Shine Bright Like a Diamond: When Signaling Creates Glass Cliffs for Female Executives

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Shine Bright Like a Diamond:

When Signaling Creates Glass Cliffs for Female Executives

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WHEN SIGNALING CREATES GLASS CLIFFS FOR FEMALE EXECUTIVES

Abstract

There is mixed support for the glass cliff hypothesis that firms will more likely appoint female candidates into top management positions when in crisis. We trace the inconsistent findings back to an underdeveloped theoretical link and deficient identification strategies. Using signaling theory, we suggest that crisis firms appoint female top managers to signal change to the market, and argue that the effect is context-dependent. In a field study of 26,156 executive appointments in US firms between 2000 and 2016, we exploit a regression discontinuity to test for the causal impact of firm crisis status on the likelihood of female top management appointments and for moderators of the effect. We find that crisis status leads to a significant increase in female top management appointments, and that crisis (vs. non-crisis) firms are more likely to frame female appointments as change-related in press releases. Importantly, the presence of the glass cliff effect hinges on attributes of the signaler (absence of another female executive), signal (appointment type), and receiver (investor attention). The findings robustly evidence the glass cliff and our theoretical extensions.

Keywords: Glass cliff, gender, organizational crisis, top management, regression discontinuity

Top management teams (TMTs) at most companies worldwide are male-dominated (Dezső, Ross, & Uribe, 2016), with female underrepresentation relatively intractable despite increased recent focus (Jeong & Harrison, 2017). Given the small, stagnating share of women at the top, research has explored barriers to mobility (Fernandez-Mateo & Fernandez, 2016; Helfat, Harris, & Wolfson, 2006) but devoted less attention to the nature of top-level positions women take. In particular, while social psychologists have probed the possibility that companies in crisis will more likely appoint women to executive positions (Ryan & Haslam, 2007), this glass cliff hypothesis has received less attention in management research. If the glass cliff exists, women would be relatively more likely than men to occupy risky executive positions set up for failure (Cook & Glass, 2014).

Anecdotal evidence appears to support the glass cliff hypothesis. Prominent cases include Anne Mulcahy, promoted to chief executive officer (CEO) with Xerox on the brink of bankruptcy, and Marissa Mayer, who became Yahoo's first female chief executive when the internet giant was badly struggling (for more examples, see Ryan et al., 2016). However, evidence beyond single cases is much less consistent (Dwivedi, Joshi, & Misangyi, 2018). Field studies examining the occurrence of the glass cliff in executive staffing have reported some supportive (e.g., Cook & Glass, 2014; Mulcahy & Linehan, 2014) and some contradictory evidence (e.g., Adams, Gupta, & Leeth, 2009; Bechtoldt, Bannier, & Rock, 2019). Similarly, a recent meta-analysis revealed no robust evidence for glass cliffs in the management domain, with substantial heterogeneity in effect sizes across studies (Morgenroth, Kirby, Ryan, & Sudkämper, 2020). These inconsistent findings fuel heated debate: some experts argue the glass cliff is more of a myth than a real phenomenon (Bechtoldt et al., 2019) but proponents contend it "is a real and reasonably pervasive phenomenon" (Ryan et al., 2016: 449).

We argue that an extended theoretical perspective and a rigorous empirical strategy are required to explain inconsistent effects and advance the glass cliff debate. Theoretically, many field studies on the glass cliff have been more descriptive (*do glass cliffs exist?*) than explanatory (*when and how do glass cliffs occur?*). The few explanatory works often involve scenario experiments with lower external validity, and focus on the role of gender and leadership stereotypes (Eagly & Karau, 2002; Heilman, 2001). The results suggest that female leaders are stereotypically seen to possess a behavioral advantage over male colleagues in leading crisis firms because of ascribed emotional sensitivity and relational style ("think crisis—think female": Ryan, Haslam, Hersby, & Bongiorno, 2011). Yet a recent meta-analysis concluded that its finding "does not support the notion that the glass cliff occurs because stereotypically feminine qualities are seen as useful in times of crisis" (Morgenroth et al., 2020: 822).

We take a different route by attributing glass cliffs not to the ascribed behavioral advantage of women in leading crisis firms but rather to the symbolic value of female appointments under crisis. Based on signaling theory (Connelly, Certo, Ireland, & Reutzel, 2011; Spence, 2002) we suggest that, regardless of whether female leaders are perceived to have a behavioral advantage in leading crisis firms (i.e., think crisis—think female), appointing a female executive sends a change signal that investors value for firms facing crises. This signaling rationale was mentioned in early glass cliff work (Ryan & Haslam, 2007) but remains underdeveloped and has untapped potential for understanding inconsistent findings.

Based on signaling theory's core rationale (Spence, 2002), that actors consider the symbolic value of their decisions, we suggest that under clearly defined conditions, crisis firms may appoint females to signal change to investors. Female executive appointments generally signal forward-thinking and a willingness to break with long-held practices (Miller & Triana, 2009)—characteristics that might otherwise be unclear or invisible to the market.

Signaling theory suggests that signaling decisions are shaped by the nature of the signaler, signal, and receiver (Connelly et al., 2011; Gomulya & Mishina, 2017). We theorize that all three facets determine if a female executive appointment is an attractive signal for a firm. The presence/absence of other female executives before the focal appointment should be a central characteristic of the signaler. We assume that appointment type (i.e., insider vs. outsider) is an aspect of the signal itself; and we categorize investors' level of attention toward the firm as a receiver-related factor. Based on signaling theory's core tenets, we theorize that the signaling value of female crisis appointments is most pronounced (i.e., glass cliffs most likely) for firms with no existing female top managers, for insider appointments, and for firms receiving high investor attention.

Empirical limitations may further explain inconsistent results as past glass cliff studies left a potential endogeneity bias mostly unaddressed. In particular, omitted variables and reverse causality might have led to erroneous conclusions (Hill, Johnson, Greco, O'Boyle, & Walter, 2021). Most notably, a firm's crisis is likely endogenous to the appointed executive's gender: a firm's financial state possibly correlates with many unobserved confounding variables (e.g., firm culture, industry norms, predecessor network) also affecting the likelihood of female appointments. Consequently, these omitted variables likely bias the correlation between firm crisis and likelihood of female appointments. Moreover, the estimated correlation might be affected by reverse causality if gender diversity in the TMT affects the firm's financial health (Dezsö & Ross, 2012). Ignoring such issues leads to estimates without a causal interpretation that are higher/lower than or in the opposite direction to the true estimate; the bias may vary widely across studies. For a clean causal interpretation, crisis status must be randomly assigned to companies—impossible in a field setting. To address this randomization problem, we rely on a quasi-experimental regression discontinuity design that exploits random variance in crisis status assignment (Lee &

Lemieux, 2010). We employ this identification strategy in a large self-constructed dataset of 26,156 executive turnovers from 2000 to 2016 in the United States. Moreover, we content analyze press releases on executive appointments for change-related language, aiming to capture the theorized signaling rationale of crisis appointments.

The study contributes to research in three notable ways. First, by integrating economic signaling theory (Spence, 2002) into the social psychology domain of glass cliff research, we gain more holistic understanding of the glass cliff. While Ryan and Haslam's (2007) seminal theorizing on glass cliffs identified the potential relevance of signaling efforts, they neglected core assumptions of signaling theory and their perspective has received scant empirical attention (for a recent scenario study, see Kulich, Lorenzi-Cioldi, Iacoviello, Faniko, & Ryan, 2015). By directly considering signaling theory, our work spotlights neglected moderators of the glass cliff and answers calls for context-sensitivity (Morgenroth et al., 2020; Ryan & Haslam, 2009).

Second, the study contributes to research on gender and upper echelons by delineating how and when the executive's gender might signal the firm's quality under crisis. Following Connelly et al.'s (2011) call to improve understanding of management phenomena by considering signaling, we move beyond the dominant behavioral perspective in upper echelons research (i.e., upper echelons theory; Finkelstein, Hambrick, & Cannella, 2009; Hambrick & Mason, 1984). Traditional upper echelons research emphasizes the effect of executive gender on strategic decisions and firm performance (Dezsö & Ross, 2012; Jeong & Harrison, 2017). We theorize on the symbolic value of leader gender, independent of actual leader behaviors, as an alternative to the behavioral perspective and elaborate on potential boundary conditions of the signaling effect. By considering the signaling value of executive gender and the three key components of signaling decisions (signaler, signal, receiver) as contextual factors, we also enrich the executive signaling literature, which has so far focused on the signaling function of experience and qualification (e.g., Gomulya, Wong, Ormiston, & Boeker, 2017; Zhang & Wiersema, 2009) and rarely tested all key components of signaling in one model.

Last, our study answers recent calls for more rigorous causal evidence in management research (Hill et al., 2021; Semadeni, Withers, & Trevis Certo, 2014) and leadership research (Adams, 2016; Antonakis, Bendahan, Jacquart, & Lalive, 2010). Leading researchers have encouraged more use of natural experiments, such as regression discontinuity designs, to establish causal effects in field settings. Regression discontinuity designs have a long tradition in economics and related disciplines, and come closest to the gold standard of randomized experiments (Lee & Lemieux, 2010). Our study aims to inspire natural experiments to answer theoretically relevant causal questions in leadership and diversity research.

THEORY AND HYPOTHESES

The basic tenet of the glass cliff hypothesis is that firms will more likely appoint women to executive positions when in crisis (Ryan & Haslam, 2007), defined "as any form of dramatic reductions in financial and/or reputational well-being that has an adverse bearing on the perceived state of the organization" (p. 553). While some recent studies have moved away from this rigid definition and considered any drop in company performance as the stimulus for a glass cliff (e.g., Adams et al., 2009; Cook & Glass, 2014), we return to the original crisis conceptualization based on the theoretical reasoning that only a strong crisis pushes companies to incur the costs of signaling and fundamentally alter the long-held practice of male executive appointments. We thus define crisis status as a company's dramatically and unambiguously weak financial reputation.

While early research pointed to a myriad of mechanisms that may create glass cliffs (Ryan & Haslam, 2007), most theoretical work focuses on gender and leadership stereotypes as the central force (Bruckmüller & Branscombe, 2010; Cook & Glass, 2014; Ryan, Haslam, Hersby, & Bongiorno, 2011). Based on gender and leadership stereotypes studies (Heilman, 2001; Schein, 1973), glass cliff researchers argue that stereotypical male traits are generally in line with ideas about successful leadership, whereas presumed female traits tend to be incompatible with the successful leader prototype, resulting in a bias toward male leadership. Extending this role (in-)congruency argument, they suggest that the conception of a good leader changes under crisis because greater emotional sensitivity and interpersonal skills are required to make difficult personal decisions (Cook & Glass, 2014; Ryan & Haslam, 2007). Female leaders with ascribed communal attributes are thus seen as more capable in times of crisis than men with ascribed agentic qualities (Bruckmüller & Branscombe, 2010; Cook & Glass, 2014).

We do not challenge the robust evidence on gender and leadership stereotypes and their discriminatory effect in hiring and promotion decisions (Cheung et al., 2016; Colella, Hebl, & King, 2017; Koenig, Eagly, Mitchell, & Ristikari, 2011); rather, we argue that the stereotyping logic may not fully explain the glass cliff phenomenon. In this context, the stereotyping mechanism rests on the idea that female leaders are appointed under crisis because their leader behavior is believed to enhance company performance. Even if we assume that the hiring committee may be subject to gendered leadership stereotypes, it seems unlikely that one woman with her perceived crisis leadership competences would be expected to single-handedly steer a company out of crisis. Morgenroth et al.'s (2020) meta-analysis further substantiates the incompleteness of stereotyping arguments in explaining the glass cliff. Finding that other disadvantaged groups for which female stereotypes do not exist (e.g., Black and Asian Americans) are appointed onto glass cliffs, the authors concluded that the stereotyping mechanism is not the only driver of glass cliffs (Morgenroth et al., 2020).

A plausible alternative is that female leaders are selected because appointing females to upper echelons increases a firm's value by altering market expectations of its willingness to change (Miller & Triana, 2009) and not because of the stereotypical conviction that female leader behavior increases firm performance. We suggest that the signaling aspect of a female appointment plays a key role in creating glass cliffs. Emerging research generally supports the relevance of signaling in top management contexts where stakeholders infer firm quality from the characteristics of board members or top managers (Certo, 2003; Zhang & Wiersema, 2009). Yet signaling logic has been largely neglected and remains underdeveloped in the context of female executive appointments. Moreover, the few studies touching on signaling logic in this context (e.g., Miller & Triana, 2009; Ryan & Haslam, 2007) neglect the role of the signaler, signal, and receiver as core aspects of signaling theory (Bergh, Connelly, Ketchen, & Shannon, 2014; Connelly et al., 2011). Thus, developing the signaling logic presents an opportunity for theory-guided inspection of potential moderators of glass cliffs, enabling more nuanced, contextualized predictions for when glass cliffs occur.

Signaling Through Glass Cliff Appointments

Companies in crisis may appoint a female executive to signal to investors their willingness to change. The incentives for sending positive signals include influencing stock performance, facilitating the provision of financial resources by capital markets, and enabling more time to reorganize (Kulich et al., 2015; Ndofor & Levitas, 2004). Female appointments signal a change from entrenched male status structures to forward-thinking and sensitivity to evolving social norms, which might be inconsistent with commitment to the status quo.

Using a top manager's gender to shape evaluations of a struggling firm is well-aligned with tenets of signaling theory (Connelly et al., 2011), which focuses on information asymmetry between two parties (Spence, 2002) and explains why parties (e.g., companies) deliberately communicate information to stress positive attributes. Observers find it difficult to ascertain a crisis firm's recovery prospects because of incomplete information about internal operations, the industriousness of management and employees, and reorganization efforts; by contrast, managers have better access to such information (Cohen & Dean, 2005; Xia, Dawley, Jiang, Ma, & Boal, 2016). This creates an information asymmetry in which observers (e.g., investors) use visible cues to make inferences about the firm's unobservable attributes (e.g., change efforts); thus, the company can use signals to indicate maximum commitment to getting back on track (Gangloff, Connelly, & Shook, 2016).

Signaling theory conceptualizes effective signals as those that are *observable* by the relevant receiver and *costly* to imitate for a sender without the underlying quality (Bergh et al., 2014; Certo, 2003; Spence, 2002). Accordingly, a signal is relatively more attractive for signalers with (vs. those without) the underlying quality (Bergh et al., 2014).

Transferring the general logic of signal observability and signaling costs to the context of executive appointments under crisis, we suggest that female leader appointments are effective change signals: First, an executive's gender can be readily observed, and female executive appointments more often receive media coverage than do male executive appointments (Gaughan & Smith, 2016; Lee & James, 2007). Second, appointing a female executive is more costly for firms that internally want to keep the status quo than for firms committed to fundamental change. The higher cost of female appointments for change-reluctant firms is substantiated by research on identity concerns in economic decision-making (Akerlof & Kranton, 2005; Akerlof & Kranton, 2010). Studies have shown that the dominant male majority in executive suites resists female executive appointments and tends to enact exclusionary strategies (Dezső et al., 2016; Knippen, Shen, & Zhu, 2019; Zhu, Shen, & Hillman, 2014). Thus, for companies unwilling to break entrenched status structures, a female appointment is particularly costly as it counters the internal norm of status quo preservation; for change-willing firms, by contrast, internal norm violation is less pronounced.

It may also be more difficult to hire a suitable female candidate who anticipates her window-dressing function, particularly where executives are required to hold shares in the company, entailing personal financial commitment and, thus, financial risk (Korczak & Liu, 2014). Moreover, where women detect that the hiring firm is unwilling to change, they may demand higher compensation because of the difficulties in leading such a company (for a similar argument linking executive risk to compensation, see Hermalin & Weisbach, 2012). By contrast, a change-willing company may find it easier to hire a female leader and without high upfront compensation, as the female candidates may see better long-term prospects for the company. In sum, appointing a female executive can be seen as a credible signal to investors that the company is actively dealing with the crisis and radically deviating from the status quo (Kulich et al., 2015; Ryan & Haslam, 2007).

In glass cliff studies, initial evidence suggests the importance of signaling. In a recent scenario experiment, Kulich et al. (2015) found that crisis firms' preference for female leadership candidates is grounded in their potential to communicate change. In line with the theoretical arguments outlined above, we propose:

Hypothesis 1: Firms in crisis status are more likely to appoint female top managers.

Moderators of Glass Cliff Appointments

While crisis status might increase the likelihood of female appointments as a signaling effort, the decision to signal plausibly has multiple determinants. As Connelly et al. (2011) argue, more accurate understanding of signaling decisions requires consideration of the signaler, signal, and receiver (see also Gomulya & Boeker, 2014). In our study, the presence of other female executives before the focal appointment is a signaler characteristic, the appointment type (insider vs. outsider) is an aspect of the signal, and the level of investors' attention toward the firm represents the receiver's role. As we outline below, all three components might shape a crisis firm's decision to signal change through appointing females.

The signaler. We argue that the existing presence of one or more women in top management is a central attribute of the signaler (i.e., the crisis firm) that influences the incentive to appoint a female executive in response to a crisis. In general, appointing a woman into a top executive position can attract favorable attention for the firm (Kanter, 1977; Wright, Ferris, Hiller, & Kroll, 1995). Yet given the costs underlying a signaling effort, the firm considers the expected utility of a signal before deciding whether to make it (Bergh et al., 2014; Ndofor & Levitas, 2004). Specifically, crisis firms may perceive that female appointments have only marginal signaling value when there are already one or more female executives. In such a scenario, appointing a female executive is no longer a notable and costly deviation from the status quo. Moreover, this signal may have lost credibility as the first female appointment did not generate change or prevent the firm slipping into crisis. Indeed, Dezső et al. (2016: 100) note that "while firms gain legitimacy from having women in top management, the marginal value of this legitimacy declines with each woman." Accordingly, we propose:

Hypothesis 2. The existing presence of female top managers moderates the positive effect of crisis status on the subsequent appointment of female top managers, such that the effect is only present for firms with no female top managers.

The signal. The availability of alternative signals may also influence a company's decision to appoint a female executive as a viable signal. Beyond a successor's gender, another particularly powerful signal in executive appointments—receiving wide attention in past research—is successor origin (Connelly, Ketchen, Gangloff, & Shook, 2016; Gangloff et al., 2016). Friedman and Singh (1989: 726) even contend that successor origin conveys "the clearest signal among the messages implicit in succession."

We suggest that appointing an outsider is a relevant change signal, although this is unlikely to co-occur with a female appointment as a change signal. In general, past signaling research acknowledges that firms aim to send consistent and reinforcing signals (Connelly et al., 2011); hence, one may expect that crisis companies opt for the strongest change signal possible by appointing a female outsider. At the same time, crisis companies need to balance between signaling their change willingness through a notable deviation from the status quo and signaling their capability for successful change implementation.

While appointing a nonprototypical female outsider is the clearest signal in terms of change willingness, the signal is less powerful on the implementation dimension because of an outsider versus insider signaling trade-off: outsiders typically stand for fundamental change but difficulties in the implementation process, while insiders potentially facilitate change implementation but stand for less fundamental change (Georgakakis & Ruigrok, 2017; Shen & Cannella, 2002). Outsiders are prized for their fresh perspectives and independence from existing networks and traditions (Gangloff et al., 2016; Shen & Cannella, 2002). Conversely, their lack of company-specific knowledge and their smaller networks inside a company may limit outsiders' power to initiate and implement change (Berns & Klarner, 2017; Kotter, 1982; Zhang & Rajagopalan, 2010), especially in the unstable context of a company struggling financially (Berns & Klarner, 2017; Georgakakis & Ruigrok, 2017). When considering executive gender, appointing a female outsider in contrast with a prototypical male outsider may signal high change willingness but particularly weak change implementation likelihood, as the combination of outsider origin and gender difference from sitting male colleagues may result in a double outsider status, making the implementation of change more difficult for a leader (Georgakakis & Ruigrok, 2017).

By contrast, insider appointments are less representative of fundamental change; however, insiders can draw on company- and industry-specific knowledge, networks, and established relationships with employees to quickly and successfully initiate change (Berns & Klarner, 2017; Kotter, 1982; Zhang & Rajagopalan, 2010). Crisis firms appointing an insider may find a female hire a viable strategy to signal notable deviation from the status quo and quick adaption and change implementation—important when close to bankruptcy. In support of this argument, Georgakakis and Ruigrok (2017) found that outsider succession is only positively related to subsequent firm performance when a new CEO is similar sociodemographically to incumbent executives. Thus, we suggest that the marginal signaling value from appointing a female insider instead of a female/male outsider is negative or nonexistent. We propose:

Hypothesis 3. Appointment type moderates the positive effect of crisis status on the appointment of female top managers, such that the effect is only present for insider (not outsider) appointments.

The receiver. The firm's signaling decision might also be influenced by who will likely observe and interpret a signal. Signaling change can be an act of investor management, where signals received and positively interpreted by investors may restore their confidence in the company (Gangloff et al., 2016; Huang & Thakor, 2013). Whereas current owners and executives have access to extensive information about the firm's change efforts and existing internal resistance to change, investors have relatively little access to such insights (Cohen & Dean, 2005; Ndofor & Levitas, 2004). A crisis firm appointing a female executive may send a signal to investors from which the firm's change-willingness is inferred, thereby restoring trust in the company's potential.

Yet signaling efforts are unlikely to succeed when potential investors are not looking for a signal (Vergne, Wernicke, & Brenner, 2018). Accordingly, Connelly et al. (2011) suggest that receiver attention—the extent to which receivers vigilantly scan the environment for signals—is a key part of the signaling process. We predict that the level of investor attention directed to the firm might influence its decision to appoint a female executive for signaling purposes. Attention toward female leader appointments might vary based on a range of factors, such as company media exposure, industry visibility, and other concurrent public events (Chang, Milkman, Chugh, & Akinola, 2019). As each credible signaling effort entails costs, crisis firms will carefully evaluate the cost–benefit ratio of a signal (Bergh et al., 2014). Accordingly, we expect investor attention to moderate the link between crisis status and female executive appointments because crisis firms on which investors are focused will more likely signal change through female leader appointments.

Greater attention might also be important for overcoming the resistance of sitting male executives to appointing a female leader. The male majority, still found in almost all TMTs, will likely resist female leader appointments as a fundamental challenge to male leadership and status (Knippen et al., 2019; Zhu et al., 2014). In a company under higher scrutiny, decision-makers may feel greater pressure to engage in legitimacy-seeking behaviors (Chang et al., 2019), so male executives' resistance is more likely overruled.

These predictions align with prior findings that public (e.g., investor) attention shapes upper echelons' staffing decisions and composition, for instance by influencing executive turnover (Boivie, Graffin, & Pollock, 2012; Harrison, Boivie, Sharp, & Gentry, 2018), board gender composition (Knippen et al., 2019), and career outcomes for executives involved in corporate fraud (Naumovska, Wernicke, & Zajac, 2020). We thus propose:

Hypothesis 4. Investor attention moderates the positive effect of crisis status on the appointment of female top managers, such that the effect is only present under high attention.

METHOD

Data

We analyze 26,156 top manager turnovers in 3,883 US public firms between 2000 and 2016. We source data from two comprehensive databases. Information on top management turnovers and board characteristics are derived from the BoardEx database. For our purpose, top managers include the CEO, chief financial officer (CFO), chief operations officer (COO), and chairperson: all four roles are clearly and consistently reported by BoardEx. Because the top manager roles are particularly powerful and visible, they are most likely used for signaling efforts. In focusing on these top managers, our approach is comparable to that of other top management studies analyzing executives at the strategic apex of an organization (e.g., Dezsö & Ross, 2012; Finkelstein et al., 2009). We obtained financial information, used to measure crisis status and control for firms' financial situation, from Compustat North America. All statistical analyses were conducted in Stata 14 SE.

As this study focuses on executive staffing, our main analyses only consider firm-year observations for which a turnover among top managers occurred (for a similar procedure, see Gupta, Mortal, Silveri, Sun, & Turban, 2020).[1] All industries other than financial services are represented in the sample, with the manufacturing sector most strongly represented (49% of firms), followed by the service sector (22%) and the wholesale & retail trade sector (12%). We excluded financial service firms because their unique asset structures affect the precision of the measure used to identify crisis status (Haleblian, McNamara, Kolev, & Dykes, 2012). Notably, the central results were unchanged when financial service firms were included.

Measures

Independent variable. The study's independent variable, *Firm Crisis Status,* represents whether a company is in crisis in the year before the executive turnover. Past glass cliff studies have measured crisis status with a single market- or accounting-based measure (e.g., Cook & Glass, 2014). However, to fully capture a firm's financial state, it is usually necessary to consider multiple measures (Carton & Hofer, 2006). Given the limitations of single accounting-based measures, scholars and practitioners rely heavily on indices combining multiple corporate income and balance sheet values to predict companies' future. One of the most prominent traditional measures is Altman Z-score (Altman, 1968). The seminal paper by Edward Altman has nearly 20,000 citations on Google Scholar and "considered by most researchers, practitioners and managers as an effective tool to predict the health of companies" (Almamy, Aston, & Ngwa, 2016: 279), and a "popular and widely accepted measure of financial distress" (Campbell, Hilscher, & Szilagyi, 2008: 2902). The accuracy of Altman Z-score has been repeatedly demonstrated, making it the most widely used measure among practitioners for many years (Almamy et al., 2016; Chen & Hill, 2013). Beyond the scientific literature practitioners have praised Altman Z as "a constant value for analysts and investors i.e. to enable users to obtain accurate estimations on corporates' default (credit risk) easily," and reported using the "Altman Z-Score model for a long time in order to analyze the credit risk incurred in financial transactions" (https://altmanzscoreplus.com/testimonials). The widespread use of Altman Z-scores along with the cut-offs may also be explained by Altman Z being a core topic in business school education, covered in several standard textbooks (e.g., Brealey, Myers, & Allen, 2020; Lando, 2004), as well as the ready availability of Altman Z scores from professional providers of financial market data (e.g., Bloomberg Professional Services, Thomson Reuters Eikon, Altman Z-Score+) and from popular finance websites (e.g., Finbox, GuruFocus, MarketInOut).

The Altman Z-score is a composite measure based on five financial ratios with complex interrelations: (1) working capital to total assets, (2) retained earnings to total assets, (3) earnings before interest and taxes to total assets, (4) sales to total assets, and (5) market value of equity to book value of total liabilities. A lower Z-score indicates higher bankruptcy risk. To facilitate interpretation, Altman (1968) defined three zones of discrimination: "crisis zone," "gray zone," and "safe zone." A Z-score below 1.81 differentiates the "crisis zone" from the "gray zone": a firm below this cut-off faces considerable risk of bankruptcy over the next two years. Several of the professional and popular financial market data providers (e.g., Altman Z-Score+, Finbox, GuruFocus, MarketInOut) highlight the zones of discrimination along with the Altman Z-score, and major financial websites prominently reference the zones of discrimination when discussing Altman Z as a bankruptcy indicator (e.g., Investopedia, Financial Express). For instance, Financial Express states under the headline "Your Money: Use Altman Z-score to sniff out bankruptcy potential" that "If the Z score is less than 1.81, the firm is a bankruptcy candidate."[2] Accordingly, all firms scoring below 1.81 have a highly salient crisis status. Given the widespread use of Altman Z-scores and the established cut-off value for the "crisis zone," firms below this cut-off might plausibly feel particular pressure to react (a conceptual argument we empirically evidence later in "Validity of Regression Discontinuity Design and Robustness Checks"). Accordingly, the crisis cut-off is a clear, salient way to measure a firm's crisis status.

To causally estimate the impact of crisis status on female executive appointments, our identification strategy relies predominantly on comparing firms slightly above and below the crisis cut-off of 1.81 in the pre-appointment year.[3] While the number of firms with crisis status is only a small proportion of the total sample, it is sufficiently large to identify a causal effect at the threshold. For instance, 169 observations had an Altman Z-score within the ± 1% interval around the crisis threshold, and 507 had a score within the ± 3% interval. These numbers give our estimations sufficient power, and our sample size compares favorably with those of other regression discontinuity setups (Arvate, Galilea, & Todescat, 2018; Flammer & Bansal, 2017).

Dependent variable. The dummy-coded dependent variable for female executive appointments (*Female Appointment*) equals 1 if the newly appointed executive (CEO, CFO, COO, or chairperson) was female and 0 if male.

Moderator variables. We measured *Female Presence in TMT* using a dummy-coded variable that equals 1 if the company had at least one female top manager at the time of appointing the focal executive, and 0 otherwise. To measure *Outsider Appointment,* we used a dummy variable coded 1 if the executive was appointed from outside the firm, and 0 otherwise. We treat an appointed executive as an outsider if they had not been previously employed by the firm for more than one year (Gangloff et al., 2016; Huson, Malatesta, & Parrino, 2004), using information from BoardEx.

We measured *Investor Attention* using the aggregate search frequency for a given company's stock symbol in Google in the year before the executive appointment. Measuring investor attention is challenging as it is not directly observable. Most traditional financial proxy measures for attention (e.g., extreme returns, advertising expenses) assume that extreme values demand investor attention which is, however, often not the case (Da, Engelberg, & Gao, 2011). Similarly, news coverage measures have been used to infer investor attention, yet the measures do not test if relevant news is actually read by investors and/or the public (Da et al., 2011). Accordingly, leading finance and accounting research has recently relied primarily on Google search volume for a company to more directly measure investor attention (e.g., Da et al., 2011; Drake, Roulstone, & Thornock, 2012; Fang, Huang, & Karpoff, 2016; Vozlyublennaia, 2014).

Google search volume offers a valid measure of investor attention because searches are a "revealed attention measure" (Da et al., 2011: 1462), with searching for a company on Google means one is paying attention to it. Moreover, Google is the most widely used search engine, making it an unbiased source for search behavior (Ren, Hu, & Cui, 2019).[4] In support, studies show that Google search scores moderately correlate with traditional attention measures but also measure investor attention in anticipation of events that may not occur or are not (yet) covered by the media (Da et al., 2011; Drake et al., 2012).

To capture investor attention, we follow Da et al. (2011; see also Drake et al., 2012) by using the Google search frequency for stock symbols (e.g., "AMZN" for Amazon.com Inc., "NFLX" for Netflix Inc.) instead of full company names, as stock symbols are largely unambiguous and investor-related (though using full corporate names produced similar results; see Appendix Table A1). Monthly data were requested for all queries by US-based users via the Google Trends service (https://trends.google.com/trends). Data were only available from 2005 onward, so all analyses involving investor attention as a moderator have a restricted sample. We scraped data automatically using the "gtrendsR" package (Massicotte & Eddelbuettel, 2018) in the statistical environment R (R Core Team, 2015). Google normalizes trends data by default, setting to 100 the month with the most search queries in the requested time frame. Companies for which no searches were made during the study period (i.e., 0 values throughout) were recoded as missing (though retaining them in the sample produced similar results see Appendix Table A1). We aggregated monthly search volumes into rolling windows of 12 months before each turnover in the analyses.

Covariates. We consider several covariates to test the robustness of our models. First, we include *Firm Size* as the firm's market capitalization in USD million (Gupta, Han, Mortal, Silveri, & Turban, 2018). Firm size may influence the pressure to adopt socially desirable practices, such as promoting gender diversity in the TMT (Knippen et al., 2019). Second, we control for *Female Presence on Board,* captured as the share of women on the board, as this may influence the decision to appoint a female executive (Dezső et al., 2016). Third, we include *Board Size,* measured as the number of board members, to account for the possibility that firms with larger boards are more likely to recruit female executives (Knippen et al., 2019). Fourth, we consider *Average Board Age*, measured in years, as director age might influence the likelihood of implementing change in leadership practices (Khan & Manopichetwattana, 1989). Fifth, for similar reasons, we control for *Firm Age*, measured in years since the company's inception (Bechtoldt et al., 2019). Sixth, we consider the type of executive position filled, as the likelihood of appointing a woman might vary across executive positions. Dummy variables capture whether the person was appointed as *CEO*, *CFO*, *COO*, and/or *Chairperson*, allowing for the possibility of an individual being appointed to multiple positions simultaneously. Last, we included *Year* and *Industry* dummies (SIC Divisions).

To mitigate the impact of outliers, we winsorized all continuous variables at the 0.5% and 99.5% levels—a common practice in strategic management (e.g., Hill, Upadhyay, & Beekun, 2015) and finance research (e.g., Geiler & Renneboog, 2015).

Table 1 gives summary statistics for all variables this section describes. Of the 26,156 executives appointed during 2000–2016, only 7.4% were women, in line with the common conception that women rarely reach the TMT (e.g., Dezső et al., 2016; Jeong & Harrison, 2017). Of all sample turnover observations, 25.2% occurred in crisis firms, consistent with findings that poor performance only explains some departures (Finkelstein et al., 2009).

------- *Insert Table 1 about here* -------

Estimation Challenges and Strategy

This paper aims to estimate the causal effect of a firm's crisis status on the likelihood of appointing female executives and the contingencies of this effect. As omitted variables and reverse causality may bias correlations between firm crisis and executive appointments, we employ the regression discontinuity design. Omitted variable bias may occur as crisis status is undoubtedly correlated with (unobserved) third variables, such as corporate culture, diversity management efforts, and firm vision, which may also influence executive appointments. Relatedly, reverse causality might be an issue because, according to upper echelons theory (Hambrick & Mason, 1984), the presence of female executives may influence company performance. Given such difficulties, a regression of firm crisis on female leader appointments would likely be biased, even when controlling for the above covariates, and not provide substantial insights into the causal direction of the effect.

A regression discontinuity design is a powerful way to address omitted variable bias and reverse causality by approximating the ideal setting of a randomized experiment in the field by introducing only mild assumptions (Lee & Lemieux, 2010; Sieweke & Santoni, 2020; for a plausibility test of the assumptions, see "Validity of Regression discontinuity design and Robustness Checks" below). To identify the causal effect, the design exploits exogenous variance in settings where a unit's score above or below a threshold on a continuous variable determines the unit's treatment status. Falling slightly above or below is akin to random assignment (Sieweke & Santoni, 2020).

The regression discontinuity design's core identifying assumption is fulfilled when falling slightly below or above the crisis threshold of Altman Z introduces random variation in crisis status. As described in the "Measures" section, the widespread use of Altman Z among investors and the salience of the zones of discrimination make the threshold of 1.81 highly consequential for firms: falling below this threshold gives companies a visible label of looming bankruptcy, thereby applying pressure to regain trust. The as-if-random assignment around the crisis threshold is plausible because the multivariate Altman Z-score of five financial ratios with complex interdependencies and unique drivers of the single ratios (Almamy et al., 2016; Altman, 1968) avoids that companies have perfect control over their exact Altman Z-score. Thus, it is a matter of chance if a company falls slightly below or above the threshold of 1.81 separating crisis and non-crisis firms. For instance, whether a company's score is 1.80 (crisis zone) or 1.82 (gray zone) is as good as random (for supporting evidence, see "Validity of Regression Discontinuity Design and Robustness Checks" below). Accordingly, assignment of the crisis label at 1.81 is random variation, and there should be no systematic covariation with observable and unobservable confounders. Our design thus addresses central sources of omitted variable bias and reverse causality.

We employ a sharp regression discontinuity design (Imbens & Lemieux, 2008) to estimate the difference in female executive appointments between firms slightly below and above the crisis threshold. To test the moderation effects proposed in Hypotheses 2 to 4, we split the sample based on the moderation variable, estimate the effect for each subsample separately, and compare the treatment effect between subsamples to reveal the moderation pattern (Flammer, 2015).

In estimating the treatment effect, we rely on Calonico, Cattaneo, and Titiunik's (2014) bias-corrected RD estimator, which was shown to outperform alternative measures. To account for within-firm dependence across appointments, we cluster standard errors at the firm level. We base treatment effect estimations on local linear polynomials for various bandwidths, and do not control for higher degree polynomials. As Gelman & Imbens (2019) outline, local linear estimates are less noisy, less sensitive to the polynomial degree, and have better coverage of confidence intervals compared to higher degree polynomials.

RESULTS

Test of the Glass Cliff's Direct Effect

To test Hypothesis 1's prediction that crisis status positively affects the probability of appointing female executives, we first plotted the likelihood of appointing female executives against the lagged ($t-1$) Altman Z-score around the crisis cut-off. The dots in Figure 1 do not represent individual appointments but observations grouped into bins spanning 0.5 Altman Z-score points. Each dot thus represents the average likelihood of a female appointment for firms in each bin. The solid line represents the predicted likelihood of female appointments based on local linear polynomials. Figure 1 illustrates a discontinuity at the cut-off, such that firms falling slightly below the threshold (i.e., with crisis status) have a considerably higher likelihood of appointing a female executive than do firms slightly above it (i.e., without crisis status). This pattern is consistent with Hypothesis 1. Interestingly, as we move further to the right of (i.e., above) the cut-off, the likelihood of appointing female executives increases.

------- Insert Figure 1 about here -------

A formal test of Hypothesis 1 is reported in Table 2. Models 1 to 7 report estimated differences in female executive appointments between companies with and without crisis status (i.e., treatment effect) for different model specifications. Based on Imbens & Lemieux (2008), we tested the treatment effect for different bandwidths. Bandwidth choice is important in regression discontinuity designs because it involves a trade-off: larger bandwidth offers greater power but also higher bias by including observations further from the threshold for which the as-if-random assumption is more questionable. Model 1 restricts the sample to the 169 appointments within the 1% interval around the crisis threshold. Firms with crisis status are 9.3 percentage points more likely to appoint a female executive than firms without crisis status (p=.015). The difference is significant for alternative bandwidths of 1.5% (Model 2, p=.000), 2% (Model 3, p=.000), 2.5% (Model 4, p=.001), and 3% (Model 5, p=.002). Moreover, the difference is also significant (p=.000) for the full model (6), but the treatment effect of 2.6 percentage points is notably smaller compared to the other models.[5] This smaller effect is likely driven by appointments made by firms far from the crisis cut-off, as the upward slope to the right of the threshold in Figure 1 indicates an increasing likelihood of appointing female executives as the Altman Z-score rises. Importantly, 2.6 percentage points is a sizable effect: as the appointment probability for women in non-crisis firms is about 5%, a 2.6 percentage points increase means that crisis firms are about 50% more likely to appoint a female executive.

We finally included all covariates from the *Measures* section in Model 7 (Table 2). While the regression discontinuity design does not require covariates because assignment around the threshold is random (Lee & Lemieux, 2010; Sieweke & Santoni, 2020), their inclusion may give insights on the robustness of results (Frölich & Huber, 2019). The treatment effect in Model 7 is still significant (p=.005), lending additional support for the robustness of our glass cliff effect.

------- *Insert Table 2 about here* -------

Tests of Glass Cliff Moderators

To test if the glass cliff effect is conditional on the existing presence of another female top manager (Hypothesis 2), the executive's origin (Hypothesis 3), or investor attention (Hypothesis 4), we performed subgroup analyses within the regression discontinuity framework.

We first re-estimated the full model separately for companies with no female incumbent and those with at least one (Table 3, Model 1a & 1b). We find a significant positive crisis effect for firms with no female incumbent (*p*=.001). Crisis firms with no female incumbent are 2.6 percentage points more likely to appoint a female executive than non-crisis firms without a female incumbent. In contrast, we find no significant crisis effect for firms with women present in the TMT (*p*=.564). To address the potential influence of imbalanced subsample sizes, we drew a random sample from the firms with no existing female top manager (*n*=898) of roughly equal size to the set of firms that already had a female top manager (for a similar procedure, see Gilliam, Heflin, & Paterson, 2015). We again find a significant crisis effect for firms with no existing presence of female top managers (*p*=.005), thus supporting the moderation effect proposed in Hypothesis 2.

------- *Insert Table 3 about here* -------

Next, we performed a similar set of analyses to examine executive origin as a moderator. To test Hypothesis 3, we estimated the full model separately for insider and outsider appointments (Table 3, Model 2a & 2b). We find a significant positive coefficient for insider appointments (*p*=.000). Firms react with an increased likelihood of female appointments by 2.8 percentage points for insider appointments but exhibit no significant change in appointment likelihoods for outsider appointments (*p*=.313). To address imbalanced subsample sizes, we drew a random subsample from the considerably larger insider appointment condition. The crisis effect for the randomly selected subsample of insider appointments (n=2,033) remains significant (p=.003), thus supporting the moderation effect of executive origin proposed in Hypothesis 3.

To test Hypothesis 4's prediction, we re-estimated the full model separately for companies above and below the median Google Trends score across all firms in the year before the appointment (for a similar procedure, see Flammer, 2015).[6] As displayed in Models 3a and 3b (Table 3), the effect of crisis status on female appointments is significant (p=.012) for firms with high investor attention where the crisis status increases the female appointment likelihood by 3.2 percentage points. The crisis effect is insignificant for firms with low investor attention (p=.281). The same pattern of results is found with an alternative investor attention measure (see Appendix Table A1).[7] Overall, the findings support Hypothesis 4 as the glass cliff effect only occurs for firms under high investor scrutiny.

Validity of Regression Discontinuity Design and Robustness Checks

To assess the validity of our regression discontinuity design and the conclusions drawn from it, we conducted additional tests of the randomization assumption, noise, an alternative status threshold, sample selection bias, and generalizability.

Randomization Assumption. The central identification assumption of our design is that having an Altman Z-score slightly above or below the crisis threshold is as good as random. Otherwise, the design cannot address omitted variable bias and reverse causality. We use two standard tests for the implications of this assumption (Eggers, Fowler, Hainmueller, Hall, & Snyder, 2015; Imbens & Lemieux, 2008; Sieweke & Santoni, 2020): (1) a test of the continuity of the Altman Z-score distribution around the crisis threshold, and (2) a test of pre-existing differences in covariates between companies just above and below the threshold.

We conducted the McCrary (2008) test for the continuity of the Altman Z-score distribution. This test considers the smoothness of the density function of Altman Z-scores around the crisis threshold. A jump in the density function around the threshold would indicate companies' ability to manipulate their Altman Z-scores, thus invalidating the as-if-random assumption around the cut-off. As Figure 2 shows, there is no evidence for a significant jump around the crisis threshold, with widely overlapping confidence intervals around the point estimates on each side. The null hypothesis of continuity of the Altman Z-score variable cannot be rejected (p=.825), indicating no discontinuity around the cut-off.

------- *Insert Figure 2 about here* -------

To test for pre-existing differences in covariates between companies around the threshold, we conducted balance tests. If assignment of crisis status at the threshold is indeed random, we should find no differences between companies on either side. Table 4 lists the differences in means among all firms with an Altman Z-score within 3% of the threshold. The results do not indicate any significant difference between companies below and above the threshold. This is in line with the assumption of randomization around the cut-off.

------- *Insert Table 4 about here* -------

Placebo Tests. An alternative explanation for the discontinuity at the crisis threshold could be that the interpretation of Altman Z-scores is so idiosyncratic that our model picks up noise rather than a change in crisis status. To rule out that our design measures noise, we artificially shift the cut-off threshold in steps of 0.5 Altman Z-score units. Estimates are reported in Figure 3. None of the alternative cut-off values (0.31, 0.81, 1.31, 2.31, 2.81, 3.31) yields a significant increase (or decrease) in female appointments. For all but the original cut-off value of 1.81, coefficients are insignificant (p>.10). We are, therefore, confident that the reported results are not spurious.

------- *Insert Figure 3 about here* -------

We also considered if the glass cliff occurs not only at the threshold separating the "crisis zone" from the "gray zone" (Z=1.81) but also at the second available threshold between the "gray zone" and the "safe zone" (Z=2.99). This would indicate that a glass cliff occurs whenever a firm is downgraded, countering our hypothesis that crisis status drives the glass cliff effect. To test this possibility, we performed a placebo test re-estimating all specifications in the original analyses using the Altman Z-score threshold of 2.99 as the cut-off. No significant treatment effect is found at the alternative threshold (full results reported in Appendix Table A2), providing additional evidence that the glass cliff effect is primarily driven by crisis status and not by other salient status changes.

Sample Selection. Although our set-up addresses omitted variable bias and reverse causality as the central sources of endogeneity discussed in the literature (Certo, Busenbark, Woo, & Semadeni, 2016), sample selection may bias our estimates because we can only observe our outcome (i.e., gender of newly appointed executives) for the firms that had a TMT vacancy. The extent of empirical issues created by non-random samples is usually less severe than some scholars suggest (Certo et al., 2016). Nonetheless, we addressed this potential bias in an additional analysis by implementing a Heckman selection correction. Non-turnover observations were retained to predict inclusion in our final sample by retirement of prior executive plus all model and control variables (Mitra, Post, & Sauerwald, 2021). From the selection model we calculated a correction factor (inverse Mills ratio) that we include with all other covariates in our final turnover-only sample as a control (Flammer & Bansal, 2017). The treatment effect when controlling for potential covariates and selection effects remains significantly positive (*estimate*=0.017; SE=0.007; p=.012), providing no evidence for severe sampling bias.

Generalizability. Because the regression discontinuity design exploits as-if-random assignment around the cut-off to establish causality, the causal estimate is based only on observations around the cut-off. These companies may not be representative of firms far away from the cut-off, potentially limiting the generalizability of our findings (Flammer & Bansal, 2017). We inspected this issue by comparing the characteristics from Table 4 for companies close to and far away from the cut-off. For each characteristic, we compared the mean in the 3% bandwidth around the cut-off to the mean for all firms outside the 3% bandwidth (and calculated the corresponding *p*-value for the difference in means). As shown in Appendix Table A3, the differences between the two groups are small and mostly insignificant; only one marginal difference exists. Thus, companies at the cut-off are likely representative in terms of central attributes.

Supplementary Tests

Although the results are robust and the moderation effects in line with our suggested signaling mechanisms, we could not directly test if crisis firms aimed to signal change to investors by appointing female executives. To further understand the mechanism underlying our findings, we conducted supplementary analyses.

We captured firms' signaling efforts in a more direct way by analyzing press releases, which firms use to deliberately communicate information to a wider audience (Zavyalova, Pfarrer, Reger, & Shapiro, 2012). Specifically, we hand-collected press releases on all executive appointments for firms in the 3% bandwidth around the threshold and coded the extent to which the press releases conveyed change.[8]

To obtain press releases on executive appointments in the 3% bandwidth around the threshold, we used the Nexis Uni database (www.nexisuni.com). We collected data from firm press releases disseminated via Business Wire and PR Newswire, two leading distribution services on which prior studies have relied to obtain a representative set of press releases (e.g., Graffin, Carpenter, & Boivie, 2011; Zavyalova, Pfarrer, Reger, & Shapiro, 2012). For the 507 turnovers within the 3% bandwidth, we obtained 136 relevant press releases.

To code the extent of change-related signals, we content-analyzed for change-oriented words with the quanteda package (Benoit et al., 2021) in R. We used the dictionary compiled and validated by McClelland, Liang, and Barker (2009), which other top management studies have applied to measure change orientation (Post, Lokshin, & Boone, 2020).

To test if firms with crisis status used more change-oriented framing than non-crisis firms for female appointments but not for male appointments, we adapted our regression discontinuity set-up by using the change-orientation measure as the outcome and keeping Altman Z as the running variable with the crisis threshold of 1.81. We then estimated the model once for the female appointments subsample and again for the male appointments subsample.

As predicted, crisis firms (compared to non-crisis firms) used significantly more change-oriented wording in their press releases when appointing a female executive (*estimate*=0.951; SE=0.428; p=0.026) but not when appointing male executives (*estimate*=−0.213; SE=0.390; p=0.585).[9] The findings further support our proposed signaling mechanism.

DISCUSSION

The glass cliff hypothesis has received much attention from researchers and the public, but findings have been inconsistent. This study draws on signaling theory (Connelly et al., 2011; Spence, 2002) to develop a more context-specific glass cliff model. We theorize that crisis firms use female executive appointments to strategically signal fundamental change efforts. Based on the signaling rationale, we contend that the crisis effect on female appointments should vary based on the nature of the signaler, signal, and receiver. Whereas past field research has primarily relied on correlational designs, we use a regression discontinuity design to provide a clean causal estimate of the crisis effect on female appointments, employing a large-scale sample of 26,158 executive appointments by US firms during 2000–2016. Our findings support the theoretical model and reveal a significant positive effect of firm crisis status on female appointments. We also find more change-related framing of female appointments in press releases by crisis firms compared to non-crisis firms.

Further supporting our theoretical signaling arguments, we find that the glass cliff is context-dependent and occurs only when companies have no existing female top managers, when firms appoint an insider rather than an outsider, and when the executive appointment receives high investor attention.

The theoretical model and empirical findings make three notable contributions to the literature. First, the study primarily contributes to glass cliff research. By developing novel theoretical insights into the signaling mechanism and contextual factors underlying the glass cliff phenomenon, the study explains past inconsistent findings. Glass cliff research has relied strongly on stereotyping arguments (think crisis—think female) to substantiate the glass cliff and has not advanced early ideas about signaling aspects in glass cliff appointments. Through an integration of signaling theory in glass cliff research, we highlight important but neglected moderators of the glass cliff. Our focus on moderators may illuminate the mixed findings of prior glass cliff studies and resolve intense debate on the existence of glass cliffs. Bechtoldt et al. (2019: 292) conclude from a field study that the "glass cliff seems to be more of a myth than a real phenomenon for female top managers in Germany and the UK," while Adams et al. (2009) also found no evidence for the glass cliff in a US context. By contrast, Ryan et al. (2016: 453) conclude that a "decade of research into the glass cliff confirms that it is a robust and pervasive phenomenon and a significant feature of the organizational landscape." The present study contributes to this debate by demonstrating that the glass cliff effect hinges on attributes of the signaler, signal, and receiver. Overlooking these signaling-related moderators may have contributed to inconclusive prior findings. Thus, part of the disagreement between glass cliff supporters and skeptics might originate from the theoretical underdevelopment of potential mechanisms leading to the premise of the glass cliff as a universal.

Moreover, the study provides much-needed additional evidence on the glass cliff from real-world organizations. There has recently been a considerable increase in use of scenario experiments with students or working adults making a hypothetical selection decision (e.g., Kulich et al., 2015; Rink, Ryan, & Stoker, 2013; Ryan et al., 2011). As demonstrated by early glass cliff work (Haslam & Ryan, 2008), scenario experiments are a good way to get an idea off the ground, develop general understanding of a phenomenon, and take steps toward establishing causality (Aguinis & Bradley, 2014). However, the limitations of this specific research design and skepticism toward its use outside social psychology (Lonati, Quiroga, Zehnder, & Antonakis, 2018) may explain reservations over purported evidence for the glass cliff in other scientific domains (i.e., strategic management and economics). In particular, scenario experiments have been criticized for potential demand effects and inherently low external validity (Gloor, Gazdag, & Reinwald, 2020; Lonati et al., 2018); it is questionable whether real-world top executive promotions with multiple stakeholders and complex selection procedures result in a similar glass cliff effect to that found in simplified hypothetical cases. Our work takes the logical next step in glass cliff research by complementing scenario experiments with causal evidence from the field.

Second, this study adds to the growing research stream on the signaling of top managers. Behavioral theorizing on TMTs—most prominently upper echelons theory (Hambrick & Mason, 1984)—has traditionally focused on how top managers' attributes or the TMT's composition influence executive behaviors, in turn influencing organizational outcomes (Finkelstein et al., 2009). More recent studies have considered signaling theory and examined visible attributes of top managers that can boost companies' public reputation (e.g., Gomulya & Boeker, 2014; Zhang & Wiersema, 2009). Such research has, for instance, studied how CEO attributes signal the quality of firms' financial statements (Zhang & Wiersema, 2009) and investigated how the composition of a firm's TMT can signal legitimacy that, in turn, affects investor decisions (Higgins & Gulati, 2006). Considering signaling through staffing decisions is also in line with research showing that equity evaluations depend on both financial and non-financial information (Certo, 2003; Trueman, Wong, & Zhang, 2000). Our study extends signaling research in the context of TMTs by considering how companies use top management gender to signal change during a crisis. The valuation of female executives is also in line with prior research demonstrating that female executives can benefit from their minority status and receive higher compensation than male colleagues (Hill et al., 2015; Leslie, Manchester, & Dahm, 2017). We also contribute to signaling theory by studying how signaling decisions can change based on the nature of the signaler, signal, and receiver. This contrasts with the predominant focus on the quality of the signaler in most signaling research on top management (Connelly et al., 2011; for an exception, see Gomulya & Mishina, 2017).

Last, this study contributes to efforts in management research to tackle endogeneity bias. Today, management researchers can draw on a solid domain-specific literature base spanning critiques and reviews of existing research designs and best-practice recommendations for designing field studies as quasi-experiments that mimic the gold standard of randomized experiments (e.g., Antonakis et al., 2010; Hill et al., 2021; Semadeni et al., 2014). Yet, despite regression discontinuity designs being praised as "a much closer cousin of randomized experiments than other competing methods" (Lee & Lemieux, 2010: 289), they are rarely applied in management research (for exceptions, see Brzykcy & Boehm, 2021; Flammer, 2015). Part of the knowledge–action gap may be attributed to the difficulties of translating general recommendations on quasi-experimental designs into specific designs to address pressing management questions: quasi-experimental designs require a new way of thinking about potential sources of exogenous variance in an endogenous predictor. Thus, our work may inspire future research to use innovative identification strategies and contribute to more robust management science.

Limitations and Future Research

The study has some notable strengths as it incorporates extensive field data with a clean causal identification strategy and supplementary evidence on the proposed mechanisms to improve understanding of the glass cliff effect. Still, some shortcomings generate avenues for future research. First, the regression discontinuity design is not without limitations. Because it exploits the as-if-random assignment around the cut-off to establish causality, the generalizability of our findings may be restricted to firms near the cut-off. While we did not find marked differences in central attributes between firms near to and far from the cut-off (see Appendix Table A3), readers should extrapolate our findings with caution.

Second, our study looks at glass cliff appointments for the four most powerful and visible top manager roles (i.e., CEO, CFO, COO, chairperson) but does not perform specific subanalyses for CEOs. CEOs have traditionally attracted prime attention among business scholars and the wider public, and we control for differences in top manager roles in our analyses (for a similar approach, see Bechtoldt et al., 2019). Still, given the high visibility of CEO appointments, additional subanalyses for CEO positions have value. Yet, the small number of female appointments to CEO positions further exaggerated by the regression discontinuity design's focus on turnover observations in a small bandwidth around the crisis threshold precluded any CEO-specific analyses and resulted in convergence issues of the models. At the same time, the robust glass cliff effect found in our sample, with a relative overrepresentation of non-CEO appointments, suggests that non-CEO appointments serve notable signaling purposes in times of crisis. Because past work has largely overlooked the signaling role of non-CEO appointments, we encourage future research in this area.

Third, this study treats a crisis as one overall construct and does not differentiate between crisis types. The regression discontinuity at the crisis cut-off allowed us to identify the effect of perilous financial status on a firm's likelihood of appointing female leaders, as postulated by glass cliff theory, but our identification strategy precludes differentiating between different forms of crisis. It is theoretically plausible that signaling through female appointments is most attractive when the crisis requirements match the stereotypical attributes of female leaders. For instance, a firm in a reputation crisis after financial misconduct may be more likely to signal trustworthiness via female appointments, whereas a firm whose crisis stems from competitive attacks may be more likely to appoint male executives to signal dominance and strength. We encourage future research to investigate this possibility.

Another potential opportunity for future research is to study the consequences of the glass cliff for the careers of female top managers. While initial research suggests that the relative riskiness of glass cliff positions leads to higher dismissal rates for female CEOs (Gupta et al., 2020), relatively little is known of the conditions in which female top managers are likely to succeed as leaders. Past research suggests that women receive higher wages than men when the widespread adoption of diversity goals in organizations creates opportunities for high-potential women (Leslie et al., 2017). Such an environment could plausibly help female top managers make career progress and avoid falling off the glass cliff.

Future research could also investigate whether this paper's signaling arguments can explain the emergence of a glass cliff for other demographic groups. Researchers have recently observed that glass cliffs may also exist for persons of color (Cook & Glass, 2014; Gündemir, Carton, & Homan, 2019). Yet Morgenroth et al. (2020) note that the stereotyping mechanism, as the traditional rationale, may fall short in explaining race- or ethnicity-based glass cliffs because the fit between crisis leadership and female stereotypes does not apply to all underrepresented racial/ethnic groups. By contrast, the signaling mechanism we propose may be more generalizable as every notable deviation from the status quo in executive appointments can signal change to the market. Accordingly, we encourage future studies to replicate our work focusing on race/ethnicity.

Practical Implications

Ryan and Haslam (2007: 550) conclude from the glass cliff effect that women are disproportionally bound to fail and may thus face a “second wave of discrimination.” Yet designing strategies to prevent the emergence of the glass cliff is a difficult endeavor: for single appointments, it is not always apparent whether a position is a glass cliff or an honest attempt to respond to public calls to increase female representation in the executive suite. Nonmarket mechanisms, like gender quotas, could be considered to prevent crisis firms from intentionally appointing women for signaling purposes. Such quotas would increase the general presence of women in top leadership positions, thereby weakening the signaling function of female appointments for crisis firms, as women in top management would be the norm, not the exception. However, appointing females beyond the quota might still signal “intent to change,” such that women remain relatively more likely than men to be placed in risky positions. Thus, mirroring the wider debate on the advantages and disadvantages of gender quotas (Hughes, Paxton, & Krook, 2017; Leslie, 2019) it remains unclear if gender quotas could avoid the creation of risky glass cliff positions by effectively reducing the attractiveness of the signal for firms.

Hence, before contemplating such quotas for TMTs, companies could first work toward making staffing processes more transparent and formalized. Decisions on top executive appointments are made behind closed doors and are often non-routine and informal, which increases the chance of signaling decisions undermining the selection process (Glass & Cook, 2016). In a similar vein, individuals involved in executive staffing (i.e., members of boards and staffing committees) should be made aware of the potential for a glass cliff, relevant contextual factors, and underlying mechanisms (i.e., signaling), enabling them to actively counter tendencies to use female leadership appointments to signal change in times of crisis. We do not advocate banning signaling aspects from staffing decisions. Rather, companies should not rely on overly broad, demographic categories but instead consider nuanced, individualized information about potential new leaders' real competencies. Thereby, companies would combat the glass cliff and ensure they select the best-qualified candidate for the job, instead of a candidate who primarily serves a signaling goal.

FOOTNOTES

[1] We retained firm-year observations without executive turnovers in a robustness check to account for selection effects (see "Validity of Regression Discontinuity Design and Robustness Checks").

[2] https://www.investopedia.com/terms/a/altman.asp https://www.financialexpress.com/money/your-money-use-altman-z-score-to-sniff-out-bankruptcy-potential/2256685/

[3] Our main analyses use the crisis cut-off for measuring a firm's crisis status, but we also use the cut-off between the "grey zone" and the "safe zone" in a placebo test to probe the plausibility of our estimation strategy (see "Validity of Regression Discontinuity Design and Robustness Checks").

[4] As of June 2019, Google's search engine market share in the United States was 88% (http://gs.statcounter.com/search-engine-market-share/all/united-states-of-america) and it handled 1.2 trillion search queries worldwide (https://www.internetlivestats.com/google-search-statistics).

[5] For the full model we used the MSE-optimal bandwidth selector for the treatment effect estimator, as recommended by Calonico, Cattaneo, & Titiunik (2014)

[6] Google Trends data are only available for more recent years. Accordingly, these subgroup analyses were performed on the sample of firms between 2006 and 2016.

[7] Based on a suggestion by an anonymous reviewer we also checked if our attention measure is confounded by industry membership. In doing so, we included the SIC division dummies as covariates when testing Hypothesis 4. However, the estimator does not converge after the sample was split in the high and low attention condition. In a workaround, we included only the three largest SIC divisions and treated membership to other divisions as the reference

category. The pattern of results remained unchanged with a significant glass cliff effect for high investor attention firms (estimate $_{\text{high investor attention}}$=0.032, SE=0.012, *p*=.010) and no significant effect for low investor attention firms (estimate $_{\text{low investor attention}}$=0.014; SE=0.013; *p*=.297).

[8] Unlike in our main moderation analyses (see Table 3), we did not employ the MSE-optimal bandwidth selector because hand-collection of press releases for all turnovers in the full sample would have been too labor-intensive. Instead, we focused on the 3% bandwidth as the widest pre-set bandwidth from our main analyses (see Model 5, Table 2).

[9] Given the reduced sample size in analyses of press release data, we did not employ firm-level clustered standard errors (average number of observations per firm=1.37), so as to maintain statistical power (Angrist & Pischke, 2009; McNeish, Stapleton, & Silverman, 2016). However, a similar pattern of results was found when using standard errors clustered at firm level, with a significant effect on female executive appointments at the 10% level (*p*=.054) and a non-significant effect on male appointments (*p*=0.609).

Table 1

Summary Statistics

	Obs.	Mean	Median	St. Dev.	25%	75%
Female Appointment	26,156	0.074	0	0.262	0	0
Firm Crisis Status	26,156	0.252	0	0.434	0	1
Female Presence in TMT	23,745	0.056	0	0.230	0	0
Outsider Appointment	26,156	0.104	0	0.305	0	0
Investor Attention	16,045	33.182	29.583	22.882	14.250	50.500
Firm Size	26,151	8,201.968	612.539	25946.82	128.546	3172.953
Female Presence on Board	26,152	0.093	0.083	0.099	0	0.154
Board Size	26,152	10.582	10	3.175	8	13
Average Board Age	26,152	59.032	59.538	4.976	56	62.500
Firm Age	24,964	21.334	15	19.390	8	29
CEO	26,156	0.198	0	0.398	0	0
CFO	26,156	0.299	0	0.458	0	1
COO	26,156	0.420	0	0.494	0	1
Chairperson	26,156	0.189	0	0.391	0	0

Notes. *Female Appointment* is a dummy that equals 1 if the newly appointed executive is female, and 0 otherwise. *Firm Crisis Status* is a dummy that equals 1 if the Altman Z-score falls below 1.81, and 0 otherwise. *Female Presence in TMT* is a dummy that equals 1 if there is at least one female in the top management team, and 0 otherwise. *Outsider Appointment* is a dummy that equals 1 if the appointed executive is hired from outside the company, and 0 otherwise. *Investor Attention* is the average Google Trends score for the 12 months before the executive's appointment. *Firm Size* is the market capitalization in USD million. *Female Presence on Board* is the percentage of women serving on the board. *Board Size* is the total number of board members. *Average Board Age* is the mean age in years of all board members. *Firm Age* measures the number of years since the firm's inception. *CEO*, *CFO*, *COO*, and *Chairperson* are dummies that take the value of 1 if the firm appoints an executive in each respective role, and 0 otherwise.

Table 2

Female Executive Appointments around Crisis Cut-Off

	Model 1 ± 1%	Model 2 ± 1.5%	Model 3 ± 2%	Model 4 ± 2.5%	Model 5 ± 3%	Model 6 Full model	Model 7 Full model w/ controls
Firm Crisis Status	0.093**	0.183***	0.129***	0.101***	0.097***	0.026***	0.019***
	(0.038)	(0.031)	(0.031)	(0.031)	(0.031)	(0.007)	(0.007)
	p=.015	*p*=.000	*p*=.000	*p*=.001	*p*=.002	*p*=.000	*p*=.005
N	169	249	325	413	507	15,527	15,942

Notes. Models 1 to 5 contain all executive turnovers within a certain percentage of the cut-off Altman Z-score of 1.81. Model 6 includes all observations. The bandwidth is chosen automatically using the MSE-optimal bandwidth selector for the treatment effect estimator, as recommended by Calonico et al. (2014). Model 7 adds controls. Standard errors (in parentheses) are clustered at firm level. *** p<0.01, ** p<0.05, * p<0.10

Table 3

Female Executive Appointments around Crisis Cut-Off with Sample Split According to Moderators

	Female Presence in TMT		*Outsider Appointment*		*Investor Attention*	
	Model (1a)	Model (1b)	Model (2a)	Model (2b)	Model (3a)	Model (3b)
	No	Yes	No	Yes	Above Median	Below Median
Firm Crisis Status	0.026***	−0.023	0.028***	0.014	0.032**	0.014
	(0.008)	(0.040)	(0.008)	(0.014)	(0.013)	(0.013)
	p=.001	*p*=.564	*p*=.000	*p*=.313	*p*=.012	*p*=.281
N	13,225	921	13,655	1,925	5,590	4,803

Notes. *Female Presence in TMT* indicates the firm had at least one female top manager at the time of the new executive's appointment. *Outsider Appointment* represents whether the firm promoted from within or hired an external candidate. *Investor Attention* is measured by Google Trends and the sample is split at the median score, producing unequal subsample sizes because the MSE-optimal bandwidth selector automatically chooses different bandwidths in subsamples. Standard errors (in parentheses) are clustered at firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table 4

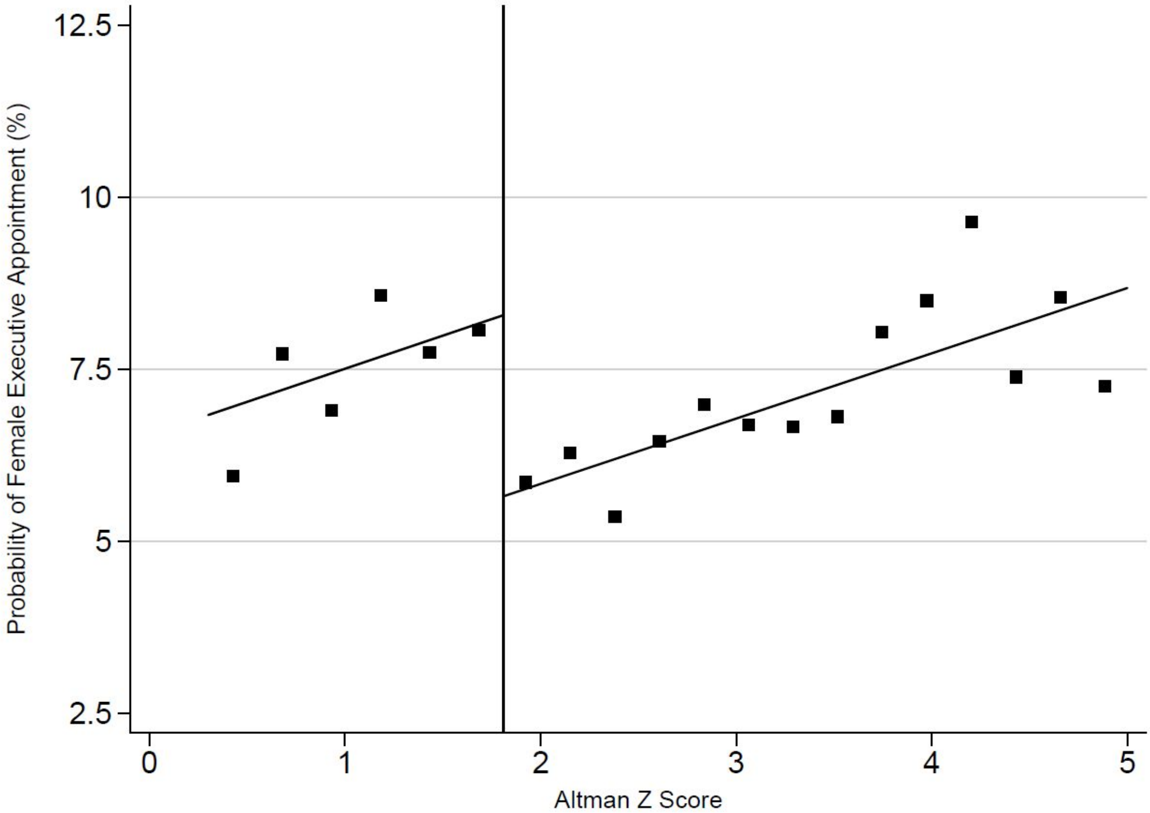
Pre-Existing Differences in Covariates as a Function of Crisis Cut-Off

Covariate	(−3%, 0)		(0, 3%)		Diff. in means
	Mean	Obs.	Mean	Obs.	*p*-value
Firm Size	5,121.767	236	6,159.431	271	.708
Female Presence on Board	0.083	236	0.089	271	.645
Board Size	10.398	236	10.886	271	.267
Average Board Age	59.683	236	59.447	271	.743
Firm Age	21.278	223	22.297	263	.771
CEO	0.182	236	0.203	271	.542
CFO	0.288	236	0.310	271	.572
COO	0.462	236	0.417	271	.308
Chairperson	0.169	236	0.177	271	.813

Notes. This table compares the controls just below (−3%, 0) and just above (0, 3%) the cut-off. *p*-values for the difference between means are based on standard errors clustered at firm level.

Figure 1

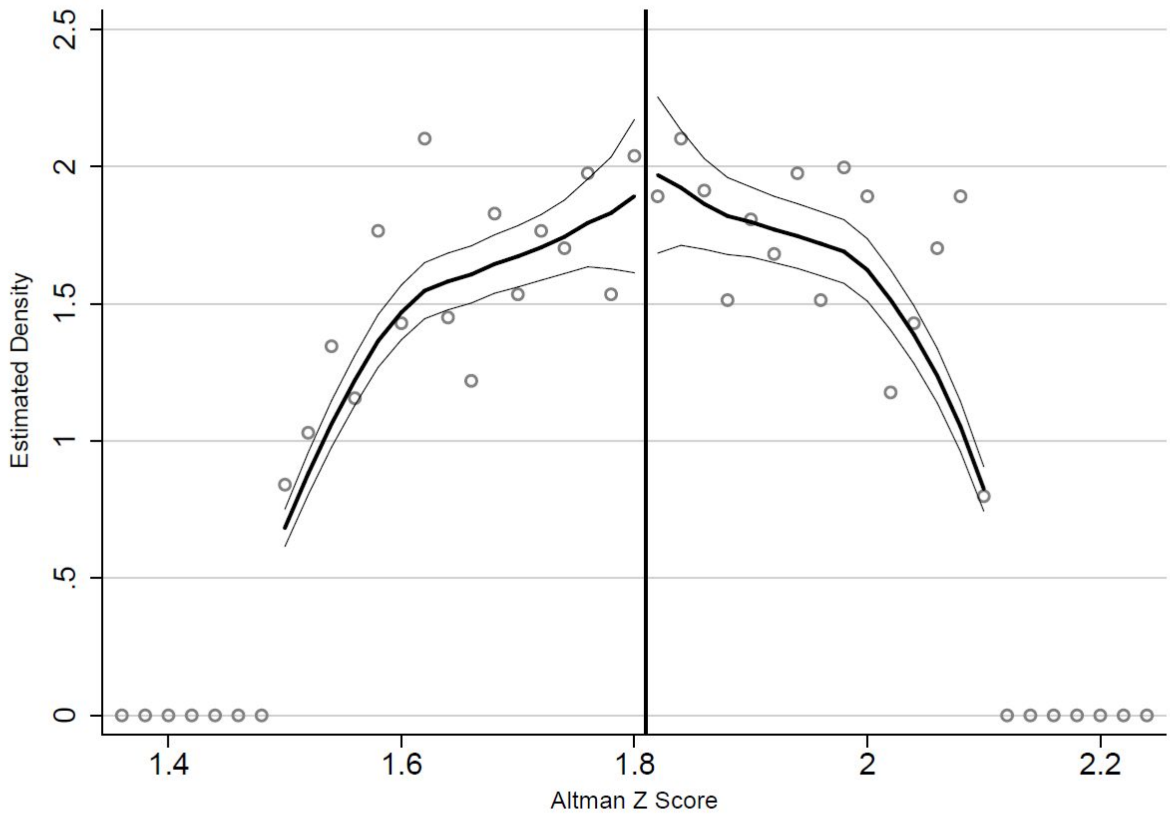
Female Executive Appointments around Crisis Cut-Off



Notes. This figure visualizes the probability of appointing a female executive around the Altman Z-score crisis threshold of 1.81. Each square represents the probability of a female executive appointment in bins of 0.5 Altman Z-scores. The vertical line marks the crisis threshold; the two sloped lines are linear regressions for above and below the crisis threshold. The vertical distance between the two sloped lines at the crisis threshold captures the estimated causal effect of crisis status on the probability of female executive appointments.

Figure 2

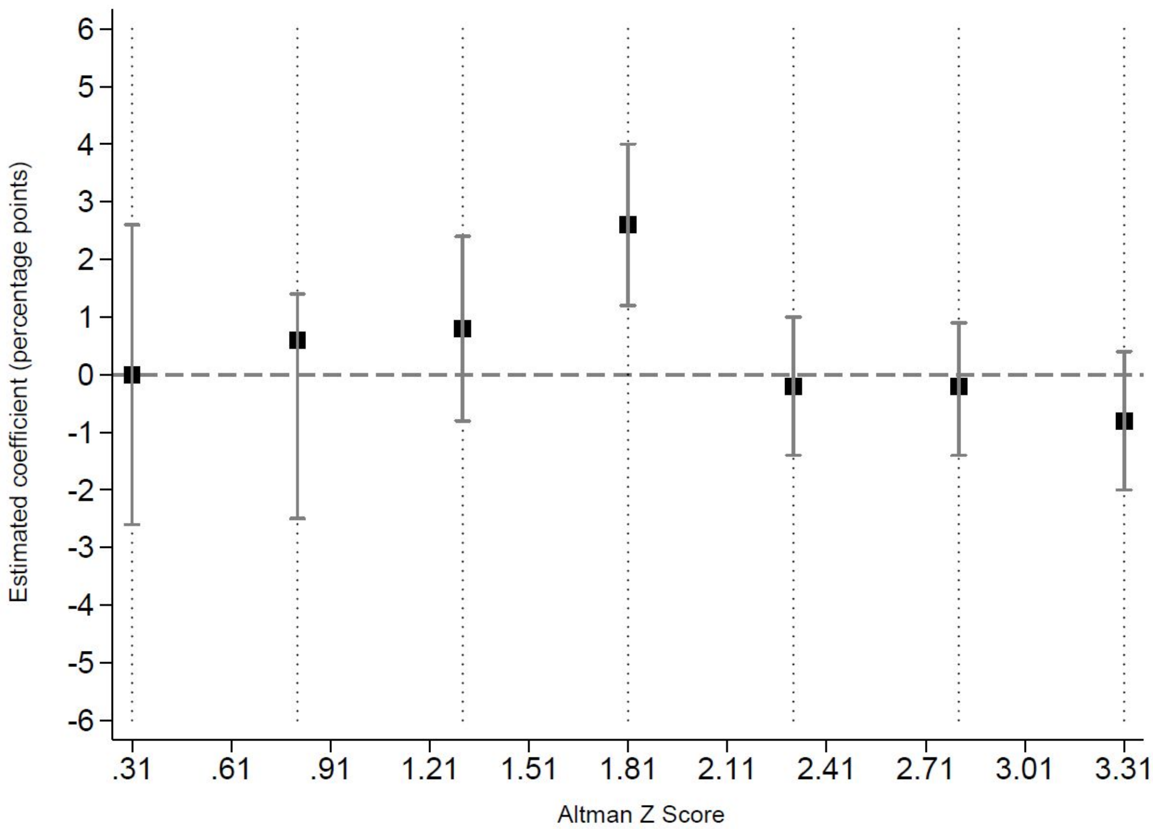
Test for Continuity of the Altman Z-score Distribution around the Crisis Threshold



Notes. This figure visualizes the continuity of the Altman Z-score distribution around the crisis threshold of 1.81, following McCrary (2008). The x-axis presents the continuous variable Altman Z-score around the cut-off. The y-axis represents the density of Altman Z-scores, measured in absolute values. The figure shows the histogram, estimated density, and 95% confidence intervals of the Altman Z-scores.

Figure 3

Estimated Change in Female Appointments at Placebo Thresholds and the Actual Crisis Threshold (1.81)



Notes. We ran a regression discontinuity model (as in Table 3, Model 6) for each threshold value of the Altman Z-score at 0.5 intervals. Squares represent the coefficient on *Firm Crisis Status* for each threshold. The error bars show 95% confidence intervals around the coefficient. Underlying standard errors are clustered at firm level. Dotted lines are for orientation only.

REFERENCES

Adams, R. B. 2016. Women on boards: The superheroes of tomorrow? *The Leadership Quarterly*, 27(3): 371–386.

Adams, S. M., Gupta, A., & Leeth, J. D. 2009. Are female executives over-represented in precarious leadership positions? *British Journal of Management*, 20(1): 1–12.

Aguinis, H., & Bradley, K. J. 2014. Best practice recommendations for designing and implementing experimental vignette methodology studies. *Organizational Research Methods*, 17(4): 351–371.

Akerlof, G. A., & Kranton, R. E. 2005. Identity and the Economics of Organizations. *Journal of Economic perspectives*, 19(1): 9–32.

Akerlof, G. A., & Kranton, R. E. 2010. *Identity economics: How our identities shape our work, wages, and well-being*. Princeton, NJ: Princeton Univ. Press.

Almamy, J., Aston, J., & Ngwa, L. N. 2016. An evaluation of Altman's Z-score using cash flow ratio to predict corporate failure amid the recent financial crisis: Evidence from the UK. *Journal of Corporate Finance*, 36: 278–285.

Altman, E. I. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4): 589–609.

Angrist, J. D., & Pischke, J.-S. 2009. *Mostly harmless econometrics: An empiricist's companion*. Princeton, NJ: Princeton Univ. Press.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. 2010. On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21(6): 1086–1120.

Arvate, P. R., Galilea, G. W., & Todescat, I. 2018. The queen bee: A myth? The effect of top-level female leadership on subordinate females. *The Leadership Quarterly*, 29(5): 533–548.

Bechtoldt, M. N., Bannier, C. E., & Rock, B. 2019. The glass cliff myth? – Evidence from Germany and the U.K. *The Leadership Quarterly*, 30(3): 273–297.

Benoit, K., Watanabe, K., Wang, H., Nulty, P., Obeng, A., Müller, S., … 2021. *Package 'quanteda'*. Retrieved from https://cran.r-project.org/package=quanteda.

Bergh, D. D., Connelly, B. L., Ketchen, D. J., & Shannon, L. M. 2014. Signalling Theory and Equilibrium in Strategic Management Research: An Assessment and a Research Agenda. *Journal of Management Studies*, 51(8): 1334–1360.

Berns, K. V. D., & Klarner, P. 2017. A Review of the CEO Succession Literature and a Future Research Program. *Academy of Management Executive*, 31(2): 83–108.

Boivie, S., Graffin, S. D., & Pollock, T. G. 2012. Time for me to fly: Predicting director exit at large firms. *Academy of Management Journal*, 55(6): 1334–1359.

Brealey, R. A., Myers, S. C., & Allen, F. 2020. *Principles of corporate finance* (Thirteenth edition, international student edition). *The McGraw-Hill/Irwin series in finance, insurance, and real estate*. New York: McGraw Hill Education.

Bruckmüller, S., & Branscombe, N. R. 2010. The glass cliff: When and why women are selected as leaders in crisis contexts. *British Journal of Social Psychology*, 49(3): 433–451.

Brzykcy, A., & Boehm, S. 2021. No such thing as a free ride: The impact of disability labels on relationship building at work. *Human Relations*: 1-30.

Calonico, S., Cattaneo, M. D., & Titiunik, R. 2014. Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica: Journal of the Econometric Society*, 82(6): 2295–2326.

Campbell, J. Y., Hilscher, J., & Szilagyi, J. 2008. In search of distress risk. *The Journal of Finance*, 63(6): 2899–2939.

Carton, R. B., & Hofer, C. W. 2006. *Measuring organizational performance: Metrics for entrepreneurship and strategic management research*. Cheltenham, U.K., Northampton, Mass.: Edward Elgar.

Certo, S. T. 2003. Influencing initial public offering investors with prestige: Signaling with board structures. *Academy of Management Review*, 28(3): 432–446.

Certo, S. T., Busenbark, J. R., Woo, H., & Semadeni, M. 2016. Sample selection bias and Heckman models in strategic management research. *Strategic Management Journal*, 37(13): 2639–2657.

Chang, E. H., Milkman, K. L., Chugh, D., & Akinola, M. 2019. Diversity thresholds: How social norms, visibility, and scrutiny relate to group composition. *Academy of Management Journal*, 62(1): 144–171.

Chen, J., & Hill, P. 2013. The impact of diverse measures of default risk on UK stock returns. *Journal of Banking & Finance*, 37(12): 5118–5131.

Cheung, H. K., King, E., Lindsey, A., Membere, A., Markell, H. M., & Kilcullen, M. 2016. Understanding and reducing workplace discrimination. In M. Buckley (Ed.), *Research in Personnel and Human Resources Management:* 101–152. Bingley, UK: Emerald Group Publishing Limited.

Cohen, B. D., & Dean, T. J. 2005. Information asymmetry and investor valuation of IPOs: Top management team legitimacy as a capital market signal. *Strategic Management Journal*, 26(7): 683–690.

Colella, A., Hebl, M., & King, E. 2017. One hundred years of discrimination research in the Journal of Applied Psychology: A sobering synopsis. *Journal of Applied Psychology*, 102(3): 500–513.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. 2011. Signaling Theory: A

Review and Assessment: A review and assessment. *Journal of Management*, 37(1): 39–67.

Connelly, B. L., Ketchen, D. J., Gangloff, K. A., & Shook, C. L. 2016. Investor perceptions of CEO successor selection in the wake of integrity and competence failures: A policy capturing study. *Strategic Management Journal*, 37(10): 2135–2151.

Cook, A., & Glass, C. 2014. Above the glass ceiling: When are women and racial/ethnic minorities promoted to CEO? *Strategic Management Journal*, 35(7): 1080–1089.

Da, Z. H., Engelberg, J., & Gao, P. 2011. In search of attention. *The Journal of Finance*, 66(5): 1461–1499.

Dezsö, C. L., & Ross, D. G. 2012. Does female representation in top management improve firm performance?: A panel data investigation. *Strategic Management Journal*, 33(9): 1072–1089.

Dezső, C. L., Ross, D. G., & Uribe, J. 2016. Is there an implicit quota on women in top management?: A large-sample statistical analysis. *Strategic Management Journal*, 37(1): 98–115.

Drake, M. S., Roulstone, D. T., & Thornock, J. R. 2012. Investor Information Demand: Evidence from Google Searches Around Earnings Announcements. *Journal of Accounting Research*, 50(4): 1001–1040.

Dwivedi, P., Joshi, A., & Misangyi, V. F. 2018. Gender-inclusive gatekeeping: How (mostly male) predecessors influence the success of female CEOs. *Academy of Management Journal*, 61(2): 379–404.

Eagly, A. H., & Karau, S. J. 2002. Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109(3): 573–598.

Eggers, A. C., Fowler, A., Hainmueller, J., Hall, A. B., & Snyder, J. M. 2015. On the Validity of the Regression Discontinuity Design for Estimating Electoral Effects: New Evidence from Over 40,000 Close Races. *American Journal of Political Science*, 59(1): 259–274.

Fang, V. W., Huang, A. H., & Karpoff, J. M. 2016. Short selling and earnings management: A controlled experiment. *The Journal of Finance*, 71(3): 1251–1294.

Fernandez-Mateo, I., & Fernandez, R. M. 2016. Bending the Pipeline? Executive Search and Gender Inequality in Hiring for Top Management Jobs. *Management Science*, 62(12): 3636–3655.

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. 2009. *Strategic leadership: Theory and research on executives, top management teams, and boards*. *Strategic management series*. Oxford: Oxford University Press.

Flammer, C. 2015. Does Corporate Social Responsibility Lead to Superior Financial Performance? A Regression Discontinuity Approach. *Management Science*, 61(11): 2549–2568.

Flammer, C., & Bansal, P. 2017. Does a long-term orientation create value? Evidence from a regression discontinuity. *Strategic Management Journal*, 38(9): 1827–1847.

Friedman, S. D., & Singh, H. 1989. CEO succession events and stockholder reactions: the influence of context and event context. *Academy of Management Journal*, 32(4): 718–744.

Frölich, M., & Huber, M. 2019. Including Covariates in the Regression Discontinuity Design. *Journal of Business & Economic Statistics*, 37(4): 736–748.

Gangloff, K. A., Connelly, B. L., & Shook, C. L. 2016. Of Scapegoats and Signals. *Journal of Management*, 42(6): 1614–1634.

Gaughan, K., & Smith, E. B. 2016. Better in the shadows? Media coverage and market reactions to female CEO appointments. *Academy of Management Proceedings*, (1): 13997.

Geiler, P., & Renneboog, L. 2015. Are female top managers really paid less? *Journal of Corporate Finance*, 35: 345–369.

Gelman, A., & Imbens, G. 2019. Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business & Economic Statistics*, 37(3): 447–456.

Georgakakis, D., & Ruigrok, W. 2017. CEO Succession Origin and Firm Performance: A Multilevel Study. *Journal of Management Studies*, 54(1): 58–87.

Gilliam, T. A., Heflin, F., & Paterson, J. S. 2015. Evidence that the zero-earnings discontinuity has disappeared. *Journal of Accounting and Economics*, 60(1): 117–132.

Glass, C., & Cook, A. 2016. Leading at the top: Understanding women's challenges above the glass ceiling. *The Leadership Quarterly*, 27(1): 51–63.

Gloor, J. L., Gazdag, B., & Reinwald, M. 2020. Overlooked or undercooked? Critical review & recommendations for experimental methods in diversity research. In A. Risberg, S. Just, & F. Villeseche (Eds.), *Routledge Companion to Organizational Diversity Research Methods*. London: Routledge.

Gomulya, D., & Boeker, W. 2014. How firms respond to financial restatement: CEO successors and external reactions. *Academy of Management Journal*, 57(6): 1759–1785.

Gomulya, D., & Mishina, Y. 2017. Signaler Credibility, Signal Susceptibility, and Relative Reliance on Signals: How Stakeholders Change their Evaluative Processes After Violation of Expectations and Rehabilitative Efforts. *Academy of Management Journal*, 60(2): 554–583.

Gomulya, D., Wong, E. M., Ormiston, M. E., & Boeker, W. 2017. The role of facial appearance on CEO selection after firm misconduct. *Journal of Applied Psychology*, 102(4): 617–635.

Graffin, S. D., Carpenter, M. A., & Boivie, S. 2011. What's all that (strategic) noise? Anticipatory impression management in CEO succession. *Strategic Management Journal*, 32(7): 748–770.

Gündemir, S., Carton, A. M., & Homan, A. C. 2019. The impact of organizational performance on the emergence of Asian American leaders. *Journal of Applied Psychology*, 104(1): 107–122.

Gupta, V. K., Han, S., Mortal, S. C., Silveri, S. D., & Turban, D. B. 2018. Do women CEOs face greater threat of shareholder activism compared to male CEOs? A role congruity perspective. *Journal of Applied Psychology*, 103(2): 228–236.

Gupta, V. K., Mortal, S. C., Silveri, S., Sun, M., & Turban, D. B. 2020. You're Fired! Gender Disparities in CEO Dismissal: Gender disparities in CEO dismissal. *Journal of Management*, 46(4): 560–582.

Haleblian, J. J., McNamara, G., Kolev, K., & Dykes, B. J. 2012. Exploring firm characteristics that differentiate leaders from followers in industry merger waves: A competitive dynamics perspective. *Strategic Management Journal*, 33(9): 1037–1052.

Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2): 193–206.

Harrison, J. S., Boivie, S., Sharp, N. Y., & Gentry, R. J. 2018. Saving face: How exit in response to negative press and star analyst downgrades reflects reputation maintenance by directors. *Academy of Management Journal*, 61(3): 1131–1157.

Haslam, S. A., & Ryan, M. K. 2008. The road to the glass cliff: Differences in the perceived suitability of men and women for leadership positions in succeeding and failing organizations. *The Leadership Quarterly*, 19(5): 530–546.

Heilman, M. E. 2001. Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues*, 57(4): 657–674.

Helfat, C. E., Harris, D., & Wolfson, P. J. 2006. The Pipeline to the Top. *Academy of*

Management Executive, 20(4): 42–64.

Hermalin, B. E., & Weisbach, M. S. 2012. Information disclosure and corporate governance. *The Journal of Finance*, 67(1): 195–233.

Higgins, M. C., & Gulati, R. 2006. Stacking the deck: The effects of top management backgrounds on investor decisions. *Strategic Management Journal*, 27(1): 1–25.

Hill, A. D., Johnson, S. G., Greco, L. M., O'Boyle, E. H., & Walter, S. L. 2021. Endogeneity: A Review and Agenda for the Methodology-Practice Divide Affecting Micro and Macro Research. *Journal of Management*, 47(1): 105–143.

Hill, A. D., Upadhyay, A. D., & Beekun, R. I. 2015. Do female and ethnically diverse executives endure inequity in the CEO position or do they benefit from their minority status?: An empirical examination. *Strategic Management Journal*, 36(8): 1115–1134.

Huang, S., & Thakor, A. V. 2013. Investor heterogeneity, investor-management disagreement and share repurchases. *The Review of Financial Studies*, 26(10): 2453–2491.

Hughes, M. M., Paxton, P., & Krook, M. L. 2017. Gender quotas for legislatures and corporate boards. *Annual Review of Sociology*, 43: 331–352.

Huson, M. R., Malatesta, P. H., & Parrino, R. 2004. Managerial succession and firm performance. *Journal of Financial Economics*, 74(2): 237–275.

Imbens, G. W., & Lemieux, T. 2008. Regression discontinuity designs: A guide to practice. *Journal of Econometrics*, 142(2): 615–635.

Jeong, S.-H., & Harrison, D. A. 2017. Glass breaking, strategy making, and value creating: Meta-analytic outcomes of women as CEOs and TMT members. *Academy of Management Journal*, 60(4): 1219–1252.

Kanter, R. M. 1977. Some effects of proportions on group life: Skewed sex ratios and responses to token women. *American Journal of Sociology*, 82(5): 965–990.

Khan, A. M., & Manopichetwattana, V. 1989. Innovative and noninnovative small firms: Types and characteristics. *Management Science*, 35(5): 597–606.

Knippen, J. M., Shen, W., & Zhu, Q. 2019. Limited progress?: The effect of external pressure for board gender diversity on the increase of female directors. *Strategic Management Journal*, 40(7): 1123–1150.

Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. 2011. Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin*, 137(4): 616–642.

Kotter, J. P. 1982. General managers are not generalists. *Organizational Dynamics*, 10(4): 5–19.

Kulich, C., Lorenzi-Cioldi, F., Iacoviello, V., Faniko, K., & Ryan, M. K. 2015. Signaling change during a crisis: Refining conditions for the glass cliff. *Journal of Experimental Social Psychology*, 61: 96–103.

Lando, D. 2004. *Credit risk modeling: Theory and applications*. *Princeton series in finance*. Princeton, NJ: Princeton Univ. Press.

Lee, D. S., & Lemieux, T. 2010. Regression Discontinuity Designs in Economics. *Journal of Economic Literature*, 48(2): 281–355.

Lee, P. M., & James, E. H. 2007. She'-e-os: Gender effects and investor reactions to the announcements of top executive appointments. *Strategic Management Journal*, 28(3): 227–241.

Leslie, L. M. 2019. Diversity initiative effectiveness: A typological theory of unintended consequences. *Academy of Management Review*, 44(3): 538–563.

Leslie, L. M., Manchester, C. F., & Dahm, P. C. 2017. Why and when does the gender gap reverse?: Diversity goals and the pay premium for high potential women. *Academy of*

Management Journal, 60(2): 402–432.

Lonati, S., Quiroga, B. F., Zehnder, C., & Antonakis, J. 2018. On doing relevant and rigorous experiments: Review and recommendations. *Journal of Operations Management*, 64: 19–40.

Massicotte, P. & Eddelbuettel, D. 2018. *gtrendsR: Perform and Display Google Trends Queries*. Retrieved from https://cran.r-project.org/package=gtrendsR.

McClelland, P. L., Xin Liang, & Barker, V. L. 2009. CEO Commitment to the Status Quo: Replication and Extension Using Content Analysis. *Journal of Management*, 36(5): 1251–1277.

McCrary, J. 2008. Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, 142(2): 698–714.

McNeish, D., Stapleton, L. M., & Silverman, R. D. 2016. On the unnecessary ubiquity of hierarchical linear modeling. *Psychological Methods*,

Miller, T., & Triana, M. d. C. 2009. Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management Studies*, 46(5): 755–786.

Mitra, A., Post, C., & Sauerwald, S. 2021. Evaluating Board Candidates: A Threat-Contingency Model of Shareholder Dissent Against Female Director Candidates. *Organization Science*, 32(1): 86–110.

Morgenroth, T., Kirby, T. A., Ryan, M. K., & Sudkämper, A. 2020. The who, when, and why of the glass cliff phenomenon: A meta-analysis of appointments to precarious leadership positions. *Psychological Bulletin*, 146(9): 797–829.

Mulcahy, M., & Linehan, C. 2014. Females and precarious board positions: Further evidence of the glass cliff. *British Journal of Management*, 25(3): 425–438.

Naumovska, I., Wernicke, G., & Zajac, E. J. 2020. Last to Come and Last to Go? The Complex Role of Gender and Ethnicity in the Reputational Penalties for Directors Linked to Corporate Fraud: On the Complex Role of Gender and Ethnicity in the Reputational Penalties for Directors Linked to Corporate Fraud. *Academy of Management Journal*, 63(3): 881–902.

Ndofor, H. A., & Levitas, E. 2004. Signaling the strategic value of knowledge. *Journal of Management*, 30(5): 685–702.

Post, C., Lokshin, B., & Boone, C. 2020. What Changes After Women Enter Top Management Teams? A Gender-based Model of Strategic Renewal. *Academy of Management Journal*, (advanced online publication).

R Core Team. 2015. R. Vienna, Austria: Foundation for Statistical Computing. Retrieved from http://www.R-project.org/.

Ren, C. R., Hu, Y., & Cui, T. H. 2019. Responses to rival exit: Product variety, market expansion, and preexisting market structure. *Strategic Management Journal*, 40(2): 253–276.

Rink, F., Ryan, M. K., & Stoker, J. I. 2013. Social resources at a time of crisis: How gender stereotypes inform gendered leader evaluations. *European Journal of Social Psychology*, 43(5): 381–392.

Ryan, M. K., & Haslam, S. A. 2007. The glass cliff: Exploring the dynamics surrounding the appointment of women to precarious leadership positions. *Academy of Management Review*, 32(2): 549–572.

Ryan, M. K., & Haslam, S. A. 2009. Glass cliffs are not so easily scaled: On the precariousness of female CEOs' positions. *British Journal of Management*, 20(1): 13–16.

Ryan, M. K., Haslam, S. A., Hersby, M. D., & Bongiorno, R. 2011. Think crisis-think female: The glass cliff and contextual variation in the think manager-think male stereotype. *Journal of Applied Psychology*, 96(3): 470–484.

Ryan, M. K., Haslam, S. A., Morgenroth, T., Rink, F., Stoker, J., & Peters, K. 2016. Getting on top of the glass cliff: Reviewing a decade of evidence, explanations, and impact. *The Leadership Quarterly*, 27(3): 446–455.

Schein, V. E. 1973. The relationship between sex role stereotypes and requisite management characteristics. *Journal of Applied Psychology*, 57(2): 95–100.

Semadeni, M., Withers, M. C., & Trevis Certo, S. 2014. The perils of endogeneity and instrumental variables in strategy research: Understanding through simulations. *Strategic Management Journal*, 35(7): 1070–1079.

Shen, W., & Cannella, A. A. 2002. Revisiting the performance consequences of CEO succession: The impacts of successor type, postsuccession senior executive turnover, and departing CEO tenure. *Academy of Management Journal*, 45(4): 717–733.

Sieweke, J., & Santoni, S. 2020. Natural experiments in leadership research: An introduction, review, and guidelines. *The Leadership Quarterly*, 31(1): 1–25.

Spence, M. 2002. Signaling in retrospect and the informational structure of markets. *American Economic Review*, 92(3): 434–459.

Trueman, B., Wong, M. H. F., & Zhang, X.-J. 2000. The eyeballs have it: Searching for the value in internet stocks. *Journal of Accounting Research*, 38: 137–162.

Vergne, J.-P., Wernicke, G., & Brenner, S. 2018. Signal incongruence and its consequences: A study of media disapproval and CEO overcompensation. *Organization Science*, 29(5): 796–817.

Vozlyublennaia, N. 2014. Investor attention, index performance, and return predictability. *Journal of Banking & Finance*, 41: 17–35.

Wright, P., Ferris, S. P., Hiller, J. S., & Kroll, M. 1995. Competitiveness through management of diversity: Effects on stock price valuation. *Academy of Management Journal*, 38(1): 272–287.

Xia, J., Dawley, D. D., Jiang, H., Ma, R., & Boal, K. B. 2016. Resolving a dilemma of signaling bankrupt-firm emergence: A dynamic integrative view. *Strategic Management Journal*, 37(8): 1754–1764.

Zavyalova, A., Pfarrer, M. D., Reger, R. K., & Shapiro, D. L. 2012. Managing the message: The effects of firm actions and industry spillovers on media coverage following wrongdoing. *Academy of Management Journal*, 55(5): 1079–1101.

Zhang, Y., & Rajagopalan, N. 2010. Once an outsider, always an outsider? CEO origin, strategic change, and firm performance. *Strategic Management Journal*, 31(3): 334–346.

Zhang, Y., & Wiersema, M. F. 2009. Stock market reaction to CEO certification: The signaling role of CEO background. *Strategic Management Journal*, 30(7): 693–710.

Zhu, D. H., Shen, W., & Hillman, A. J. 2014. Recategorization into the In-group. *Administrative Science Quarterly*, 59(2): 240–270.

APPENDIX

Table A1

Robustness Check Using Alternative Investor Attention Measures

	Investor Attention using full corporate names		*Investor Attention* without recoding of zeros to missing	
	Model (1a)	Model (1a)	Model (2a)	Model (2b)
	Above median	Below median	Above median	Below median
Firm Crisis Status	0.040***	0.013	0.027**	0.016
	(0.013)	(0.013)	(0.013)	(0.013)
	p=.003	*p*=.307	*p*=.038	*p*=.231
N	4,348	4,333	5,444	4,966

Notes. *Investor Attention* is measured by Google Trends and the sample is split at the median score. Subsample sizes are not equal because the MSE-optimal bandwidth selector automatically chooses different bandwidths in the subsamples. Standard errors (in parentheses) are clustered at firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table A2

Placebo Tests with Cut-Off between Safe Zone and Gray Zone

	Model 1 ± 1%	Model 2 ± 1.5%	Model 3 ± 2%	Model 4 ± 2.5%	Model 5 ± 3%	Model 6 Full model	Model 7 Full model w/ controls
Firm Crisis Status	-0.069	0.035	0.074	0.035	0.022	-0.007	-0.002
	(0.086)	(0.072)	(0.061)	(0.053)	(0.048)	(0.006)	(0.007)
	p=.426	*p*=.624	*p*=.224	*p*=.504	*p*=.650	*p*=.214	*p*=.764
N	170	256	331	451	528	19,076	16,048

Notes. Models 1 to 5 contain all executive turnovers within a certain percentage of the placebo cut-off Altman Z-score of 2.99. Model 6 includes all observations. The bandwidth is chosen automatically using the MSE-optimal bandwidth selector for the treatment effect estimator, as recommended by Calonico et al. (2014). Model 7 adds controls. Standard errors (in parentheses) are clustered at firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table A3

Generalizability

Covariates	Mean [-3%, 3%]	Mean other	Diff. in means *p*-value
Firm Size	5676.416	8251.900	.098
Female Presence on Board	0.086	0.093	.238
Board Size	10.659	10.581	.731
Average Board Age	59.557	59.021	.154
Firm Age	21.829	21.324	.788
CEO	0.193	0.198	.792
CFO	0.300	0.299	.965
COO	0.438	0.420	.443
Chairperson	0.174	0.189	.356

Note. p-values for the difference between means are based on standard errors clustered at firm level.