine similarity, as follows:

$$\theta'_{m,n} = \frac{\sum_K w_{m,k} \cdot w_{n,k}}{\sqrt{\sum_K w_{m,k}^2} \sqrt{\sum_K w_{n,k}^2}}$$

We then took the average of the pairwise similarity in director functional experience for all pairs of directors on the board of the firm i and reverse coded it as follows:

$$\text{Functional experience diversity}_i = 1 - \frac{1}{N_i(N_i - 1)} \sum_{i, m \neq n} \theta'_{m,n}$$

where N_i is the number of directors on the board. Functional experience diversity ranges from 0 to 1, with a higher number indicating a higher level of functional diversity in directors' work experience.

Finally, diversity in board experience was measured as the standard deviation in the number of outside directorships that each director on the same board holds. A higher score in this board experience diversity means that the board is composed of both directors who have greater board experience in a number of different boards and those who have limited involvement except for the focal board. In online Appendix A, we share a simple example illustrating how expertise diversity in each of these dimensions is calculated.

As we are interested in the overall level of diversity from different sources of expertise, we derive a composite measure from different sources of experience. To do so, we standardized the scores for each expertise dimension (industry, functional, and board experience), as a z-score. We then summed the z-scores to obtain a composite measure of *Expertise diversity*. In an additional analysis, we used scores from each dimension to further investigate which of these dimensions was affected by negative performance feedback.

Board Ascriptive Diversity. Board ascriptive diversity was measured using two dimensions of board characteristics. First, we measured the gender diversity of

the board, using a reverse-coded Herfindahl index. Formally, gender diversity for firm i is measured as:

$$\text{Gender diversity}_i = 1 - \left(\frac{n_{i,f}}{N_i} \right)^2 - \left(\frac{N_i - n_{i,f}}{N_i} \right)^2$$

where $n_{i,f}$ refers to the number of female directors and N_i is the total number of directors on the board. A higher number for this metric indicates that the board is diverse in its gender composition. We also check the robustness of our results with an alternative operationalization using a simple proportion of female directors on the board.

The second dimension of ascriptive diversity was based on the race of the directors. ISS/Metrics provides director race/ethnicity information for six categories: White, Black, Hispanic, East Asian, Central/Middle Eastern Asian, and Native American. In our sample, the majority of the directors were White (88.96%), followed by Black (4.40%), and East Asian (3.28%). Given this skewed distribution, we used only two categories: racial majority group (white) versus racial minority groups (others). Using this information, we measured racial diversity for firm i as follows:

$$\text{Racial diversity}_i = 1 - \left(\frac{n_{i,c}}{N_i} \right)^2 - \left(\frac{N_i - n_{i,c}}{N_i} \right)^2$$

where $n_{i,c}$ is the number of white directors. A higher number for this metric indicates that the board is racially diverse. The results are robust if we keep the original six categories to compute *Racial diversity*. We also check the robustness of our results using a simple proportion of directors from racial minority groups.

Similar to *Expertise diversity*, we are interested in the overall level of diversity in ascriptive background. To do so, we use a composite measure based on gender and racial background. To obtain a composite measure of *Ascriptive diversity*, we standardized gender and racial diversity as a z-score and then added them. In a supplementary analysis, we also used scores from each dimension to gain a deeper understanding of our results.

Independent Variable

To measure the negative performance feedback, our key independent variable, we first measured firms' aspiration level following Greve (2003). In performance feedback research, aspiration level generally emerges from two sources: historical aspiration level and social aspiration level. Historical aspiration level refers to the aspiration level given the firm's history of past performance. Social aspiration level refers to the aspiration level considering the performance of the firm's competitors in a given industry. To measure firm performance, we used the firm's return on asset (ROA), because this is the most comparable performance metric across firms in the manufacturing industries we studied.

A firm's historical aspiration level ($ha_{i,t}$) was captured as the exponential moving average of a firm's past ROA. Formally, it is defined as:

$$ha_{i,t} = \beta \times ROA_{i,t-1} + (1 - \beta) \times ha_{i,t-1}$$

where β refers to the relative weight given to the firm's previous year's performance level. A firm's social aspiration level ($sa_{i,t}$) is captured as the average ROA of firms in the same industry, defined as firms sharing the same two-digit SIC code. Finally, a firm's aspiration level ($al_{i,t}$) was represented as a weighted average of historical and social aspiration level, which is formally defined as:

$$al_{i,t} = \alpha \times sa_{i,t} + (1 - \alpha) \times ha_{i,t}$$

where α captures the relative weight between the social and historical aspiration levels. Based on a firm aspiration level, we derived performance feedback variables using a spline function. Specifically, our variables are defined as follows:

$$\begin{aligned} \text{Above aspiration}_{i,t} &= \max(ROA_{i,t} - al_{i,t}, 0) \\ \text{Below aspiration}_{i,t} &= \max(al_{i,t} - ROA_{i,t}, 0) \end{aligned}$$

To determine the weights α and β in deriving a firm's aspiration level, we followed recommendations from Greve (2003) and others (Audia and Greve 2006, Greve and Gaba 2017) to conduct a grid search with 0.1 intervals for the weights that yield the best fit in our models, as assessed using Bayesian information criteria (BIC). For example, to predict *Expertise diversity*, our search yields $\alpha = 0.1$ and $\beta = 0.8$ as the best fitting weights. This implies that the performance of a firm's competitor in the same industry was weighted as 0.1 weight for its aspiration level, whereas the firm's previous year's performance was weighted as 0.72 (0.9×0.8), and the firm's previous year's historical aspiration level was weighted as 0.18 (0.9×0.2). Our search yields weights of $\alpha = 0.9$ and $\beta = 0.1$ for models predicting *Ascriptive diversity*. This means that the average performance of a firm's competitors in the same industry received a weight of 0.9; the previous

year's performance of the firm a weight of 0.01 (0.1×0.1); and the previous year's historical aspiration of the firm a weight of 0.09 (0.1×0.9).

In some prior work, scholars have separated performance feedback from historical aspiration level and social aspiration level (Baum et al. 2005, Kacperczyk et al. 2015). Although we did not have an a priori theory to predict the differential effects of underperformance compared with historical aspiration level and social aspiration level, we conducted additional analyses with the two aspiration levels separated.

Moderating Variables

To test Hypotheses 3(a) and 3(b), we captured whether directors with minority status in their expertise or ascriptive backgrounds occupy a chair position on one of three important board committees: compensation, audit, and nomination (Triana et al. 2014, Garg et al. 2018). These three committees are the most common across firms and are important means for monitoring and reporting the core activities of a firm (Braiotta and Sommer 1987). Thus, holding a chair position for one of these committees signals the power and qualifications of a director, who, as a committee chair, can exercise power to influence corporate decisions, including board composition change (Kesner 1988).

We measured *Expertise minority chairs* using an approach similar to that used to measure *Expertise diversity*. First, we measured the extent to which chair-directors have experiences similar to that of the other directors on the same board. To accomplish this, we retained all pairs consisting of a director who serves as chair and another director who does not serve as chair in one of the three committees. We then computed the average cosine similarity scores between chair-directors and the rest of the directors for each of the two expertise dimensions we used: industry experience, and functional experience. As we are interested in capturing the committee chair's minority status in expertise, we subtracted each of these scores from one. For the board experience dimension, we computed the absolute difference in the average number of outside directorships that chair-directors hold and that non-chair-directors hold. We then standardized each of the three scores as z-scores and then added these to obtain a measure of *Expertise minority chairs*. A higher score on this measure indicates that the chairs of the board have dissimilar expertise compared with the rest of the directors.

Ascriptive minority chairs is a dummy variable capturing whether women or directors from underrepresented racial groups hold any of the chair positions on the board. In our sample of manufacturing firms, only three firms have a board in which female directors are the majority and only seven have a board in which

directors from underrepresented racial groups are the majority.

Control Variables

We used several control variables to account for possible confounders. First, we controlled for several characteristics of the board and the CEO. *Ascriptive minority CEO* is a dummy variable measuring whether the CEO is either female or nonwhite. *CEO-chair* refers to a dummy variable that represents whether the CEO holds a chair on the board. *Succession* is a dummy variable that represents whether it is the first year of the CEO's reign for the firm. These account for alternative power structures that could affect whether negative performance feedback motivates the board to explore diverse expertise or homogenize ascriptive backgrounds.

Second, we controlled for time-varying characteristics of the firm that are known to affect a firm's search behaviors. *Organizational slack* measures the extent to which the firm has slack resources at its disposal. Specifically, this variable was measured as the natural log of the current asset over the current liability. We also took *R&D intensity* as the expenditures on research and development divided by sales, multiplied by 100. This captures the extent to which a firm is focused on organizational search.

Third, *Interlocks* counts the number of firms to which the firm is connected through board interlocks, which helps mitigate concerns over alternative ways of seeking strategic change (Beckman and Haunschild 2002). We also controlled for the size of the board (*Board size*) by taking the natural log to consider the effect of having a large board on increasing its diversity. We controlled for the log number of independent directors (*Independent directors*). Finally, *CEO-directors* counts the log number of directors who are the CEO of another company.

Analysis

In our analytical approach, we used fixed effects ordinary least squares (OLS) models to estimate the effect of *Below aspiration* on *Expertise* and *Ascriptive diversity*. The fixed effects model helps us to address several important alternative factors that could cause firms to underperform, motivating them to change their boards. For example, firms endowed with poor resources and capabilities may experience chronic underperformance compared with their competitors and repeatedly engage in board recomposition. Some firms upholding an ideological stance toward having diverse representation may consider financial performance as a secondary goal. To address these kinds of firm-specific unobserved heterogeneity, we used firm-level fixed effects in our analysis.

Different types of industries may also show specific trends in board diversity, such as being more open to

ascriptive minorities, and thus diversity in ascriptive backgrounds is seen as less costly compared with other industries. For example, the food and beverage manufacturing industries, which have shown greater openness to female directors due to their consumer market orientation, might display a trend that differs from other male-dominant industries, such as the industrial machinery industry (Fryxell and Lerner 1989). These industry-specific trends can be a source of concern if they are correlated with industry-specific performance trends and thus affect the performance feedback based on the historical aspiration level. To alleviate this issue, we used industry-by-year fixed effects by including a series of unique dummies for each combination of industry and year. This is more restrictive than including year fixed effects and industry-fixed effects separately, which account for a single trend that applies to all industries. Our use of the restrictive list of fixed effects allows us to conduct a more conservative test of the effect of performance feedback than previous works in this area.

Given the complex interdependence between the firm-year observations, we use multiway clustering proposed by Cameron et al. (2011). Specifically, we clustered the standard errors by each firm and each industry-by-year to match the fixed effects that we use in the model.

Results

Effect of Negative Performance Feedback on Expertise Diversity

Table 2 shows the descriptive statistics for all the variables used in our analyses. Table 3 shows zero-order pairwise correlations for the model predicting *Expertise diversity*. Table 4 shows the estimation results using the fixed effects OLS models. In Model 1, we first test Hypothesis 1 in a simple regression framework without any controls. In Hypothesis 1, we predict that firm performance below their aspirational level will be positively associated with *Expertise diversity* of their board. The key independent variable, *Below aspiration*, has a positive and statistically significant association with *Expertise diversity* ($p < 0.05$), supporting Hypothesis 1. Model 2 continues to test Hypothesis 1 but with additional controls in the model. *Below aspiration* continues to show a positive and statistically significant association with *Expertise diversity* where control variables improve the precision in the estimate ($p < 0.01$).

In Models 3 to 6 in Table 4, we provide further analyses to deepen our understanding of the main findings. In Model 3, we first test Hypothesis 1 by separating performance feedback from historical aspiration levels and performance feedback from social aspiration levels. We find a differential effect between

Table 2. Descriptive Statistics ($N = 6,672$)

Variables	Mean	Standard deviation	Min	Max
<i>Expertise diversity</i> ^a	0.09	1.75	-6.91	22.40
<i>Ascriptive diversity</i>	0.17	1.53	-2.16	4.67
<i>Above aspiration</i> ^b	0.02	0.03	0.00	0.46
<i>Below aspiration</i> ^c	0.02	0.04	0.00	0.78
<i>Expertise minority chairs</i>	0.08	1.59	-5.14	8.78
<i>Ascriptive minority chairs</i>	0.28	0.45	0.00	1.00
<i>Ascriptive minority CEO</i>	0.08	0.26	0.00	1.00
<i>CEO-chair</i>	0.41	0.49	0.00	1.00
<i>CEO succession</i>	0.11	0.32	0.00	1.00
<i>Organizational slack</i>	1.63	0.48	0.22	4.11
<i>R&D intensity</i>	0.08	0.41	0.00	20.12
<i>Interlocks</i>	5.31	4.95	0.00	41.00
<i>Broad size</i> ^d	9.35	2.30	3.00	21.00
<i>Independent directors</i> ^d	6.87	2.30	0.00	16.00
<i>CEO-directors</i> ^d	2.04	1.24	0.00	11.00

^aThe maximum value is an extreme outlier. The second highest value of *Expertise diversity* is 7.74.

^bDescriptive statistics are based on models predicting *Expertise diversity*. For the same variable predicting *Ascriptive diversity*, *Above aspiration* has mean = 0.03, standard deviation = 0.05, min = 0.00, max = 0.54.

^cDescriptive statistics are based on models predicting *Expertise diversity*. For the same variable predicting *Ascriptive diversity*, *Below aspiration* has mean = 0.03, standard deviation = 0.06, min = 0.00, max = 1.12.

^dDescriptive statistics are based on the values that are not logged.

historical and social aspirations. We find that *Below historical aspiration* has a positive and statistically significant association with *Expertise diversity* ($p < 0.01$), as expected. This implies that firms underperforming compared with their past performance are likely to recalibrate the expertise of the board by seeking different expertise. However, we do not find a statistically significant effect of *Below social aspiration* on *Expertise diversity*. Nevertheless, Model 2, using a composite measure of performance feedback, shows a better model fit in terms of Akaike Information Criterion (AIC) and Bayesian Information

Criterion (BIC) than Model 3, which separates performance feedback from historical and social aspiration. Hence, we continue to use the composite measure in Models 4 through 6, which efficiently captures performance feedback with no loss of information.

Next, in Models 4 to 6, we decompose *Expertise diversity* into each of the three subdimensions of expertise and estimate the effect of *Below aspiration*. Models 4 and 6 show that the effects of *Below aspiration* on a board's *Industry experience diversity* and *Board experience diversity* are positive and statistically significant, supporting Hypothesis 1. Model 5 shows the estimation result for the board's *Functional experience diversity*. Although the coefficient of *Below aspiration* is positive, it fails to reach a commonly accepted level of statistical significance. Collectively, these models show that in our sample, when a firm falls below its performance aspiration, its board becomes more diverse in terms of member experience in different industries and on other corporate boards, but not necessarily their different functional areas.

Effect of Negative Performance Feedback on Ascriptive Diversity

Table 5 shows zero-order pairwise correlations for the models predicting *Ascriptive diversity*. Table 6 shows the estimation results with the models, including firm and industry-by-year fixed effects. Model 7 tests Hypothesis 2 without any controls. In Hypothesis 2, we predict that the underperformance of a firm compared with its aspiration is negatively associated with the ascriptive diversity of a board; that is, negative performance feedback is associated with a reduced level of *Ascriptive diversity*. *Below aspiration* has a negative and statistically significant association with *Ascriptive diversity* ($p < 0.01$), supporting Hypothesis 2. Model 8 includes control variables to check the

Table 3. Expertise Diversity: Pairwise Zero-order Correlations Among Variables in Table 4 to Test Hypotheses 1 and 3(a) ($N = 6,672$)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) <i>Expertise diversity</i>													
(2) <i>Above aspiration</i>	-0.05												
(3) <i>Below aspiration</i>	-0.05	-0.22											
(4) <i>Expertise minority chairs</i>	0.49	-0.05	-0.03										
(5) <i>Ascriptive minority chairs</i>	0.05	-0.02	-0.01	0.06									
(6) <i>Ascriptive minority CEO</i>	-0.03	-0.01	0.03	-0.03	0.07								
(7) <i>CEO-chair</i>	-0.03	-0.04	-0.07	-0.04	0.09	0.03							
(8) <i>CEO succession</i>	0.02	0.02	-0.01	0.02	-0.00	0.04	-0.07						
(9) <i>Organizational slack</i>	-0.18	-0.03	0.05	-0.12	-0.04	0.03	0.01	-0.05					
(10) <i>R&D intensity</i>	-0.01	0.05	0.32	-0.02	-0.01	0.00	-0.05	-0.00	0.06				
(11) <i>Interlocks</i>	0.63	-0.08	-0.07	0.39	0.06	-0.05	-0.05	0.04	-0.30	-0.07			
(12) <i>Broad size</i>	0.30	-0.13	-0.12	0.22	0.15	-0.10	0.03	0.04	-0.24	-0.09	0.57		
(13) <i>Independent directors</i>	0.30	-0.09	-0.11	0.20	0.22	-0.04	0.09	0.01	-0.23	-0.06	0.51	0.75	
(14) <i>CEO-directors</i>	0.24	-0.05	-0.02	0.15	-0.05	-0.04	-0.11	0.01	-0.19	-0.05	0.43	0.30	0.22

Note. $\rho > |0.02|$ is statistically significant at $p < 0.05$.

Table 4. Fixed Effects OLS Estimates for Board Expertise Diversity (1998–2013; $N = 6,672$, 733 firms)^a

Variables	Expertise diversity		Expertise diversity		Industry experience diversity		Functional experience diversity		Board experience diversity	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6				
Above aspiration ^b	0.62 (0.71)	0.70 (0.57)		0.02 (0.02)	0.05 (0.06)	0.12 (0.19)				
Below aspiration ^b	1.10* (0.43)	1.06** (0.39)		0.04* (0.02)	0.03 (0.03)	0.26* (0.12)				
Above historical aspiration			0.48 (0.56)							
Below historical aspiration			1.25** (0.46)							
Above social aspiration			0.13 (0.69)							
Below social aspiration			-0.46 (0.65)							
Expertise minority chairs		0.18** (0.02)		0.01** (0.00)	0.01** (0.00)	0.02** (0.00)				
Ascriptize minority chairs		0.02 (0.05)		0.00 (0.00)	-0.01 (0.01)	0.02 (0.02)				
Ascriptize minority CEO		0.03 (0.13)		0.01 (0.01)	0.00 (0.02)	-0.02 (0.04)				
CEO-chair		-0.07 (0.07)		-0.00 (0.00)	0.00 (0.01)	-0.02 (0.02)				
CEO succession		-0.00 (0.04)		-0.00 (0.00)	-0.00 (0.00)	0.01 (0.01)				
Organizational slack		-0.10 (0.08)		-0.00 (0.00)	-0.01 (0.01)	-0.01 (0.03)				
R&D intensity		0.01 (0.05)		-0.00* (0.00)	0.00 (0.00)	0.01 (0.02)				
Interlocks		0.16** (0.01)		0.01** (0.00)	-0.00+ (0.00)	0.04** (0.00)				
Broad size		-1.02** (0.24)		-0.08** (0.01)	0.01 (0.03)	-0.14+ (0.08)				
Independent directors		0.11 (0.16)		0.02+ (0.01)	0.01 (0.02)	-0.05 (0.05)				
CEO-directors		0.01 (0.07)		0.01 (0.00)	0.00 (0.01)	-0.03 (0.02)				
Constant	0.06** (0.02)	1.48** (0.41)	1.51** (0.40)	0.22** (0.02)	0.64** (0.05)	1.22** (0.14)				
Observations	6,672	6,672	6,672	6,672	6,672	6,672				
AIC	18,426.79	16,935.03	16,937.41	-23,838.34	-14,419.58	17,39.17				
BIC	18,440.40	17,023.50	17,039.50	-23,749.87	-14,331.11	18,27.64				
F	3.41	39.41	34.23	31.24	4.00	19.24				
R ²	0.70	0.76	0.76	0.82	0.70	0.66				

^aFirm and industry × year fixed effects are included in all models. Standard errors are clustered by firm and industry × year.

^bBased on the grid search, we use $\alpha = 0.1$ and $\beta = 0.8$. This implies that the average performance of a firm's competitors in the same industry gets a weight of 0.1 and the previous year's performance of the firm gets a weight of 0.72 (= 0.9 × 0.8) and the previous year's historical aspiration of the firm gets a weight of 0.18 (= 0.9 × 0.2).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$, two-tailed test.

Table 5. Ascriptive Diversity: Pairwise Zero-Order Correlations Among Variables in Table 6 to Test Hypotheses 2 and 3(b) ($N = 6,672$)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) <i>Ascriptive diversity</i>													
(2) <i>Above aspiration</i>	0.03												
(3) <i>Below aspiration</i>	-0.07	-0.29											
(4) <i>Expertise minority chairs</i>	0.15	0.00	-0.03										
(5) <i>Ascriptive minority chairs</i>	0.38	0.02	-0.01	0.06									
(6) <i>Ascriptive minority CEO</i>	0.22	-0.02	0.03	-0.03	0.07								
(7) <i>CEO-chair</i>	0.08	-0.00	-0.10	-0.04	0.09	0.03							
(8) <i>CEO succession</i>	0.02	-0.01	0.02	0.02	-0.00	0.04	-0.07						
(9) <i>Organizational slack</i>	-0.17	-0.08	0.04	-0.12	-0.04	0.03	0.01	-0.05					
(10) <i>R&D intensity</i>	-0.05	-0.03	0.53	-0.02	-0.01	0.00	-0.05	-0.00	0.06				
(11) <i>Interlocks</i>	0.37	0.03	-0.13	0.39	0.06	-0.05	-0.05	0.04	-0.30	-0.07			
(12) <i>Broad size</i>	0.38	-0.04	-0.15	0.22	0.15	-0.10	0.03	0.04	-0.24	-0.09	0.57		
(13) <i>Independent directors</i>	0.40	-0.04	-0.12	0.20	0.22	-0.04	0.09	0.01	-0.23	-0.06	0.51	0.75	
(14) <i>CEO-directors</i>	0.14	0.06	-0.09	0.15	-0.05	-0.04	-0.11	0.01	-0.19	-0.05	0.43	0.30	0.22

Note. $\rho > |0.02|$ is statistically significant at $p < 0.05$.

robustness of our estimates. *Below aspiration* continues to have a negative and statistically significant effect, supporting Hypothesis 2.

Again, we further analyze the data to provide a more detailed understanding of our main finding. First, in Model 9, we separate the performance feedback from historical and social aspirations. We find a differential effect between historical and social aspirations. We find that *Below historical aspiration* has no statistically significant association with *Ascriptive diversity*, whereas *Below social aspiration* has a negative and statistically significant association with *Ascriptive diversity* ($p < 0.05$). This suggests that firms underperforming compared with their industry peers change their boards to achieve more similarity in their ascriptive composition. This finding is consistent with our argument that when firms' performance falls below that of their competitors, their boards are hard-pressed to quickly react, which in turn imposes greater pressure on them to avoid potential intergroup conflict arising from different ascriptive backgrounds. This leads to an increase in ingroup favoritism toward directors who share similar ascriptive backgrounds. Model 8, which uses a composite measure, again shows a better model fit in terms of BIC than does Model 9. Hence, we continue our analyses using the composite measure.

In Models 10 and 11, we separate *Ascriptive diversity* into its subdimensions, *Gender diversity* and *Racial diversity*. In Model 10, we find that *Below aspiration* is negatively associated with *Gender diversity* at a statistically significant level ($p < 0.01$). In Model 11, we find that *Below aspiration* is also negatively associated with *Racial diversity*, but the effect is not statistically significant at a conventionally accepted level. This difference could be explained by an anticipated cost of appointing female directors that a prior research has found (Solal and Snellman 2019). Taken together, the set of

findings supports our hypothesis that boards tend to decrease their ascriptive diversity in response to negative performance feedback.

Robustness Checks and Supplementary Analyses

Although we theorize on the effects of expertise and ascriptive diversity separately, the two dimensions might be negatively correlated to each other, which may raise a concern that our results are due to a mechanical correlation between the two variables. However, the correlation between the two variables in our sample is positive and statistically significant ($\rho = 0.22$, $p < 0.01$). The positive relationship is also clear in the regression line between the two variables in Figure 1, which shows the binned contour scatterplot of *Expertise diversity* and *Ascriptive diversity* of each firm-year observations. This suggests that firms usually form a board that is diverse in both expertise and ascriptive background—contrary to the hypothesized differentiating effects of negative performance feedback, which increases expertise diversity but reduces ascriptive diversity. This positive association from descriptive analysis would arise partially because in our sample ascriptive minority directors have different industry and functional experience than white male directors (see online Appendix B). Specifically, we find that ascriptive minority directors are less likely to hold board seats in manufacturing industries, but more likely to have seats in retail industries. Ascriptive minority directors are less likely to have functional experience in manufacturing-related roles and executive roles, but more likely to have experience in support roles. This is consistent with what previous research has found (Hillman et al. 2002).

It is important to note that nor are the effects we find a byproduct of underperforming firms' inability

Table 6. Fixed Effects OLS Estimates for Board Ascriptive Diversity (1998–2013; $N = 6,672, 733$ firms)^a

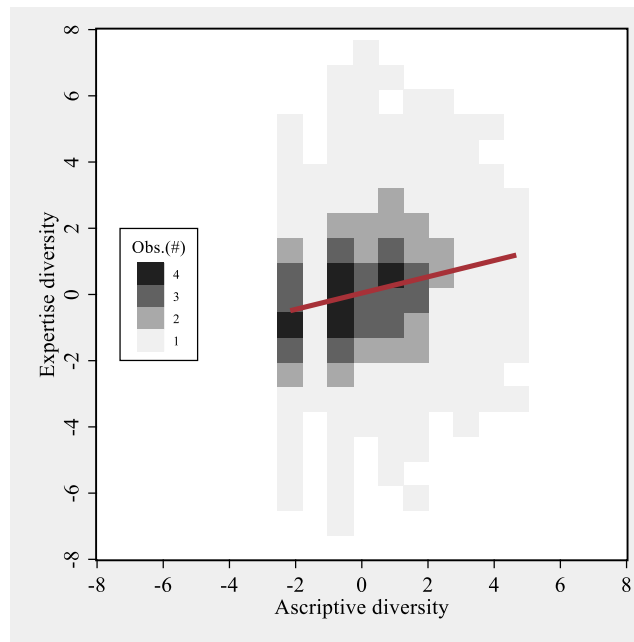
Variables	Ascriptive diversity		Ascriptive diversity		Ascriptive diversity		Gender diversity		Racial diversity	
	Model 7		Model 8		Model 9		Model 10		Model 11	
<i>Above aspiration</i> ^b	-0.24	(0.42)	-0.02	(0.41)			-0.02	(0.04)	0.01	(0.04)
<i>Below aspiration</i> ^b	-1.19**	(0.42)	-0.94**	(0.34)			-0.07*	(0.03)	-0.06	(0.04)
<i>Above historical aspiration</i>					-1.36	(0.97)				
<i>Below historical aspiration</i>					1.30	(1.13)				
<i>Above social aspiration</i>					1.15	(1.03)				
<i>Below social aspiration</i>					-2.14*	(1.07)				
<i>Expertise minority chairs</i>			-0.01	(0.01)	-0.01	(0.01)	-0.00	(0.00)	0.00	(0.00)
<i>Ascriptive minority chairs</i>			0.20**	(0.05)	0.20**	(0.05)	0.01*	(0.00)	0.02**	(0.01)
<i>Ascriptive minority CEO</i>			0.38**	(0.09)	0.38**	(0.09)	0.02	(0.01)	0.04**	(0.01)
<i>CEO-chair</i>			0.16*	(0.07)	0.16*	(0.06)	0.01	(0.01)	0.02*	(0.01)
<i>CEO succession</i>			-0.04	(0.03)	-0.04	(0.03)	-0.00	(0.00)	-0.00	(0.00)
<i>Organizational slack</i>			0.14*	(0.06)	0.13*	(0.06)	0.01	(0.01)	0.01+	(0.01)
<i>R&D intensity</i>			-0.07*	(0.03)	-0.07*	(0.03)	-0.00	(0.00)	-0.01*	(0.00)
<i>Interlocks</i>			0.02*	(0.01)	0.02*	(0.01)	0.00	(0.00)	0.00*	(0.00)
<i>Broad size</i>			-0.04	(0.20)	-0.06	(0.20)	-0.02	(0.02)	0.02	(0.02)
<i>Independent directors</i>			0.31*	(0.14)	0.31*	(0.13)	0.04*	(0.01)	0.01	(0.01)
<i>CEO-directors</i>			0.07	(0.06)	0.08	(0.06)	0.01+	(0.01)	-0.00	(0.01)
Constant	0.21**	(0.02)	-0.88*	(0.36)	-0.84*	(0.37)	0.13**	(0.04)	0.05	(0.04)
Observations	6,672		6,672		6,672		6,672		6,672	
AIC	13,657.98		13,460.15		13,452.90		-17,869.80		-16,570.78	
BIC	13,671.59		13,548.62		13,554.99		-17,781.33		-16,482.30	
F	3.94		6.44		6.21		3.18		5.11	
R ²	0.81		0.81		0.81		0.79		0.77	

^aFirm and industry × year fixed effects are included in all models. Standard errors are clustered by firm and industry × year.

^bBased on the grid search, we use $\alpha = 0.9$ and $\beta = 0.1$. This implies that the average performance of a firm’s competitors in the same industry gets a weight of 0.9 and the previous year’s performance of the firm gets a weight of 0.01 (= 0.1 × 0.1) and the previous year’s historical aspiration of the firm gets a weight of 0.09 (= 0.1 × 0.9).

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$, two-tailed test.

Figure 1. (Color online) Contour Binned Scatter Plot of Expertise and Ascriptive Diversity



Notes. To allow visual inspection and accounting for the differences in scales, *Expertise diversity* is binned in 20 buckets and *Ascriptive diversity* is binned in 10 buckets. Also, one extreme outlier of *Expertise diversity* (22.40) is removed from the scatterplot. Each point on the grid represents the mean number of observations in its respective bin. The solid line refers to linear regression line between *Expertise* and *Ascriptive diversity*. Pairwise correlation between *Expertise* and *Ascriptive diversity* is 0.22 ($p < 0.01$).

Table 7. Robustness Checks: Alternative Measurements of Expertise Diversity and Ascriptive Diversity^a

Variables	Expertise diversity (Herfindahl Index)		Ascriptive diversity (%)	
	Model 12		Model 13	
<i>Above aspiration</i>	0.44	(0.52)	−0.03	(0.40)
<i>Below aspiration</i>	0.95**	(0.34)	−0.68*	(0.33)
<i>Expertise minority chairs</i>	0.08**	(0.01)	−0.01	(0.01)
<i>Ascriptive minority chairs</i>	0.04	(0.06)	0.24**	(0.05)
<i>Ascriptive minority CEO</i>	−0.03	(0.12)	0.47**	(0.10)
<i>CEO-chair</i>	−0.08	(0.08)	0.17**	(0.06)
<i>CEO succession</i>	−0.01	(0.04)	−0.03	(0.03)
<i>Organizational slack</i>	0.03	(0.08)	0.13*	(0.06)
<i>R&D intensity</i>	−0.02	(0.05)	−0.06*	(0.03)
<i>Interlocks</i>	0.16**	(0.01)	0.01	(0.01)
<i>Broad size</i>	−0.95**	(0.26)	−0.14	(0.20)
<i>Independent directors</i>	0.10	(0.17)	0.27*	(0.13)
<i>CEO-directors</i>	−0.08	(0.08)	0.09	(0.06)
Constant	1.16*	(0.45)	−0.58	(0.36)
Observations	6,672		6,672	
AIC	16,780.80		13,086.57	
BIC	16,869.27		13,175.04	
F	26.18		7.34	
R ²	0.78		0.82	

^a*Firm* and *industry* × *year* fixed effects are included in all models. Standard errors are clustered by *firm* and *industry* × *year*.
 * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$, two-tailed test.

to attract experienced directors. In a supplementary analysis shared in online Appendix C, we find that performance below aspiration has no significant effect on the level of average age and industry tenure of the board members. Taken together, this set of analyses suggests that the asymmetrical effects of negative performance feedback on expertise and ascriptive diversity is not a result of mechanical correlation, but a firm’s purposeful response to performance downfall.

To further investigate the robustness of our results, we use a different operationalization of our diversity measures. First, instead of using cosine similarity to measure industry (functional) experience diversity, we calculated the extent to which each board member’s experience is concentrated in a certain industry (function), using the Herfindahl index. We then subtracted the index score from one so that a higher score captures the diversity in experience. Finally, we averaged the scores to measure the average level of diversity in board members’ industry (functional) experience. Each score was then standardized to create an alternative composite measure of board Expertise diversity (Herfindahl Index). Model 12 in Table 7 shows the results using this alternative measure and we continue to find that *Below aspiration* is positively associated with the level of board expertise diversity ($p < 0.05$).

Second, instead of using the Herfindahl index to measure gender and racial diversity, we used the fraction of women or racial minority directors on a board to check the robustness of our results. To derive a composite measure of *Ascriptive diversity* at the board

level, we again standardized each type of diversity and added the standardized scores. Model 13 in Table 7 shows the results. The effect of *Below aspiration* is negative and statistically significant ($p < 0.05$), continuing to support Hypothesis 2.

We theoretically developed and empirically tested our hypotheses at the board level because we were interested in understanding how board diversity changes in response to negative performance feedback. A part of such changes results from individual directors joining and leaving the focal board. We thus further investigated how these processes can impact expertise and ascriptive diversity by modeling the similarity between existing directors and either those who newly joined the board or those who left the board (online Appendix D). The results provide consistent support for our hypotheses. We find that *Below aspiration* is negatively associated with the functional similarity between the newly joined directors and the existing directors. We also find that *Below aspiration* is positively associated with similarity in industry experience between the directors who left the board and the remaining directors. Taken together, the results suggest that the boards of an underperforming firm appoint directors with dissimilar functional expertise while reducing the redundancy in industry expertise, a pattern consistent with Hypothesis 1. Similarly, exploring the relationship between the ascriptive diversity of the board and the individual director turnover, we find that *Below aspiration* is positively associated with the number of racial minority directors who

left the board. This set of findings provides additional support for Hypothesis 2, which argues that underperforming firms would reduce the level of ascriptive diversity in the boardroom.

Finally, board expertise diversity may also change by remaining directors' changes in expertise. To examine this, we recalculated *Expertise diversity* by only comparing the experience of board members who remained (online Appendix E). Again, we find that *Below aspiration* is positively associated with *Expertise diversity* in a statistically significant way. We also find that this is mostly driven by a positive association between *Below aspiration* and *Industry experience diversity*, suggesting that remaining board members either gain experience in new industries where their fellow members did not experience or cut down their experience in industries where their fellow board members already possess a wealth of experience.

Moderating Effect of Minority Chairs

In Table 8, Model 14 includes the interaction term between performance feedback and *Expertise minority chairs* to test Hypothesis 3(a), in which we predict that having expertise minorities as chairs further helps the board increase its level of *Expertise diversity*. The interaction between *Below aspiration* and *Expertise minority chairs* is positive but statistically insignificant. Hence, we do not find support for Hypothesis 3(a).

Table 8. Contingent Effect of Expertise Minority Chairs on Board Expertise Diversity (1998–2013; $N = 6,672$; 733 firms)^a

Variables	Expertise diversity	
	Model 14	
<i>Above aspiration</i>	0.76	(0.61)
<i>Below aspiration</i>	1.12**	(0.39)
<i>Above aspiration</i> × <i>Expertise minority chairs</i>	0.20	(0.27)
<i>Below aspiration</i> × <i>Expertise minority chairs</i>	0.30	(0.24)
<i>Expertise minority chairs</i>	0.17**	(0.02)
<i>Ascriptive minority chairs</i>	0.02	(0.05)
<i>Ascriptive minority CEO</i>	0.03	(0.13)
<i>CEO-chair</i>	−0.07	(0.07)
<i>CEO succession</i>	−0.00	(0.04)
<i>Organizational slack</i>	−0.10	(0.07)
<i>R&D intensity</i>	0.00	(0.05)
<i>Interlocks</i>	0.16**	(0.01)
<i>Broad size</i>	−1.02**	(0.24)
<i>Independent directors</i>	0.11	(0.16)
<i>CEO-directors</i>	0.01	(0.07)
Constant	1.49**	(0.41)
Observations	6,672	
AIC	16,936.58	
BIC	17,038.67	
F	34.32	
R ²	0.76	

^a*Firm* and *industry* × *year* fixed effects are included in all models. Standard errors are clustered by *firm* and *industry* × *year*.

⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$, two-tailed test.

In Table 9, Model 15 introduces the interaction term between *Below aspiration* and *Ascriptive minority chairs* to test Hypothesis 3(b). We predict that for firms that fail to meet their performance aspirations, having ascriptive minority chairs on important committees can mitigate the tendency to reconfigure the board with directors that are homogenous in terms of their gender and race. Consistent with our prediction, we find that the interaction between *Below aspiration* and *Ascriptive minority chairs* has a positive and statistically significant effect ($p < 0.05$). Figure 2 demonstrates the moderating effect of *Ascriptive minority chairs*. When an ascriptive minority director holds a chair position on one of the three key committees, the decrease in ascriptive diversity in the boardroom is mitigated, even when the firm's performance has fallen below its aspirations.

Models 16 and 17 in Table 9 test Hypothesis 3(b) on each subdimension of *Ascriptive diversity*. In both models, we first find that the simple term of *Below aspiration* has a negative and statistically significant effect ($p < 0.05$), supporting Hypothesis 3(b). In Model 16, we find no statistically significant moderating effect of *Ascriptive minority chair* on *Gender diversity*. In Model 17, we find a positive and statistically significant moderating effect of *Ascriptive minority chair* on *Racial diversity* ($p < 0.05$), supporting Hypothesis 3(b). We also find that the simple effect of *Below aspiration* is negative and statistically significant ($p < 0.05$). The findings suggest that for boards without ascriptive minority chairs, negative performance feedback is associated with a reduced level of racial diversity, lending additional support to Hypothesis 2.

Discussion

Performance feedback theory (Cyert and March 1963) has been the focus of considerable research with a wide range of evidence supporting the theory's implications. As Posen et al. (2018) noted, around 250 studies have explored what firms do when their performance fails to meet their aspirations. Despite the wealth of research, the majority of this work has focused on the impact of negative performance feedback on various dimensions of firms' strategic change. In doing so, previous studies on problemistic search have implicitly assumed that, despite negative performance feedback, the body that formulates, implements, and oversees strategic changes remains the same. This is surprising because performance feedback theory was built on a foundation where firms' strategic decisions are made by a collection of groups, or what Cyert and March (1963) call coalitions. Recognizing this lack of attention to the board, Argote and Greve (2007) emphasized that investigating how groups, such as boards of directors, react to negative

Table 9. Contingent Effect Ascriptive Minority Chairs on Board Ascriptive Diversity (1998–2013; $N = 6,672, 733$ firms)^a

Variables	Ascriptive diversity		Gender diversity		Racial diversity	
	Model 15		Model 16		Model 17	
<i>Above aspiration</i>	0.15	(0.46)	-0.01	(0.05)	0.03	(0.04)
<i>Below aspiration</i>	-1.27**	(0.39)	-0.08*	(0.04)	-0.11*	(0.04)
<i>Above aspiration</i> × <i>Ascriptive minority chairs</i>	-0.58	(0.64)	-0.03	(0.06)	-0.05	(0.07)
<i>Below aspiration</i> × <i>Ascriptive minority chairs</i>	1.35*	(0.66)	0.01	(0.06)	0.19*	(0.08)
<i>Expertise minority chairs</i>	-0.01	(0.01)	-0.00	(0.00)	0.00	(0.00)
<i>Ascriptive minority chairs</i>	0.18**	(0.05)	0.01*	(0.01)	0.02**	(0.01)
<i>Ascriptive minority CEO</i>	0.38**	(0.09)	0.02	(0.01)	0.04**	(0.01)
<i>CEO-chair</i>	0.16*	(0.07)	0.01	(0.01)	0.02*	(0.01)
<i>CEO succession</i>	-0.04	(0.03)	-0.00	(0.00)	-0.00	(0.00)
<i>Organizational slack</i>	0.14*	(0.06)	0.01	(0.01)	0.01+	(0.01)
<i>R&D intensity</i>	-0.06*	(0.02)	-0.00	(0.00)	-0.00*	(0.00)
<i>Interlocks</i>	0.02*	(0.01)	0.00	(0.00)	0.00*	(0.00)
<i>Broad size</i>	-0.06	(0.20)	-0.02	(0.02)	0.02	(0.02)
<i>Independent directors</i>	0.33*	(0.13)	0.04**	(0.01)	0.01	(0.01)
<i>CEO-directors</i>	0.08	(0.06)	0.01+	(0.01)	-0.00	(0.01)
Constant	-0.86*	(0.36)	0.13**	(0.04)	0.05	(0.04)
Observations	6,672		6,672		6,672	
AIC	13,450.51		-17,866.61		-16,586.90	
BIC	13,552.59		-17,764.52		-16,484.81	
F	6.53		2.84		5.06	
R ²	0.81		0.79		0.77	

^aFirm and industry × year fixed effects are included in all models. Standard errors are clustered by firm and industry × year.

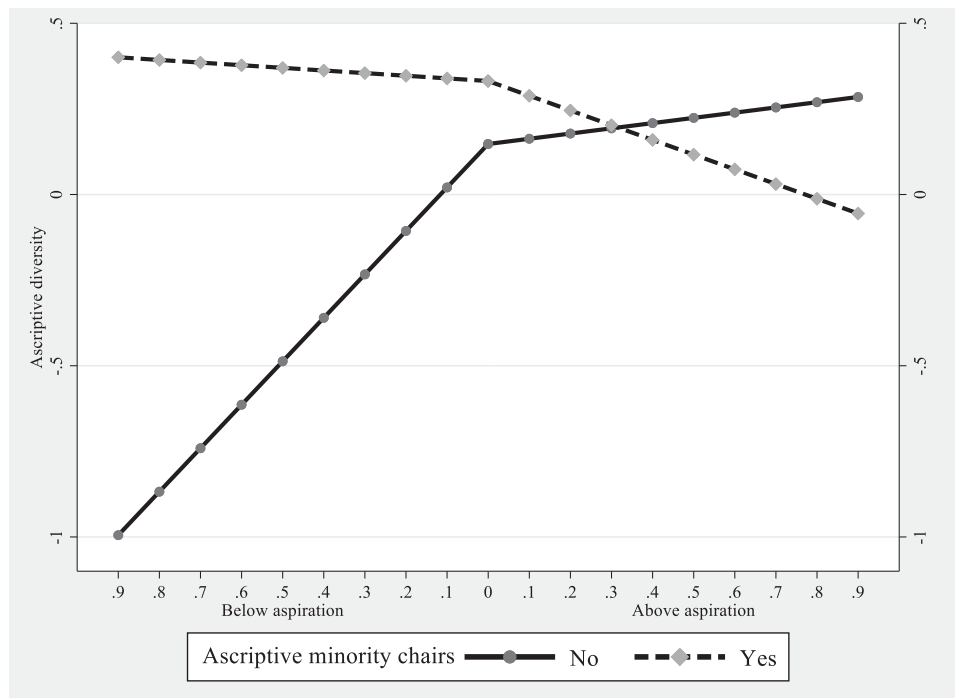
+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$, two-tailed test.

performance feedback is needed (see also Gavetti et al. 2012, Greve and Gaba 2017). Considering the role of the board in strategic changes, which is well recognized in the corporate governance literature, we examined how boards change in response to negative

performance feedback. This has allowed us to make the following theoretical contributions.

First, we showed that changes in expertise diversity and ascriptive diversity of a board differ in response to negative performance feedback. Our theory suggests

Figure 2. Contingent Marginal Effects of Performance Feedback on Ascriptive Diversity (Hypothesis 3(b))



Note. Marginal effects are calculated based on the estimates from Model 15 in Table 9.

that different tendencies emerge due to two motivations of a problemistic search; that is, the need to seek strategic alternatives and the need to build a prompt consensus in the boardroom. We found that the board of underperforming firms becomes more diverse in terms of their expertise, especially regarding industry and board experience among directors. We conjecture that the boards of underperforming firms seek new director expertise in diverse industries to generate insights into strategic challenges at the corporate level (e.g., where to compete across different industries) rather than seek expertise related to different functional experiences, which is more closely related to strategic challenges at the individual business-unit level (e.g., how to compete in a given industry). Underperforming firms are averse to having an ascriptively diverse board, both in terms of gender and race. Negative performance feedback provides a situational and internal trigger for the board to form a more ascriptively homogeneous board, which, in most cases in the United States, is heavily represented by white male directors.

It is worth noting that the latter finding—that is, underperforming firms tend to reduce ascriptive diversity—stands in contrast to the economics of discrimination (Becker 1957, Arrow 1998), where intense competition in the market is theorized to prevent firms from discriminating against people based on ascriptive backgrounds that are unrelated to productivity. Insofar as a firm's underperformance arises from intense market competition, the economics of discrimination predicts that the ascriptive diversity of the board should increase, rather than decrease, as we predicted. Consistent with this theory, Zhang (2019), for instance, showed that racial bias in team selection diminishes when National Basketball Association (NBA) teams underperform.

An important consideration that distinguishes our theory from the economics of discrimination is that the board of directors engages in highly uncertain and nonroutine tasks of making strategic decisions where individuals' productivity is difficult to ascertain; for example, whether to replace the CEO or whether to initiate and approve acquisitions and alliances. The performance consequences of these decisions are not so straightforward and often debatable. The collective dynamics of the board also raise questions regarding the foundation of the economics of discrimination; namely, that ascriptive backgrounds are largely exogenous to the productivity of potential employees. In the context of boards of directors, ascriptive similarity helps directors to trust one another and thus help them coordinate and build consensus quickly. In this sense, ascriptive similarity is integral to the board's collective work.

Second, we also contribute to performance feedback theory and the board diversity literature by considering

the role of committee chairs. Research has long acknowledged that power and politics of the top decision makers influence a firm's strategic decision making (Pfeffer 1981, Finkelstein 1992, Haynes and Hillman 2010). Recently, research has started to pay closer attention to the role of powerful coalitions, which affect the strategy of a firm through the alignment of the firm's strategic choices with the collective beliefs and preferences of the coalition (Gaba and Joseph 2013, Zhang and Greve 2019). However, despite their substantial influence committee chairs are rarely explored in the performance feedback literature (Bunderson 2003, Van der Vegt et al. 2010, Triana et al. 2014). We argue that the presence of expertise or ascriptive minority chairs on the board moderates a board's tendency to seek or avoid diversity in response to negative performance feedback. We found that this moderating hypothesis based on the power of chairs who lead key committees is valid only in the case of ascriptive minority chairs.

The lack of support for the moderating hypothesis regarding expertise minority chairs (Hypothesis 3(a)) may be attributable to the different levels of conflict and intergroup bias brought about by different dimensions of diversity. Differences in expertise may be seen as less conflictual than differences in visible and less permeable characteristics such as race or gender. For example, changes in the level of ascriptive diversity on the board require changes in the list of board members, which may cause more conflict and tension. This is not true for expertise diversity, which can be changed without removing old or adding new members. Therefore, changes in the diversity of expertise may be less politicized, leading expertise minority chairs to play a limited role in the process.

Finally, the present study extends corporate governance literature by considering negative performance as an antecedent of board diversity. Although the literature on board diversity has its well-established traditions (e.g., Hillman et al. 2000, Carter et al. 2003), theoretical accounts of the antecedents in board diversity remain incomplete. Scholarship has been more focused on the effects of regulatory or institutional pressure that mandates a higher level of diversity from outside the firm (e.g., Ahern and Dittmar 2012) and found mixed results on the intended performance increase (Erhardt et al. 2003, Adams and Ferreira 2009, Miller and Triana 2009, Post and Byron 2015). The present work instead focuses on the drivers of board diversity and unveils a motivational source internal to the firm: negative performance feedback. This theoretical departure allows us to distinguish the contrasting effects of negative firm performance on board diversity with the expertise and ascriptive backgrounds of directors (Ridgeway 1991, Jehn et al. 1999, Jung et al. 2017). In particular, our study offers

alternative insights into why it is difficult to achieve ascriptive diversity in the corporate boardroom (Carter et al. 2003, Groysberg and Bell 2013, Post and Byron 2015, Chang et al. 2019).

This is a meaningful and timely finding, given the current growing calls to improve gender and racial minority representation on boards (Creary et al. 2019). In fact, when GE reshuffled its board in response to underperformance, the company spokesperson stated that the outspoken goal of board change was to “use future refreshment opportunities to enhance that diversity” (Gryta and Lublin 2018). Although the experience of the board became more diverse as planned, the gender and racial makeup of the board became more homogeneous. This should be surprising given that ascriptive minority directors, in general, have different expertise from white male directors (Hillman et al. 2002). Increasing expertise diversity does not have to come at an expense of ascriptive diversity (for example, see Figure 1). Our study suggests that firms’ underperformance can drive out female or racial minority directors from the boardroom, allowing the firm to deviate from the institutional call for more equitable representation of ascriptive minority directors on the board. This work is a first step toward addressing the more nuanced nature of diversity management in the corporate boardroom and we hope our theory and empirical findings start a conversation for future research.

Limitations and Future Research

This paper has several limitations that create important opportunities for future research. First, we theorize that negative performance feedback motivates a firm to decrease board ascriptive diversity in response to the need to build consensus while prioritizing performance-related goals. However, the influence of negative performance feedback may vary across different industries. Prior studies have shown that some industries may benefit more from gender diversity due to the characteristics of their product market strategies and their consumer base (Hambrick et al. 1996, Joshi and Roh 2009). Rather than exploring the contextual sources of variation across different industries, we were more interested in the general processes of how negative performance feedback reshapes the board. This led us to use a more stringent level of fixed effects that remove industry-specific yearly trends of board diversity. Exploring the more contextual factors that amplify or mitigate the two motivations underlying the problemistic search that we document in this paper—such as industry or country variations (Zhang 2020) or the nature of change in a firm’s external environment—might be an interesting avenue for future research.

Second, although our parallel predictions on two different types of board diversity and multiple empirical approaches to test our hypotheses make a simple endogeneity concern less plausible, we were not able to fully address the endogeneity concern. In fact, it is an especially challenging task, considering the multifaceted sources of performance feedback and its behavioral consequences. Whereas the accumulation of a large body of evidence supports the importance of performance feedback, future research may focus on devising an empirical design that can address the potential endogeneity concerns and establish a stronger causality in mechanisms underlying our hypotheses.

Third, we focused on the ramifications of receiving negative performance feedback, rather than managerial attention that shifts between historical and social aspiration levels. Accordingly, we used a weighted average between the two sources of aspiration levels. Indeed, numerous studies in the performance feedback literature have used this approach, which is “justified contextually and determined endogenously from the data” (Greve and Gaba 2017, p. 8). Although “there is no agreement yet on how decision makers select and weigh these aspirations” (Greve and Gaba 2017, p. 10), our choice of using a weighted average—which yields a better model fit than does separating the two aspiration levels—is also theoretically justified, as our theory does not distinguish the sources of threat between the two aspiration levels. However, when we further tested our model using the two separate aspirations, we found a differential effect between social and historical aspirations—that is, performance compared with historical aspiration is related to expertise diversity, whereas performance compared with social aspiration is related to ascriptive diversity. We believe this finding can open new avenues of interesting research. For example, it would be worthwhile to address the differences in the social-psychological processes that arise from the two sources of performance feedback. This includes exploring what historical or social aspiration means to boards and whether failure to meet each aspiration imposes the same intensity of pressure on implementing strategic changes.

Fourth, we would like to caution against a simple interpretation of our findings on board diversity, viewing them as unanimous evidence of gender or racial discrimination across different industries. In our context of U.S. large firms, where white males are the majority ascriptive background, the tendency to decrease ascriptive diversity will inevitably yield discrimination against women and nonwhite minorities. Nevertheless, if we consider a context where white males are not the majority, for example, in the beauty industries or professional basketball, the tendency to avoid ascriptive diversity may indicate greater inclusion of women and racial minorities. However, even

in such a context where women and racial minorities take the majority, the effect may be weaker, because the bias against a traditional dominant group (white men) tends to be weaker than the bias against a traditional minority group (women and racial minorities). In this regard, it is important to consider contextual factors to fully understand how the negative performance feedback is associated with gender and racial bias (Leigh and Melwani 2019).

Finally, we focused on the process of change that occurs in the boardroom in response to negative performance feedback. Given this emphasis, we did not address such questions as to whether a board with diverse expertise or homogenous ascriptive backgrounds can recover from performance shortfalls more effectively or develop competitive advantages more quickly. These issues were beyond the scope of our current endeavor since our main interest was to investigate whether negative performance feedback motivates a board to enhance its expertise and ascriptive diversity. We do not assume that a board's tendency to pursue diversity just among themselves is a rational decision or even a road to success. Rather, we draw on the social-psychological tendency that when a board faces a threat it tends to seek alternatives and to value trust and solidarity to build a prompt consensus around the new strategic directions. These mechanisms could be disentangled in future studies to identify the extent to which the board's efforts to reshape different dimensions of diversity indeed address a firm's underperformance.

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Endnotes

¹ We conducted focused interviews (Merton and Kendall 1946, Weiss 1995) to further corroborate the understanding of the board dynamics that we obtained from prior literature and that are not directly observable through large empirical investigations. To do so, using the authors' personal networks, we approached three directors with varying amounts of experience from a first-time director to a long-time chair from large U.S. listed manufacturing firms. We spent an hour to an hour and a half with a set of prespecified questions that were shared with the directors. We thank our anonymous reviewers for encouraging us with this helpful suggestion.

² Although ISS/RiskMetrics is one of the most widely used databases for board research due to its wider coverage, it is known to contain some inconsistencies. For example, the database has

identified different directors with the same or a similar name with a common unique identifier or assigned multiple unique identifiers to the same director at different companies or at different points in time. Given that we measured board characteristics on each board every year, these inconsistencies in assigning unique identifiers did not pose serious issues in our measurement. Nevertheless, we extensively cleaned ISS/RiskMetrics by using a method similar to Chu and Davis (2016). Specifically, we used company and director names, director birth year, director board lists, and company director lists to match directors with similar characteristics. When an exact match was not found, we used fuzzy match. Thereafter, one of the authors and a research assistant independently researched the fuzzy matches to determine a match. Whenever inconsistencies were found in our work, we gathered additional information about the directors through a web search to determine a match.

³ We acknowledge that one limitation of drawing on such data are that it captures race based on perceived race rather than directors' self-identification. This approach, nevertheless, is adopted in prior works using secondary field data to capture directors' race/ethnicity (Hillman et al. 2002, Miller and Triana 2009, Zhu et al. 2014) and is appropriate for our purpose where intergroup boundaries are socially defined regardless of people's self-identification.

⁴ We used the major division, the highest level of the industry classification of SIC codes. The specific categorization we used is as follows: agriculture, forestry, and fishing (01–09), mining (10–14), construction (15–17), manufacturing (20–39), transportation, communications, electric, gas, and sanitary services (40–49), wholesale (50–51), retail (52–59), finance, insurance, and real estate (60–67), services (70–89), and nonclassifiable (99). The motivation for this categorization was twofold. First, we aim to account for the relatedness between industry experiences. A more fine-grained classification such as two-digit SIC code approach will overestimate the dissimilarity between any two related industries that share similar knowledge and expertise. For example, using the two-digit SIC code approach, the experience in SIC codes 22 (textile) and 23 (apparel) will be treated as equally dissimilar as the experiences in SIC codes 22 (textile) and 61 (banking). Aggregating industry experience to the higher level helps us alleviate this overestimation. Second, directors are unlikely to hold simultaneous directorships in competing firms. Aggregating industry experiences to a higher level helps us avoid undercounting the similarity in directors' experience due to this restriction.

⁵ We were not able to find work histories of all the directors in BoardEx. When work histories were unavailable, we considered this to be missing and removed these directors when measuring functional diversity.

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