

Counterbalancing Overconfidence: The Role of Female Independent Directors in Enhancing CEO Accountability and Firm Performance^{*}

Suman Banerjee[†]

Ronald W. Masulis[‡]
ECGI, ABFER

Arun Upadhyay[§]

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Abstract

Little research exists on matching corporate directors and CEOs with behavioral biases. Our study reveals that female independent directors (IDs) significantly enhance the positive effects of overconfident CEOs (OC-CEOs). Female IDs enhance accountability in OC-CEOs, resulting in higher valuation multiples and improved operating performance. The departure of female IDs from firms led by OC-CEOs yields negative stock returns and deteriorating firm performance. Conversely, the appointment of female IDs at firms with OC-CEOs and independent nominating committees generates positive CARs. These findings underscore the crucial role of female IDs in counteracting OC-CEO biases.

JEL Classification Code: G23, G32, G34

Keywords: Female Independent Directors, Gender-diverse Board, Director Death, Male Independent Directors, Board Independence, Overconfident CEOs, Firm Performance, Cumulative Abnormal Returns, SOX Compliant Firms.

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[†] Stevens Institute of Technology. Tel: 201-216-3689. E-mail: sbanerj2@stevens.edu

[‡] University of New South Wales, Australia. Tel:(612) 9385-5860. Email: ron.masulis@unsw.edu.au

[§] Florida International University. Tel: 305-348-5427. Email: arun.upadhyay@fiu.edu

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“If you want something said, ask a man; if you want something done, ask a woman.” ~ Margaret Thatcher

The impact of gender diversity on firm performance remains a contested issue in corporate governance. A critical question is whether female directors contribute to enhanced productivity and under what circumstances they do so. Although existing literature provides mixed empirical evidence (e.g., Fich (2005), Adams and Ferreira (2009), Linck, Netter, and Yang (2009), Matsa and Miller (2013), Ahern and Dittmar (2012), Hwang, Shivdasani, and Simintzi (2019), Kim and Starks (2016), and Eckbo et al. (2022)), research often focuses on overall board composition, rather than on the nuanced impact of female directors at firms led by certain types of CEOs.

This study shifts the focus towards understanding whether female independent directors (IDs) can enhance shareholder value by mitigating the biases associated with overconfident (OC) CEOs. While previous research explores the relationship between CEO types and board composition, it is crucial to investigate whether female IDs, known for their stronger monitoring capabilities, can effectively balance the risks and rewards of CEO overconfidence.⁵ OC CEOs, while potentially beneficial in environments rich with profitable opportunities, often misjudge risks, leading to suboptimal decisions. The literature presents evidence for both sides: Hirshleifer, Low, and Teoh (2012) and Galasso and Simcoe (2011) highlight some benefits, whereas Malmendier and Tate (2008), Ben-David, Graham, and Harvey (2013), and Banerjee, Humphery-Jenner, and Nanda (2015) underscore the pitfalls.⁶

CEO overconfidence can also lead to myopic decision-making (see, e.g., Ben-David et al. 2013), prioritizing short-term gains at the expense of long-term value, as observed by Malmendier and Tate (2005). It may even lead to earnings manipulation and fraud (Gervais, Heaton, and Odean 2011; Schrand and Zechman 2012).⁷ Boards lacking sufficient independence exacerbate these negative outcomes, as seen in the Enron scandal (see, e.g., O'Connor 2003). The Sarbanes-Oxley Act (SOX) of 2002 introduced governance reforms that improved board independence and enhance firm value, as shown by Knyazeva, Knyazeva, and Masulis (2013) and Guo and Masulis

⁵ We find a few studies that examine whether matching CEO types and director types affect shareholder wealth (Bandiera et al. 2020). Evidence indicates how directors with specific skills (e.g., bankers, venture capitalists, ex-politician, and lawyers) bring value to firms that need specific skill sets. See, e.g., Byrd and Mizruchi, 2005; Hillman, 2005; Kirk and Gwin, 2009.

⁶ The prior literature finds independent directors to be valuable monitors of managers (e.g., Balsam et al. 2016, Bernile et al. (2018), Core et al. 2006, Duchin, Matsusaka and Ozbas, 2010; Nguyen and Nielsen, 2010; Knyazeva, Knyazeva and Masulis, 2013; Falato, Kadyrzhanova and Lel, 2014; Guo and Masulis, 2015; and Masulis and Zhang, 2019. See Masulis, 2020 for a more detailed survey.)

⁷ Overconfident CEOs undertake hubris driven takeovers (see, e.g., Roll, 1986; Malmendier and Tate, 2008), increase corporate risk-taking (see, e.g., Cain and McKeon, 2016; Banerjee et al., 2015), and to spend more from internal funds (see, e.g., Malmendier and Tate, 2005; Banerjee et al., 2015). See, also, Barber and Odean (2001) for OCs effects on fund investment outcomes.

(2015).⁸ However, SOX also imposed significant compliance costs on US firms, particularly smaller firms vis-à-vis comparable firms not subject to such regulations as documented by Ahmed et al. (2010), Ashbaugh-Skaife et al. (2008), Bedard and Graham (2011), Hollis et al. (2008), Iliev (2010), Leuz, Triantis, and Yue Wang (2008), and Wintoki (2007).⁹

This study explores the effectiveness of simpler governance mechanisms, specifically focusing on board independence and the inclusion of female IDs, in achieving similar outcomes to those provided by more complex and costly regulatory mechanisms. A key question emerges: Why emphasize female IDs over their male counterparts or even IDs in general?¹⁰ The rationale lies in the unique perspectives and decision-making approaches that female directors bring to a boardroom, which can complement and enhance the governance process in ways that may not be fully captured by gender-neutral criteria alone. For example, psychological research suggests that female tend to exhibit greater patience and lower impulsiveness, making female IDs particularly effective in restraining the excesses of OC CEOs (see, e.g., Cross et al. 2011). Powell et al. (1997) finds that while females are generally less risk-seeking than males, these strategic differences do not impair performance. Social psychology literature highlights the important role diverse perspectives play in enhancing group decision-making (e.g., Phillips, Liljenquist, and Neale 2009; Eyrich, Quin, and Fessell 2019). While homogeneity can provide comfort, it often restricts the exchange of new ideas and stifles productive debate. Diversity can lead to some boardroom conflict, but it also fosters innovation and improved problem-solving, even if its benefits are not immediately apparent.¹¹ Thus, female IDs can bring valuable heterogeneity to a board packed with “good old boys,” where they act as catalysts for idea exchange and fresh thinking.¹²

Further, research in economics and psychology consistently finds that female tend to be less overconfident than men, which may translate into more measured decision-making at the board level (Croson and Gneezy 2009). Huang and Kisgen (2013) find that male CEOs make more

⁸ Refer to Arping and Sautner (2013) and Ashbaugh-Sakife et al. (2009) for insights on SOX’s impact on accounting-related issues.

⁹ Disclosure requirements targeting only a subset of firms can harm the information environment, potentially negating the direct benefits of disclosure regulation. Hao (2024) illustrates in the context of mandatory versus voluntary disclosures.

¹⁰ Duchin, Matsusaka, and Ozbas (2010) and An et al. (2021) demonstrate the conditions under which outside (independent) directors are most effective.

¹¹ Moreover, evidence suggests that gender diversity in the workforce is linked to superior innovation performance (see, e.g., Turban et al. 2019; Griffin, Li, and Xu 2021). Also, these findings are consistent with studies that examine investment decisions of traders (see, e.g., Barber and Odean, 2001, and M&A decisions by corporate boards (see, e.g., Levi, Li, and Zhang, 2014).

¹² Also, see KelloggInsight (October 2010) titled “Better Decisions Through Diversity” and Fang and Huang (2017) on the weaker career benefits female financial analysts obtain from their connections to institutional investors, suggesting greater independence.

acquisitions and issue debt more frequently than female CEOs, resulting in lower announcement returns, indicating greater male executive overconfidence.¹³ Building on these insights, we propose that even a single female ID can significantly impact board dynamics, fostering a culture of rigorous scrutiny and more comprehensive discussions (see, e.g., Stahl et al. 2009). This shift could lead to strategic decisions that align more closely with long-term growth, as supported by Griffin, Li, and Xu (2021). This study aims to assess whether gender-specific contributions can effectively mitigate risks associated with OC CEOs and ultimately enhance shareholder value, thus potentially offering a more efficient alternative to broad-sweeping regulatory interventions.

It is important to recognize that gender diversity is not a universal solution and can come with its own set of challenges. For instance, Garlappi, Giammarino, and Lazrak (2017) and Donaldson, Malenko, and Piacentino (2020) highlight that gender diversity may lead to slower decision-making and increased conflict within the boardroom, which can impose costs on the firm. These drawbacks can be particularly pronounced in environments where swift decision-making is critical, or where the firm operates in highly competitive markets.

These drawbacks highlight the need to balance diversity with board cohesion to fully leverage diverse perspectives while avoiding inefficiencies. We argue that the advantages of female IDs may be less pronounced when firms are led by rational CEOs or when market pressures push for short-term gains over long-term strategy. In such cases, female IDs may have limited ability to temper CEO overconfidence or improve strategic decision-making. This nuanced perspective may explain the mixed findings in the literature on the impact of female IDs on firm performance, as seen in studies by Adams and Ferreira (2009), Ahern and Dittmar (2012), Matsa and Miller (2013), Kim and Starks (2016), Eckbo et al. (2022), and Xu (2017).

Thus, while gender diversity of corporate boards can offer clear benefits, particularly in mitigating the risks associated with OC CEOs and fostering diverse perspectives, it is important to weigh these benefits against the possible costs. The effectiveness of female IDs may vary depending on the specific context, including the nature of the CEO's leadership style and the competitive dynamics of the industry and the qualifications of female IDs. This study seeks to

¹³ Studies like Dhir (2015) and Gul, Srinidhi, and Ng (2011) argue that gender diversity reduces groupthink and herding among corporate directors, thereby enhancing board oversight.

contribute to the ongoing debate by examining these trade-offs and providing a more nuanced understanding of when and how gender diversity on boards can enhance firm performance.

Our research yields several critical insights into the intersection of board gender diversity and CEO overconfidence. First, we analyze market reactions to news of female ID appointments in firms with OC CEOs using an event study methodology. This approach mitigates endogeneity concerns in long-term stock price changes, providing an unbiased estimate of investor expectations about the impact of these appointments on shareholder value, absent confounding news.¹⁴

Our results reveal a positive average cumulative abnormal return (CAR) for female ID appointments. However, when we stratify the sample by CEO overconfidence, we observe a significantly larger mean CAR for firms led by overconfident CEOs. This supports our core hypothesis that the presence of a female ID is particularly advantageous in this context.

We then assess the impact of female IDs on firm performance, controlling for various factors including board size, firm and CEO characteristics, and market conditions. Using conventional performance measures such as Tobin's Q and return on assets (ROA), we find that female IDs in firms with OC CEOs significantly enhance operating efficiency and shareholder value. This effect remains robust whether we use a binary indicator of an OC CEO or a continuous measure, and whether we measure the presence of female IDs with an indicator variable or as a ratio of female IDs to total board size. The results hold even when we account for industry or firm fixed effects. Notably, a 10% increase in the female ID ratio corresponds to a significant 2.92% increase in Tobin's Q, underscoring the substantial economic impact of female IDs in firms with OC CEOs.¹⁵

Our study also differentiates between the effects of female IDs and other female directors, such as executive and affiliated directors. We hypothesize that female executive directors, who report directly to OC CEOs, and female affiliated directors, who may have financial or familial ties to the CEO, are less likely to challenge CEO decisions.¹⁶ Empirical evidence confirms that female IDs drive the value creation observed. In contrast, male IDs in the same context do not produce significant results, suggesting that female IDs play a unique role in enhancing firm value.

¹⁴ For example, we drop those announcements that are accompanied by news about mergers, CEO turnovers, dividend declarations, stock splits, tender offers, new product announcements, charter amendments, etc.

¹⁵ We report the detailed calculations of economic significance in Subsection 3.3.

¹⁶ Prior literature also finds that independent directors are less likely to be influenced by the CEOs compared with executive directors or affiliated gray directors and are better monitors (see, e.g., Linck et. al. 2009 and Masulis and Wang, 2019).

In our analysis of CEO turnover and compensation in firms with OC-CEOs, we find that female IDs are linked to more frequent CEO turnovers following poor stock performance, highlighting their role in protecting shareholder interests. They are also linked to higher quality financial reporting. Female IDs appear to support stricter accountability, increasing the likelihood of an underperforming CEO being replaced and tying compensation more closely to performance, thereby mitigating the moral hazard problem associated with CEO overconfidence.

We also examine the influence of female IDs on corporate risk-taking (see, e.g., Ben-David et al., 2013; Banerjee et al., 2015; Niu, 2010). Our findings show that firms with OC CEOs and gender-diverse boards lower their risk levels, consistent with prior research indicating that overconfident CEOs tend to take excessive short-term risks while avoiding long-term investments (see, e.g., Goel and Thakor, 2008; Gervais et al., 2011; Hirshleifer et al., 2012; Banerjee et al., 2015; Banerjee et al., 2024).¹⁷ The presence of female IDs curbs these tendencies, reducing firm risk after their appointment. Additionally, female IDs in the boardroom play a crucial role in challenging risky decisions, fostering discussions that lead to more prudent risk management, especially in firms operating within lower-opportunity industry sectors.

To address endogeneity concerns, we incorporate firm and industry fixed effects and analyze stock market reactions to "sudden departures" of female IDs due to exogenous factors (death and serious illness). Firms with OC CEOs show significant declines in market value following these departures, reinforcing our findings that female IDs enhance firm performance.¹⁸ We also examine potential self-selection among female IDs, where high demand might allow them to join better-performing firms (see, e.g., Gabaix and Landier, 2008).¹⁹ By comparing OC CEO led firms with and without female IDs, we find female ID appointments correlate with improved firm performance, particularly when the nominating committee is fully independent.

Our findings reveal a significant positive correlation between female ID appointments and improved performance at firms led by OC CEOs. This effect notably does not appear in firms without OC CEOs. Given that CEOs can exert substantial influence on new director selection, we

¹⁷ As argued in Griffin, Li and Xu, 2021; Kaplan et. al., 2012; Malmendier and Tate, 2005; Gervais et. al., (2011), and Banerjee et al. (2015), overconfident CEOs overweigh short term cash flows and are associated with myopic investment behavior. Investments in R&D generally produces long term benefits.

¹⁸ We find no significant changes in ROA since operational changes take time to manifest. However, the anticipation of future operational inefficiencies due to female ID's departure causes an immediate drop in firm valuation, with the extent of the decline depending on the likelihood of appointing a female ID in the future.

¹⁹ To avoid contaminating market reactions to female ID appointments, we exclude firms with simultaneous male ID appointments.

further investigate the role of independent nominating committees in firms before the Sarbanes-Oxley Act (SOX). We find that the positive impact of female ID appointments on firm performance becomes pronounced only when nominating committees operate independently.²⁰

To address potential econometric concerns, we conduct a series of robustness tests, accounting for various firm, CEO, and governance characteristics, and incorporating firm, industry, and year fixed effects into our analysis. Our results remain consistent even when considering significant exogenous events, such as the departures of female IDs due to external factors, the implementation of SOX, and changes in NYSE and Nasdaq listing rules that increased the demand for independent directors. We conclude that endogeneity in board selection, particularly reverse causality, is unlikely to drive our findings.

Our research makes substantial contributions to the fields of managerial overconfidence and board gender diversity. Consistent with prior literature, we confirm that CEO overconfidence can lead to poor decision-making and a decline in shareholder value. However, our findings show that in firms with OC CEOs, female IDs play a critical role in curbing the adverse effects of CEO overconfidence while preserving its potential benefits. This underscores the importance of aligning CEO traits with an appropriate board composition. Our study provides novel empirical evidence on the advantages of including female IDs on boards, as they effectively moderate the aggressive and often unprofitable behaviors associated with OC CEOs.

While our findings may not apply to other governance reforms, our research strongly suggests that appointing female IDs is an effective mechanism for restraining excessive CEO risk-taking and mitigating short-termism. This, in turn, brings tangible benefits to firm value and may contribute to broader social welfare. The central message of our study is clear: managerial overconfidence can be effectively managed and channeled through the relatively simple governance strategy of enhancing gender diversity among IDs. However, the broader question of how to optimize governance to fully leverage CEO overconfidence remains open and critically important. While our results indicate the potential efficacy of a less intrusive approach to improving board decision-making, we do not claim to offer a definitive solution for designing regulations that maximize the net benefits of CEO overconfidence.

²⁰ We also investigate whether similar mitigating effects are observed when a firm with female IDs appoints a new overconfident CEO. We find positive effects, particularly when the nominating committee is independent. See the discussion in Section 4.5.1.

2 Data

We analyze a dataset of ExecuComp firms from 1998 to 2018, excluding utilities and financial services firms, following the approach of Banerjee et al. (2015), Hirshleifer et al. (2012), and Malmendier and Tate (2005, 2008). Board characteristics including structure, director-firm relationships, and beneficial stockholdings are obtained from the ISS database (formerly RiskMetrics) and proxy statements. Accounting and financial data come from COMPUSTAT, while industry segment details are sourced from the COMPUSTAT segment files. Stock prices, returns, and market data are drawn from the University of Chicago's CRSP database. CEO compensation data is provided by ExecuComp, and institutional ownership information is sourced from Thomson Financials 13f filings.

2.1 Key Explanatory Variables

We assess gender diversity on boards using several measures. First, we employ an indicator variable for the presence of at least one female ID. Second, we quantify gender diversity by calculating the ratio of female independent directors to total board size. To explore differences based on director affiliation, we introduce two added indicators: one for female affiliated (gray) directors and another for female executive directors. Affiliated directors have business or familial ties with the firm, while executive directors are company employees. To compare the impact of female and male IDs, we also include the ratio of male IDs to board size in our regression models.

Our second key variable of interest is CEO overconfidence, for which we employ multiple alternative measures. Following the established literature (Banerjee et al., 2015; Hirshleifer et al., 2012; Malmendier and Tate, 2005, 2008), we primarily assess CEO overconfidence by examining the value of unexercised, but exercisable options.²¹ This involves calculating the Black-Scholes value per vested option and dividing it by the firm's year-end stock price from COMPUSTAT to ensure the measure is bounded between 0 and 1.²²

²¹ CEOs receive restricted stock and options as compensation but face vesting periods and are generally barred from short selling. Since their wealth is tied to the firm's success, poor diversification should prompt rational CEOs to exercise options and sell stock quickly, especially deep-in-the-money options (Lambert et al., 1991; Meulbroek, 2001; Hall and Murphy, 2000, 2002). While some CEOs hold vested, deep-in-the-money options due to positive private information, their firms often underperform the market, suggesting optimism may be "perceived" rather than based on real value. Malmendier and Tate (2008) highlight that holding these options yields low returns, contradicting the idea that insider knowledge drives the delay.

²² This continuous variable serves as our primary overconfidence measure as we construct CEO Holder67 and CEO Overconfidence TopQ measures using this continuous variable.

We also create an overconfidence indicator, CEO Holder67, which equals 1 if the CEO's continuous measure exceeds the 67th percentile of our sample. To identify persistent overconfidence, we classify a CEO as overconfident only if they surpass the 67th percentile at least twice within a 5-year window.²³ For robustness, we consider alternative cut-offs, such as the median and the top 25th percentile. In addition, we incorporate a press-based measure of CEO overconfidence by analyzing media descriptions of CEOs from 2000 to 2006, following the methodology of Hirshleifer et al. (2012) and Banerjee et al. (2015).

For performance metrics, we primarily use Tobin's Q to assess stock performance and return on assets (ROA) for firm operating performance, consistent with prior studies (Coles et al., 2008; Yermack, 1996). Tobin's Q is approximated by scaling a firm's market value of assets by its book value. Specifically, we estimate the market value of assets by adding the market value of equity to the book value of debt. Specifically,

$$\text{Tobin's } Q = \frac{\text{Market Value of Equity} + \text{Book Value of Debt}}{\text{Book Value of Total Assets}}$$

In our performance regressions, we include a 1-year leading measure of Tobin's Q and a 2-year leading measure of return on assets (ROA). The 2-year leading ROA helps capture the delayed impact of investment decisions on firm operating performance, which tends to reflect past actions. By incorporating these leading measures, we aim to better capture the dynamic nature of performance changes and their relationship to our variables of interest.

We also analyze the risk-taking behavior of firms by decomposing total stock risk into idiosyncratic risk and market risk (Beta). This is done using the mean square error (MSE) from a one-factor market model regression, based on the stock's return over the previous year and the value-weighted market return index. These risk measures allow us to assess both firm-specific and systematic risks in firms led by OC CEOs.

2.3 Control Variables

In line with prior research, we incorporate several common control variables into our analysis to account for firm-specific characteristics, CEO attributes, market factors, and board structure. Firm-specific controls include annual sales, insider holdings, financial leverage, diversification

²³ We employ another alternative measure, CEO Overconfidence TopQ, which is assigned a value of 1 if the continuous CEO overconfidence measure exceeds the third quartile value of the sample for a given year and is 0 otherwise.

(measured by industry segments), R&D intensity, firm age, and institutional ownership. For CEO-related controls, we include incentive compensation, gender, age, and tenure. Since our primary measure of overconfidence is based on CEO option holdings, we use a non-equity-linked incentive measure—specifically, the ratio of CEO salary to bonus, as suggested by Banerjee et al. (2015).

We also include market-related controls such as annual market return volatility, beginning-of-year institutional ownership value (or percentage of shares outstanding), and annual stock return. Board structure controls include board size and insider equity ownership. We follow ISS (formerly RiskMetrics) definitions for executive, affiliated, and independent directors and measure board size as the natural logarithm of the number of directors, following Yermack (1996).²⁴

We control for firm size using the natural logarithm of market capitalization, as per Coles et al. (2008)²⁵ and firm profitability by ROA.²⁶ Leverage is calculated as the ratio of long-term and short-term debt to total assets. Institutional ownership is measured as the proportion of shares outstanding held by institutional investors. Diversification is captured by the number of industry segments in which a firm operates, as documented by Yermack (1996). Firm age is measured by the natural logarithm of the years since the firm's inclusion in the CRSP database. Intangible assets are represented by the ratio of intangible assets to total assets. CEO age is logged, and total risk is captured by the standard deviation of monthly stock returns over the past 60 months, following Coles et al. (2008). CEO tenure is measured by the number of years the CEO has held the position.

2.4 Univariate Analysis

In Panel A of Table 1, we present descriptive statistics for the variables used in our sample. The average proportion of female IDs on corporate boards is 0.108, with a median of 0.111, indicating that about 10.8% of board members in S&P 1500 firms are female IDs. The highest observed ratio of female IDs on a board is 0.667, meaning two-thirds of the directors are female IDs, though some firms in our sample have no female IDs at all. About 66.2% of sample firms have at least one female ID. Further, only 2.7% of sample firms have female CEOs, and 22.7% have an OC CEO (top quartile of overconfidence). Using the CEO Holder67 measure, around 43%

²⁴ We also analyze the impact of board size without applying a logarithmic transformation and observe consistent findings.

²⁵ We also consider other firm size measures such as the natural logarithm of book value assets and the natural logarithm of capital. In unreported analysis, we find that our results remain qualitatively unchanged.

²⁶ To further assess the robustness of our findings, we investigate Operating Cash Flows (OCF) as an alternative measure of operating performance. OCF is less susceptible to earnings management, providing a more reliable indicator in this regard. Importantly, we find that our primary results remain consistent even when considering OCF as an alternative measure.

of sample firms have an OC CEO, consistent with Banerjee et al. (2015). Table OA1, Panel A, presents pairwise correlations of key variables, aligning with previous research on board structure.

In Table 1, Panel B, we compare characteristics of female and male IDs. Female IDs are generally younger and have a shorter board tenure compared to male IDs. On average, female IDs hold a smaller fraction of the firm's common stock, which correlates with their shorter tenure. Also, female IDs hold more board seats than male IDs and are less likely to miss board meetings.

[Insert Table 1, Panels A and B]

2.5 Announcement Return Analysis

Announcement returns are crucial in finance research for evaluating market efficiency, understanding investor behavior, assessing the impact of events on stock prices, and analyzing corporate decisions such as female ID and OC CEO appointments. These returns offer insights into financial market dynamics and deepen our understanding of their economic impacts.

Our primary hypothesis suggests that gender-diverse boards can enhance the ability of OC CEOs to generate long-term corporate value and improve performance. However, establishing a causal link between the presence of female IDs and firm performance in companies led by OC CEOs is challenging due to the lack of an exogenous factor driving the hiring of female IDs, which could lead to alternative interpretations of the observed relationship. To address this challenge, we use a variety of empirical approaches to test our hypothesis while accounting for endogeneity.

We start by examining market reactions to announcements of female and male ID appointments in firms led by OC CEOs, compared to firms without OC CEOs. We also analyze investor responses to announcements of OC CEO appointments versus non-OC CEO appointments in firms with at least one female ID, relative to firms with no female IDs. To collect the relevant appointment announcement dates, we identify female and male ID appointments within our sample using Lexis-Nexis and other sources "Mergent" online databases.

We apply exclusion criteria to ensure the integrity of our event study analysis.²⁷ Specifically, we exclude announcements that coincide with potentially confounding events such as mergers, CEO turnovers, dividend declarations, stock splits, tender offers, new product launches, charter

²⁷ In addition, we conduct searches across reputable business news sources, including but not limited to the Wall Street Journal, Financial Times, and New York Times, to gather relevant information for our study.

amendments, large order announcements, or significant changes in capital structure. Additionally, we omit announcements of female and male ID appointments within the same year. After applying these filters, our final sample consists of 1,807 female ID appointments and 6,006 male ID appointments. We further categorize these appointments based on whether the firms are led by OC CEOs. To identify OC CEOs, we use a continuous measure of CEO overconfidence, classifying CEOs in the top quartile as OC, and CEOs in the remaining three quartiles as non-overconfident.

To calculate abnormal returns, we subtract predicted returns from actual daily stock returns. Predicted returns are derived using a one-factor market model based on the CRSP value-weighted market index, estimated with a year's worth of daily trading data, ending three days before the announcement date. We then calculate five-day cumulative abnormal returns (CARs) from two days before to two days after the announcement. Table 2 presents the mean and median 5-day CARs for the different subgroups of ID appointments.

2.5.1 Market Reaction to FID Appointment Announcements

In Panel A of Table 2, we find that, on average, investors respond positively to the appointments of both female and male IDs. The data reveals a notable difference in investor reactions depending on whether the firm is led by an OC CEO or non-overconfident CEO. Specifically, the mean 5-day CAR for female ID appointments in firms with OC CEOs is 1.40%, compared to just 0.3% in firms without OC CEOs. For male ID appointments, the mean 5-day CAR is 1.10% in firms with OC CEOs and 0.10% in firms with non-overconfident CEOs.

The differences in CARs between female and male ID appointments, when comparing firms led by OC CEOs versus non-overconfident CEOs, are statistically significant at the 1% level. This indicates that the market perceives the appointment of female IDs more favorably, especially in firms with OC CEOs. A stronger positive reaction to female ID appointments suggests that investors view these appointments as a valuable check on OC CEO behavior, potentially leading to better governance and enhanced long-term performance. This effect is particularly pronounced in firms where OC CEOs might otherwise pursue riskier decisions or suboptimal outcomes, highlighting the perceived importance of gender diversity in mitigating such risks. To sum up, our event study suggests that the market views female IDs as a stabilizing influence, expected to enhance governance and curb the risky, unprofitable decisions often associated with OC CEOs.

2.5.2 Market Reaction to Overconfident CEO Appointment Announcements

In Panel B of Table 2, we analyze the CARs associated with CEO appointments, differentiating between firms with and without female IDs and between OC CEOs and non-overconfident CEOs.²⁸ Our findings indicate that the mean 5-day CAR for appointments of OC CEOs is 0.90% in firms with at least one female ID, compared to 0.20% in firms without female ID presence. In contrast, the mean CAR for non-overconfident CEO appointments is 0.10% in firms with gender-diverse IDs and 0.20% in firms lacking such diversity. The difference in CARs between OC CEO and non-overconfident CEO appointments, contingent on the presence of female IDs, is statistically significant at the 5% level. Notably, the positive stock market reaction is more pronounced for OC CEO appointments in firms with gender-diverse boards.

These results, consistent across Panels A and B, suggest a stronger favorable market response to female ID appointments, particularly in the context of OC CEOs. The average CAR in firms with OC CEOs and female IDs is significantly higher than in those with non-overconfident CEOs. Despite our best efforts to isolate the impact of these appointments, some announcements may be contaminated by other news that could also influence firm value. This potential confounding factor could attenuate the statistical significance of the observed differences across the subgroups.

[Insert Table 2, Panels A, B, and C]

Table 2 reports the share price reactions to announcements of ID and CEO appointments, but it does not control for several variables that could affect the relationship between the presence of female IDs and stock performance. For example, firms more likely to appoint female IDs may also be those with a higher concentration of OC CEOs who drive value through increased innovation. Consequently, the positive effects on shareholder wealth observed in Table 2 may not be solely attributable to the presence of female IDs, but rather to unobserved firm-level factors that these event studies do not account for.

3. Multivariate Analysis of the Effect of FIDs

In this section, we investigate the performance disparities among firms led by OC CEOs based on the gender composition of IDs on the board. Specifically, we compare firms with at least one

²⁸ One could ask a question about the identification of overconfident CEOs at the time of their appointment. Our identification is based on a CEO's post-appointment option holding patterns. Thus, we differentiate overconfident CEOs' appointments from non-overconfident CEOs based on whether during her/his tenure a CEO falls at least twice in the top quartile of CEO overconfidence measure in our sample. We also use 67th percentile cut-off and treat a CEO as overconfident if she/he falls above that cut-off and find robust results.

female ID to those with exclusively male IDs. To ensure robust findings, we control for a range of firm-level factors that could influence performance and correlate with ID gender characteristics. Our primary analysis examines whether the presence of female IDs leads to improved firm performance in OC CEO-led firms, using a binary indicator for female ID presence as the main explanatory variable and the percentage of female IDs on the board as a secondary measure.

Of course, the relationship between having a female ID and firm performance may be endogenous. Two key endogeneity concerns arise: (1) reverse causality, where female IDs might select better-performing OC CEO-led firms, and (2) omitted variable bias, where unobserved firm-specific factors, such as organizational culture, could simultaneously influence the hiring of both OC CEOs and female IDs. To address these concerns and establish a causal link, we employ multiple empirical strategies designed to mitigate these potential endogeneity biases.

3.1. Are Female IDs Associated with Better Performance at Overconfident CEO Led Firms?

To assess the impact of board gender diversity and CEO overconfidence on firm value, we construct a firm-year panel dataset using COMPUSTAT. Our empirical models incorporate firm and year fixed effects to control for time-invariant firm characteristics and annual macroeconomic conditions. Additionally, we estimate models with *Industry * Year and Firm fixed effects* to account for industry-specific factors influencing the appointment of female directors alongside overconfident CEOs, and to control for any systematic matching between firms and CEOs that could drive performance outcomes. We cluster standard errors by firm to address potential serial correlation in firm-level variables. Firm performance is evaluated using Tobin's Q and ROA as dependent variables, with the model specified as follows:

$$\begin{aligned} \text{Firm Performance}_{i,t+1} = & \alpha + \beta_1 \text{Female ID/Ratio}_{i,t} + \beta_2 \text{OC CEO}_{i,t} \\ & + \beta_3 \text{Female ID/Ratio}_{i,t} * \text{OC CEO}_{i,t} + \theta x_{i,t} + \eta_i + \varphi_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

To rigorously assess the impact of gender-diverse boards and CEO overconfidence on firm value, we incorporate *firm* and *industry*year* fixed effects while controlling for a range of relevant factors. Firm value is measured by Tobin's Q and ROA. In analyzing ROA, we apply a two-year lead, while for Tobin's Q we used a one-year lead. The rationale behind this approach is that ROA, a backward-looking metric, reflects changes in operating performance that typically require a longer time to manifest, partly due to the gradual adjustments and learning curve associated with

newly appointed directors. In contrast, Tobin's Q is expected to respond more immediately, as it reflects market expectations of future profitability improvements.

In our analysis, we expect a positive coefficient for the interaction between indicators of OC CEOs and the presence of female IDs. Table 3, Panel A and B, present results where columns 1-4 use a binary indicator for female IDs, while columns 5-8 employ the Female ID Ratio as a continuous measure of board gender diversity.²⁹ Additionally, we examine two alternative measures of CEO overconfidence: a continuous measure of CEO Overconfidence and a binary indicator, CEO TopQ, capturing CEOs with relatively high levels of overconfidence. To demonstrate robustness, we estimate models with various fixed effects at the year, industry, firm, and CEO levels across different columns in both panels.

Our findings consistently show that the interaction between female IDs and CEO overconfidence is positive and significant across all eight models, supporting our primary hypothesis that the presence of female IDs enhances shareholder value in firms led by OC CEOs. Specifically, estimates from Table 3, Panel A, column 6 indicate that a 10% increase in ID gender diversity—equivalent to adding approximately one female director—leads to a 2.90% increase in firm stock value.³⁰ Similarly, estimates from Table 3, Panel B, column 6 show that the same increase in gender diversity results in a 5.22% improvement in operating performance. Conversely, the impact of OC CEOs in firms with non-gender-diverse boards is either insignificant or negative. Notably, the interaction terms between the Male ID Ratio and CEO overconfidence are generally negative but insignificant, although in some cases they are significantly negative, implying that male IDs are not as helpful as female IDs. Furthermore, the presence of female IDs in firms led by non-overconfident CEOs does not show a significant association with firm performance, as the coefficients on the Female ID/Ratio are statistically insignificant across models, and the Male ID Ratio coefficients are similarly insignificant. These results align with our primary hypothesis.

In Table 3, Panel C, we re-estimate firm performance models using an alternative measure of CEO overconfidence, CEO Holder67, while controlling for firm, and *industry*year* fixed effects.

²⁹ For the sake of brevity, the reported regressions in our analysis incorporate an intercept term, as well as firm and year fixed effects. However, the specific coefficients associated with these effects are not presented in the tables. In order to account for potential correlation within firms, we employ cluster-robust standard errors at the firm level.

³⁰ In column 6 of Panel A Table 3, the coefficient on *Female ID Ratio* is -0.183 and the coefficient on the interaction term *Female ID Ratio × CEO TopQ* is 0.785. The mean of Tobin's Q in our sample is 2.074. Thus, the overall effect of a 10% increase in the *Female ID Ratio* for the average firm led by an overconfident CEO = $(-0.183+0.785) \times 0.10/2.074=0.0290$ or 2.90%.

The results remain consistent with our primary hypothesis: OC CEOs in firms with gender-diverse boards achieve better firm performance, while non-overconfident CEOs do not exhibit the same positive outcome. Firms with a higher proportion of male independent directors do not show the same positive outcomes when led by OC CEOs, further supporting our hypothesis that the combination of OC CEOs and gender-diverse boards drives superior firm performance.³¹

To address concerns that the observed relationship between firm performance and the combination of a gender-diverse board and an OC CEO might be influenced by prior firm performance, we re-estimate the models from Table 3, Panel C, while controlling for lagged firm performance. In Panel D of Table 3, we present results for three alternative overconfidence measures: *CEO Overconfidence*, *CEO TopQ*, and *CEO Holder67*. We continue to find a positive and significant coefficient on the interaction terms between female IDs and CEO overconfidence, while the individual coefficients for female ID and the CEO overconfidence measures remain insignificant, as do the interaction terms for the male ID ratio and CEO overconfidence. These findings reinforce our proposition that the association of superior firm performance with the combination of an OC CEO and a gender-diverse board is not merely a result of prior firm success but rather the strategic alignment of these two factors.

In summary, we conclude that female IDs, recognized for their heightened caution and conservatism, play a crucial role in the board curbing some of the actions of OC CEOs. This restraint likely fosters more measured and deliberate decision-making, ultimately enhancing the firm's long-term value. In the next section, we examine the impact of an exogenous departure of female IDs on the performance of firms led by overconfident CEOs.

[Insert Table 3, Panels A, B, C, and D]

3.2 Exogenous Departures of Female IDs, Overconfident CEOs and Firm Performance

To address potential endogeneity concerns related to the possibility that female directors may prefer to join better-performing firms led by OC CEOs, we examine whether the departure of female IDs have a negative impact on firm performance. If the positive effects we previously documented are indeed due to the presence of female IDs on the boards of OC CEO-led firms, we should observe a decline in firm performance following their departure. However, it is also

³¹ While we controlled for own stock return in all our tables, we did not account for market return. However, Table OA6 confirms that our baseline results remain consistent even after adjusting our overconfidence measures to exclude the impact of market return.

possible that female directors might leave a firm due to anticipated poor performance, making the observed negative effects a signal of their private knowledge rather than a direct consequence of their departure. To mitigate this concern, we focus our analysis on exogenous female ID departures, such as those due to death, critical illness, or other health-related reasons. We source this data from Audit Analytics for the period 2001-2018 and exclude firms that simultaneously experience a CEO departure to isolate the effect of losing female IDs. To ensure that our analysis does not capture any effects of new CEOs or the negative performance leading to CEO turnover, we also limit our sample to those CEOs who have been in office for at least three years.

We re-estimate our base model (see, e.g., Equation 1) for firm performance, including an indicator for female ID departures. For comparison, we also include an indicator for exogenous male ID departures. We run firm-fixed effects analysis on two sub-samples of firms: OC CEO led firms and non-OC CEO led firms. We also include industry*year fixed effects. This analysis allows us to compare the effects of exogeneous departure of female and male IDs in firms that differ by the overconfidence status of their CEOs after controlling for any unobservable firm-specific factors and for any industry-specific trends. The dependent variables are the 1-year leading Tobin's Q in columns 1-2 and 2-year leading ROA in columns 3-4. The results of this analysis are presented in Table 4, Panel A.

[Insert Table 4 Panel A here]

Consistent with our primary hypothesis, we find that firms led by OC CEOs experience a decline in performance following the exogenous departure of a female ID. Specifically, the *Female ID Exogenous Departure* indicator yields a negative coefficient in column 1. Consistent with our earlier findings, we do not find a significant coefficient on the *Female ID Exogenous Departure* indicator in column 2, which uses the subsample of firms led by a non-OC CEO. These results indicate that firms led OC CEOs see a decline in their performance following the exogenous departure of female IDs, but this is not the case at non-OC CEO led firms. In contrast, the coefficients for "*Male ID Exogenous Departure*" are insignificant, suggesting that departures of

male IDs do not significantly impact firm performance, neither in OC CEO-led firms, nor in other non-OC CEO led firms.³²

To further isolate the effects of female ID departures on the performance of firms led by overconfident CEOs from other potential sources of performance changes, we analyze a subsample of firms that experienced an exogenous ID departure without any concurrent departures of CEOs or other directors. This approach allows us to compare changes in firm performance due to shifts in board gender diversity excluding cases of exogeneous departures of male IDs, conditional on whether the firm is led by an OC CEO or non-overconfident CEO. If the synergy between gender-diverse boards and OC CEOs is crucial to performance, then the departure of a female ID should negatively impact performance only in firms led by OC CEOs. Conversely, if board gender diversity alone is the key factor, we should observe a performance decline regardless of CEO type. To address any other changes that could lead to a change in firm performance, we also control for the changes in other control variables as well as the industry*year fixed effects.

The results of this analysis, presented in Panel B of Table 4, show that exogenous departures of female IDs lead to declines in Tobin's Q when firms have OC CEOs. The insignificant coefficient on *Female ID Exogenous Departure* suggests that the specific combination of a gender-diverse board and an OC CEO is a critical driver of firm performance. This effect is not observed for operating performance measures. These findings further support our primary hypothesis that female IDs play a crucial role in disciplining OC CEOs and in guiding their investment and risk-taking strategies towards more productive outcomes that enhance shareholder value.

[Insert Table 4, Panel B]

These results strengthen our main conclusion. We showed that presence of female IDs results in improvements in firm value. The sudden absence of Female IDs results in a deterioration in firm value, which helps confirm a causal link.

3.3 Diversity Among Female Directors and Overconfident CEOs' Firm Performance

3.3.1 Variation in Affiliation of Female Directors

³² It's important to note that male IDs constitute the majority in almost all firms, so the departure of one or a few male IDs is unlikely to have a significant impact. To accurately assess the effects, we control for the simultaneous departures of both male and female IDs within the same model.

In the previous sections, we established that the combination of gender-diverse IDs and an overconfident CEO leads to improved firm performance, likely due to enhanced board monitoring. This raises a pertinent question: does gender diversity across the entire board produce similar effects, or does the impact vary depending on the category of female directors? To explore this, we differentiate female directors into three categories: executive, affiliated, and independent, using separate indicator variables for each. We hypothesize that any positive effects of gender diversity will be weaker for executive and affiliated directors, given their financial or personal ties to the firm and its senior executives. Specifically, executive directors are directly supervised by the CEO, who influences their job security and compensation, while affiliated directors may include bankers, lawyers, consultants, or executives connected to the firm through business relationships or interlocking directorships. The remaining female directors are classified as independent.

Table 5 presents the results for Tobin's Q and ROA, where we modify the baseline specification from Table 3 to include indicators for female executive and affiliated directors. The interaction terms for female executive and affiliated directors are insignificant across both models. In contrast, the interaction terms for female IDs remain positive and statistically significant at the 1% or 5% levels. These findings reinforce our hypothesis that the positive effects of board gender diversity in firms led by OC CEOs stem from the stronger monitoring role played by female IDs, who generally maintain greater independence from the CEO.

[Insert Table 5 here]

3.3.2 Variation in Board Leadership Position of Female IDs

We investigate the mechanisms through which gender-diverse boards impact firm performance, particularly in companies led by OC CEOs. To pinpoint the sources of this influence, we conduct a targeted analysis. We first focus on board leadership roles, as directors with significant committee memberships or those serving as chairs of key board committees—or as board chair—are in a stronger position to influence board decisions. Female IDs assigned to specific board committees or leadership roles in companies led by OC CEOs can often excel as directors because they provide a more balanced perspective at the board level, where they provide a focused oversight in areas like auditing, compensation, and risk management, where they can offer more independent analysis of complex issues. Female IDs are especially effective in fostering a culture of accountability, ensuring that decisions align with a company's long-term goals, which

significantly enhances governance and overall performance in environments with OC CEOs. We hypothesize that female IDs in these leadership roles have a greater impact on firms with OC CEOs. If this alignment is less critical, we would not expect a significant relationship between firm performance and the presence of female board leaders or key committee members.

To test the above prediction, we re-estimate the firm performance models in Table 3, Panel C, after replacing Female ID with separate indicators for firms with and without female IDs on a key board monitoring committee (Audit, Compensation, and Nominating) *Female ID Committee Member*, which equals 1 if a firm has at least one female ID on any of the three key committees, and 0 otherwise and *Female ID Non-Committee Member*, which equals 1 if no female ID serves on any of these three committees, and 0 otherwise. To explore the effects across different CEO types, we include interaction terms of these two female ID indicators with *CEO Holder67*. The results, presented in Table 6, show that the positive impact of gender-diverse boards at firms with overconfident CEOs is concentrated in firms with female IDs on a key monitoring committee.

We extend this analysis by introducing two new indicators, *Female ID Board Leader*, which equals 1 if a firm has at least one female ID in a leadership role on a key committee or as board chair, and 0 otherwise and *Female ID Non-Leader*, which equals 1 if no female ID holds such positions, and 0 otherwise. We also include interaction terms between these two indicators and *CEO Holder67* in our regressions. The firm performance estimates, shown in columns 2 and 4 of Table 6, reveal that the positive association between firm performance and gender-diverse boards and with OC CEOs is primarily driven by firms with a female ID in a leadership role.

[Insert Table 6 here]

3.3.3 Variation in Firm Performance and the Primary Professions of Female IDs

In Table 7, we explore whether our findings are influenced by the primary professions of female IDs, which may reflect their motivations for serving on boards. It is possible that some firms, under social and political pressure, appoint female IDs who may lack the motivation to fully fulfill their director duties, especially if these roles do not align with their primary professional interests. To distinguish female IDs likely to be motivated and effective monitors from those who might not be, we categorize IDs based on their primary professions.

We posit that female IDs who are executives of other firms are more likely to be motivated monitors, as their board performance could positively impact their own career advancement. Female IDs with experience in other firms are catalysts for reducing biases in boardroom decisions particularly firms led by OC CEOs. Their ability to challenge the status quo, backed by proven success in diverse corporate environments, promotes merit-based decisions over entrenched biases or groupthink. Conversely, directors who are retired or primarily engaged in community leadership activities may prioritize accumulating board seats over actively excelling in their board roles, potentially leading to less focused and effective boardroom engagement. This distinction aligns with the findings of Masulis and Mobbs (2014), who show that IDs strategically adjust their effort levels based on the personal benefits they derive from directorships.

To test this hypothesis, we create indicator variables for a female ID's primary profession. The variable *Non-Corp Female ID* takes a value of 1 if the female ID's primary profession is outside the corporate executive realm, and 0 if she holds an executive position in a for-profit firm. We also introduce *Retired Corp Female ID* to capture the effect of retired executives. Similar control variables are created for male IDs to account for their professional backgrounds.

We re-estimate Equation 1, incorporating *Non-Corp Female ID* and its interaction with *CEO Holder67*, and then *Retired Corp Female ID* and its interaction with *CEO Holder67*. Given that retired executives can have weaker monitoring incentives due to their shorter career horizons, we expect them to be less effective in their board duties, particularly in firms led by OC CEOs. The results, presented in Table 7, show that the interaction terms between *Non-Corp Female ID* and *CEO Holder67*, as well as *Retired Corp Female ID* and *CEO Holder67*, are insignificant in both models using Tobin's Q or ROA as a dependent variable. In contrast, *Female ID*CEO Holder67* remains positive and significant across all four models. These findings suggest that our results are primarily driven by female IDs who are more likely to undertake an active monitoring role.

[Insert Table 7 here]

3.3.4 Impact of Female IDs' Busyness on Firm Performance

To further disentangle the effects of female IDs on firm performance, we investigate whether their effectiveness varies based on how likely they are to be occupied with other responsibilities. While busyness is often measured by the number of board meetings an ID attends, it can also be inferred from their primary profession. Some professions, particularly that of a CEO, can demand

significant time and attention, making these directors potentially less focused on their board duties. Although CEOs of other firms can bring valuable insights to the board, their high level of external responsibility may adversely affect their ability to monitor effectively.

We hypothesize that if female IDs are otherwise effective in their roles, high external professional demands could lead to inattention, diminishing their contributions to firm performance, especially in firms led by overconfident CEOs who may require more oversight and guidance. Conversely, directors who are already less effective might not experience a significant decline in performance due to busyness, as their baseline level of contribution is already low. Therefore, we expect to see a more pronounced deterioration in performance for female IDs who become inattentive, particularly in the context of OC CEOs.

To capture this potential inattention, we create two indicator variables: *Inattentive Female ID* and *CEO Female ID*. *Inattentive Female ID* is set to 1 if a female ID attends fewer than 75% of board meetings and 0 otherwise. *CEO Female ID* is set to 1 if the female ID is the current CEO of another firm and 0 otherwise. To assess whether their impact varies in the presence of an OC CEO, we also create interaction terms between these indicators and *CEO Holder67*. Additionally, we control for male ID busyness by introducing analogous variables: *Inattentive Male ID Ratio* and *CEO Male ID Ratio*. We use ratios for male IDs due to their typically larger board representation and we also include interaction terms of these ratios and *CEO Holder67*.

We re-estimate our primary firm performance models, as reported in Table 3, Panel C, incorporating these new variables, with the results presented in Table 8. We find that the interaction terms between *CEO Holder67* and the variables capturing female ID inattention are either insignificant or negative. However, the positive and significant coefficients on *Female ID * CEO Holder67* persist across all four models in Table 8. Similarly, the interaction terms between *CEO Holder67* and the male ID ratios capturing inattention also yield insignificant or negative coefficients. These results suggest that female IDs positively influence firm performance when serving on the boards of firms led by overconfident CEOs, provided they remain well informed and actively participate in board deliberations.

[Insert Table 8 here]

3.3.5 Variation in the Degree of Independence of Female IDs

Passage of SOX (2002) underscored the critical importance of having a fully independent nominating committee when selecting female IDs. The nomination of truly independent versus pseudo-independent female directors depends critically on the nominating committee's ability to carry out an unbiased selection process (see, e.g., Coles et al., 2014). Before the SOX reforms, the independence of board nominating committees varied widely. In 2003, post-SOX, the NYSE and Nasdaq mandated fully independent nominating committees composed exclusively of IDs. By focusing on cross-sectional variations in nominating committee independence during the pre-SOX period, we can more effectively isolate the specific characteristics of female IDs that drive shareholder value. But we lose a large portion of our observations in analyzing this subsample. We find that pre-SOX female IDs were only effective monitors when nominating committees were fully independent. This result, shown in Table 9, suggest that fully independent nominating committees are better at selecting truly independent directors, including socially independence.³³

[Insert Table 9 here]

3.4 Forced Turnover of OC CEOs and Firm Performance Sensitivity: Effects of Female IDs

CEO turnover decisions are a key responsibility of the board, serving as an indicator of whether a board is effectively monitoring a firm's senior executives. Analyzing CEO turnover in response to firm performance provides insight into the diligence and effectiveness of the board's oversight. We identify CEO turnover events using the ExecuComp database,³⁴ focusing on instances where a new CEO is reported, and the outgoing CEO's departure is not due to death or retirement (for those under 65). Overconfident CEOs are more likely to heed the board's concerns if they perceive the board as willing to take decisive action against firm underperformance.

To assess whether gender-diverse boards are more inclined to discipline CEOs, we examine forced turnover of OC CEOs and its sensitivity to firm performance, with a particular focus on the influence of female IDs. The results of our logit regressions are presented in Table 10. In columns 1 and 2, we analyze whether the impact of female IDs on the likelihood of forced CEO turnover varies with firm performance by including an interaction term between *Female ID* and *CEO Holder67*. Column 1 presents results for firm-years where equity returns fall below the industry

³³ To see if female ID appointments by partially independent nominating committees in 2002-2005 affect our results, we exclude new female ID appointments during this period. In unreported analysis, we find qualitatively similar results to those in Table 3.

³⁴ This data is from Wharton Research Data Services and is based on Peters and Wagner (2014) and Jenter and Kanaan (2015).

median (Poor Performance), while column 2 focuses on firm-years with equity returns are above the industry median (Good Performance). To ensure consistency, we exclude firm-years where the current CEO's tenure was under three years, as our overconfidence measure relies on a history of option exercises, which is not available for executives who only have unvested stock options.

The analysis reveals that the coefficient for *Female ID* in column 1 of Table 10 is positive and significant, indicating a greater likelihood of forced CEO turnover when firm performance is below the industry norm. In contrast, the coefficient is insignificant in column 2, suggesting that gender-diverse boards are unlikely to force CEO turnover when performance is strong. The interaction term *Female ID*CEO Holder67* in column 1 is also positive and significant, highlighting that poor firm performance significantly increases the likelihood of forced turnover of OC CEOs when female IDs are present. This interaction term is insignificant in column 2, reinforcing the conclusions that gender-diverse boards are unlikely to force out OC CEOs for positive performance. These findings suggest that boards with female IDs are more assertive in supporting the forced turnover of OC CEOs following poor firm performance.

[Insert Table 10 here]

3.5 Firm Performance Sensitivity to CEO Compensation: Effects of Female IDs

CEO compensation adjustments are crucial board decisions that signal a board's effectiveness in monitoring and motivating senior executives to enhance firm performance. Boards influence CEO behavior by tying compensation to firm performance, with numerous studies showing that performance-sensitive pay reduces the likelihood of excessive risk-taking or under-investment due to shirking. We investigate if OC CEO compensation is more performance-sensitive in firms with female IDs. If female IDs are more effective monitors than males, then we expect to see stronger pay-for-performance links for OC CEOs in firms with female IDs compared to firms without them.

To evaluate female ID impact on CEO compensation policy, we estimate the future total compensation of CEOs one year ahead for two sub-samples of firms, categorized based on their annual equity performance relative to industry peers. The Poor (Good) Performance subsample includes firms that underperform (outperform) their industry peers. To analyze how a CEO's future compensation varies with their overconfidence and the presence of board gender diversity, we include the variables *Female ID* and *Female ID*CEO Holder67* in our model. The results of this analysis are presented in Table 11, where $\ln(CEO\ Total\ Compensation)_{t+1}$ is the dependent

variable. The first column reports results for firms in the Poor Performance subsample, while the second column focuses on firms in the Good Performance subsample.

The findings reveal that firms with an OC CEO and at least one female ID tend to design compensation packages more closely aligned with firm performance. These firms offer higher future CEO pay when their performance exceeds the median in our sample, indicating a stronger pay-for-performance link in gender-diverse boards. For non-OC CEOs, strong performance is associated with lower CEO pay in firms with gender-diverse boards.³⁵ In contrast, when firms perform poorly, future CEO pay remains largely unchanged, regardless of whether a CEO is overconfident or not. These findings suggest that female IDs play a key role in enhancing firm performance by reinforcing performance-based compensation, particularly for OC CEOs.

[Insert Table 11 here]

3.6 Do Female IDs Reduce Overconfident CEO Risk-taking Tendencies?

Regardless of whether a firm is engaging in overinvestment, OC CEOs often expose a firm to high levels of risk, as measured by stock return volatility and its components—systematic market risk (beta) and idiosyncratic (firm-specific) risk. We next explore whether female IDs mitigate the impact of OC CEOs on a firm's risk exposure. Since OC CEOs tend to overestimate expected returns and underestimate the associated risks, their firms are prone to taking on excessive or suboptimal risk levels. We argue that female IDs, who bring diverse perspectives and skillsets, creates a boardroom environment that restrains OC CEOs from unilaterally determining a firm's risk profile. Specifically, female IDs, known for being more skeptical, more cautious, and less acquisitive than male IDs (Levi et al., 2010; Huang and Kisgen, 2013; Levi et al., 2014), are likely to encourage a more critical assessment of firm risk-taking activities. Therefore, we hypothesize that female IDs can help mitigate the potentially excessive risk-taking behavior of OC CEOs.

We examine both market/systematic risk (beta) and idiosyncratic/firm-specific risk (see, e.g., Banerjee et al., 2015; Low, 2009). We test this proposition using the statistical model specified in Eq. (2) below with firm and industry*year fixed effects and standard errors clustered by firm.

³⁵ This result suggests that gender-diverse boards tend to moderate CEO compensation levels, even when firms have positive performance. This challenges the usual expectation that better performance automatically results in higher CEO pay and suggests that gender-diverse boards may support more restrained CEO compensation practices. Also, we find evidence that female IDs differentially influence OC CEO compensation compared to non-OC CEOs, although this finding warrants further investigation.

$$(Risk)_{i,t+1} = \alpha + \beta_1 Female\ ID_{i,t} + \beta_2 CEO\ Holder67_{i,t} + \beta_3 Female\ ID_{i,t} \\ * CEO\ Holder67_{i,t} + \theta X_{i,t} + \eta_i + \varphi_t + \varepsilon_{i,t} \quad (2)$$

where the dependent variable, $Risk_{i,t+1}$ is defined as $Total\ Risk_{i,t+1}$ measured by stock return volatility, or one of its two components, $Market\ Risk_{i,t+1}$, and $Idiosyncratic\ Risk_{i,t+1}$. X represents a vector of control variables, and η_i and φ_t , are *firm* and *industry*year* fixed effects respectively.³⁶

Our findings show that firms with OC CEOs and at least one female ID tend to have significantly lower risk exposure.³⁷ This conclusion is based on the negative and significant interaction terms in two of the three models, particularly in reducing idiosyncratic risk. In contrast, the coefficient for *Female ID* alone is insignificant, indicating that female IDs do not generally reduce firm risk across all CEO types. Additionally, the coefficients for *Male ID Ratio* and its interaction terms are insignificant across all models. Overall, these results support our hypothesis that female IDs significantly reduce risk exposure in firms led by OC CEOs.

In Panel B of Table 12, we investigate the relationship between the presence of female IDs and the appointing firm's future risk-taking strategies. We categorize industries into high-growth and low-growth based on industry sales growth at the 2-digit SIC level, identifying high-growth industries as those in the top sales growth quartile. Our analysis reveals that the observed risk reduction is predominantly concentrated in low-growth industries. In such industries, with poorer investment opportunities, OC CEOs may be reluctant to acknowledge this less attractive investment environment and might engage in excessive risk-taking that is unjustified by the expected returns. The presence of female IDs in the boardroom appears to play a critical role in challenging these decisions, fostering discussions that lead to more prudent risk management in firms operating in low-opportunity sectors.

[Insert Table 12 Panels A and B here]

In summary, female IDs likely challenge the overly optimistic risk assessments of OC-CEOs, encouraging more cautious and prudent strategies, particularly in sectors with limited investment opportunities. This aligns with the existing literature that finds women typically exhibit a more

³⁶ We estimate beta with a single-factor market model over the prior year using daily stock returns data. Idiosyncratic risk is defined as the mean squared error (MSE) from a single-factor model. Some studies (e.g., Banerjee et al., 2015) use natural logs when examining return variance and MSE to adjust for non-linearities. We find qualitatively similar results using a log transformation.

³⁷ We run similar tests for female executive and gray directors and find an insignificant association between firm risk measures (Beta and MSE) and these female directors when they serve on the board of an overconfident CEO led firm.

conservative approach to financial decision-making. The next section examines the impact of female IDs on reporting quality.

3.7 Female IDs and Reporting Quality in Overconfident CEO Led Firms

Prior research suggests that gender-diverse boards are associated with higher oversight standards, leading to improved financial reporting quality. In contrast, firms led by OC CEOs tend to produce more optimistic, and potentially misleading, financial disclosures (see, e.g., Gul et al., 2011; Schrand and Zechman, 2012; Hribar and Yang, 2016). To assess whether gender-diverse boards enhance financial reporting in firms with OC CEOs, we analyze alternative measures of reporting quality commonly used in the accounting literature. Specifically, we examine the absolute value of discretionary accruals $|Discretionary\ Accruals|$ and S&P's Earnings Quality Rating, following the approaches used in prior studies (Francis et al., 2005; Doyle et al., 2007; Ashbaugh-Skaife et al., 2008; Arping and Sautner, 2013; Fang and Huang, 2017).

Discretionary accruals are estimated using the model developed by Kothari et al. (2005), adjusted for performance using ROA. Larger discretionary accruals indicate lower quality earnings. For ease of interpretation, we transform S&P's earnings quality ratings into numerical values, where higher numbers reflect better earnings quality. The results are detailed in Table 13 and include *industry*year* fixed effects across all the models to capture industry trends. We also add firm fixed effects to the regression model shown in column 2.³⁸

The findings presented in Table 13 demonstrate that the presence of female IDs improves the reporting quality of firms led by overconfident CEOs. The negative and significant coefficient of the interaction term *Female ID*CEO Holder67* in the regression for "Discretionary Accruals" indicates that gender-diverse boards reduce the use of discretionary accruals. Similarly, the positive and significant interaction term in the "S&P Quality" regression suggests that earnings quality is higher in firms with both an overconfident CEO and gender-diverse boards. In contrast, interaction terms involving male IDs, specifically *Male ID Ratio*CEO Holder67*, are insignificant, suggesting that male IDs are less effective in monitoring the quality of financial reporting.

[Insert Table 13 here]

³⁸ Since the dependent variable, absolute discretionary accruals, is relatively stable over time at the firm level, much of its effect is likely to be absorbed in the firm fixed effect.

We find that female IDs provide stronger oversight of financial disclosures, countering OC-CEOs' tendency to present overly optimistic reports. This improves transparency and reliability, crucial for investor trust and firm valuation. We next explore the impact of female IDs on firm performance in the post-SOX Act environment.

3.8 Appointments of IDs in Response to SOX and Performance of OC CEO Firms: Difference-in-Differences Analysis

The post-SOX exchange listing rule changes required firms to establish fully independent audit, nominating, and compensation committees and to ensure a majority of independent directors on the board. Many companies had to hire additional independent directors, both male and female, to comply with these 2002 mandates. Given the large number of non-compliant firms at the time, this created a significant increase in demand for independent directors without a corresponding increase in supply, thereby reducing the discretion boards had in selecting directors. As a result, changes in firm performance following these board composition adjustments are likely driven by the mandated changes rather than by time-invariant firm characteristics. To explore the effect of ID gender diversity in this context, we analyze whether the impact of female IDs on firm performance varies depending on a firm's compliance status with the new 2002 exchange listing rules. We expect to see a positive performance relationship in the post-SOX period, particularly for firms that were non-compliant in 2001, but were subsequently required to comply.

In Table 14, we conduct a performance analysis for the subsamples of compliant and non-compliant firms over the 2001-2006 period. The sample period ends in 2006 to account for the grace period ending in 2005, during which firms were required to comply with board independence requirements. We identify firms that were compliant with these requirements in 2001 and distinguish them from non-compliant firms by creating an indicator variable *SOX-Non-compliant*, which takes a value of 1 if a firm did not meet the independence criteria for the board, audit, compensation, and nominating committees at the end of 2001, and 0 otherwise. We also identify firms that appointed at least one female ID or male ID and create two indicator variables: *Female ID Appointment* and *Male ID Appointment*. Each variable equals 1 if a firm appoints at least one female or male ID in year t , respectively, and 0 otherwise. To isolate these appointment effects from changes in CEO overconfidence, we exclude firms that changed CEOs in this period to ensure that changes in Tobin's Q and ROA are not influenced by shifts in CEO overconfidence levels.

To control for unobservable time-invariant firm-specific factors, we include firm fixed effects, and year fixed effects are added to account for secular trends. To capture the effect of female ID appointments at firms led by OC CEOs that were non-compliant in 2001, we include a triple interaction term *Female ID Appointment* CEO TopQ* SOX-Non-compliant*. This specification enables a difference-in-differences analysis, which compares performance changes between non-compliant and compliant firms before and after SOX. Similarly, we include a second triple interaction term *Male ID Appointment* CEO TopQ* SOX-Non-compliant* to capture the effects of male ID appointments at non-compliant firms. The results are presented in Table 14.

Column 1 uses *Tobin's Q* as the dependent variable, while column 2 uses *ROA*. As expected, the triple interaction term *Female ID Appointment* CEO TopQ* SOX-Non-compliant* is positive and statistically significant at the 5% level in column 1, indicating that female ID appointments positively affect firm valuation when made by non-compliant firms led by OC CEOs. In contrast, the triple interaction terms for male ID appointments are insignificant. The coefficients for *Female ID Appointment* and *Female ID Appointment* CEO TopQ* are also insignificant, as are the single interaction terms *Female ID Appointment* SOX-Non-compliant*. These results suggest that female ID appointments at non-compliant firms, unlike male ID appointments, mitigate excessive risk-taking and overinvestment by OC CEOs, thereby creating shareholder value.

[Insert Table 14 here]

4. Robustness Tests

We take several additional steps to address possible alternative explanations for our findings and to mitigate econometric concerns about the robustness of our results.

4.1 Alternative CEO Overconfidence Measures and Controlling for New CEOs

To ensure that our results are not driven by a specific measure of CEO overconfidence, we introduce several alternative approaches to capture the effects of such CEOs. We use alternative cut-off points to identify whether a CEO is in the top quartile of our overconfidence measure. Instead of using annual cut-off, we identify a CEO as overconfident only if she is in the top quartile for at least 2 years during her tenure in our sample. Our primary results do not change with these alternative ways to capture the effects of an OC CEO. Our results remain robust even when

excluding firms experiencing recent CEO turnovers.³⁹ Specifically, we analyze a subsample of firms where CEOs have held their positions for at least four years after their appointment and find that the results are qualitatively consistent with those reported earlier. We repeat this analysis for CEOs with at least four years of tenure and continue to find similar results to those in Table 3. This provides further evidence that our findings are not due to a mechanical change in CEO overconfidence due to a new CEO. These results are presented in online appendix Table OA1.

4.2 Recent Sample Periods

In all our reported tables, we control for firm and year fixed effects and cluster standard errors at the firm level. Our main findings are robust across various alternative specifications, including use of more granular industry fixed effects (e.g., 2-digit SIC codes or higher), exclusion of industry and year fixed effects, and the clustering of standard errors by industry or year instead of by firm.

In online appendix Table OA2, we further assess the robustness of our main results by examining a more recent sample period marked by significant changes in board composition and director characteristics. Using data from 2011-2018, we replicate our primary firm performance results (shown in Table 3, Panel C) and continue to find a positive and significant relationship between firm performance and gender-diverse boards paired with OC CEOs. These results indicate that our primary conclusions are not due to observations from a specific subsample period.

4.3 Press-Based Measure of CEO Overconfidence

Our findings remain robust when substituting a press-based measure of CEO overconfidence. Previous studies have utilized such measures, typically derived from the difference in the number of business articles describing a CEO as overconfident versus those portraying the CEO as not overconfident (e.g., Hirshleifer et al., 2012; Shu, Yeh, Chiang, and Hung, 2013). Following a similar approach, we construct a 'Net News' measure, calculated as the number of articles reporting the CEO as overconfident minus the number of articles reporting the CEO as not overconfident. We extract these articles from Factiva using keyword searches as in Hirshleifer et al. (2012), drawn from publications including the New York Times, USA Today, BusinessWeek, and the Wall Street Journal. Our data covers the years 2000, 2004, and 2006, and for the years 2000-2006, we backfill missing data by using the value from year $t+1$ for year t .

³⁹ Our primary results are also robust to excluding firms that have recently gone public.

We run our analysis with Tobin's Q_{t+1} as the dependent variable in column 1 and ROA_{t+2} in column 2. Notably, the results are qualitatively consistent with those from our primary model, as reported in Table 3. These findings suggest that our earlier conclusions are robust, even under an alternative measure of CEO overconfidence based on a fundamentally different methodology. The detailed results are provided in online appendix Table OA3.

4.4 Propensity-Matched Sample Analysis

We apply a conventional propensity score matching (PSM) methodology to address potential self-selection bias in the presence of female IDs and OC CEOs. To isolate the impact of having a gender-diverse board combined with an OC CEO (Treatment Firms), we match these firms with a control group that share a wide array of characteristics (CEO Tenure, Age, Salary/Bonus, Gender, Firm Size, Age, Leverage Ratio, Diversification, Intangible Assets, Insider Holdings, Stock Return, Stock Return Volatility and Institutional Ownership), allowing for a cleaner comparison of firm performance between the two subgroups of firms.

In predicting the likelihood of a firm having both a female ID and an OC CEO, we include all control variables used in our primary firm performance regression model (as shown in Table 3). To account for time trends and industry-specific factors influencing the appointment of female directors, we include year and industry fixed effects (based on 2-digit SIC codes). Using an estimated logit selection model, we identify a propensity score-matched control sample and compare the performance of the treatment and matched control samples, as reported in online appendix Table OA4. We employ nearest-neighbor matching with replacement to select the control sample of firms. Within a matched subsample of firm-years, we analyze the impact of female IDs in firms led by OC CEOs relative to other firms with the results presented in columns 1-2 of Table OA5, Panel B. Our key findings regarding the market performance of firms with female IDs and an OC CEO remain robust under this alternative methodology.

4.5 Resolving Endogeneity Concerns: Arellano-Bond Estimation

To address reverse causality concerns, we re-estimate firm performance regressions in Table 3 using an Arellano-Bond (1991) estimator. Since prior performance can influence both board structure (Hermalin and Weisbach, 1998) and board gender diversity (Adams and Ferreira, 2009), we control for lagged performance, following studies of board structure (e.g., Yermack, 1996;

Wintoki et al., 2012) and CEO overconfidence (e.g., Hirshleifer et al., 2012). Firm fixed-effects mitigate omitted variable bias, but leave reverse causality unaddressed (Wintoki et al., 2012).

To ensure the associations in Table 3 are not due to spurious correlations, we use a one-step Arellano-Bond GMM dynamic panel estimator that captures the evolving relationship of female IDs and prior firm performance, including firm fixed effects. This estimator uses a firm's historical variables as instruments, treating Female ID/Male ID Ratio, CEO Holder67, and their interactions as endogenous variables. The results of this analysis are provided in Table OA5 of the online appendix. The dependent variables are Tobin's Q_{t+1} (Column 1) and ROA_{t+2} (Column 2). Interaction terms between Female ID and OC CEO measures are consistently positive and significant, while those between the Male ID Ratio and CEO Holder67 are insignificant. These findings support our hypothesis that female IDs are more effective monitors of OC CEOs.

4.6 Residual CEO Overconfidence

We construct a "residual" CEO overconfidence measure (CEO Resid OC) by regressing the CEO OC measure on future stock returns for year $t+1$ along with year and firm fixed effects. This residual captures the component of *CEO Overconfidence* that extracts out private information a CEO may hold about future firm performance. As we report in online appendix Table OA6, our findings remain robust when using this alternative overconfidence measure, indicating that our results are unlikely driven by a CEO's private insights into the firm's future stock performance.

4.7 Controlling for CEO Entrenchment

Our main results are robust even when controlling for managerial entrenchment. The literature suggests that managerial entrenchment, often indicated by a high number of anti-takeover provisions, can shield managers from the discipline of the corporate control market, allowing them to pursue self-serving or unprofitable empire-building investments (e.g., Bebchuk et al., 2009; Gompers et al., 2003; Harford, Humphery-Jenner, and Powell, 2012; Masulis, Wang, and Xie, 2007). Conversely, some studies highlight an endogenous relationship for CEO entrenchment and firm performance (e.g., Core, Guay, and Rusticus, 2006; O'Connor and Rafferty, 2012).

To explore this issue, we incorporate managerial entrenchment data from IRRC/RiskMetrics, although this reduces our sample size. In an unreported table, we analyze models using either an average entrenchment index (Bebchuk et al., 2009) of other firms in the firm's headquarters state,

or the subject firm's actual entrenchment index when available. We consider state-averages, recognizing that entrenchment levels are influenced by corporate law in a firm's state of incorporation, and previous research suggests that some states engage in a race-to-the-bottom in corporate governance statutes (McCahery and Vermeulen, 2005). Our results consistently show that our findings are qualitatively robust when controlling for a firm's entrenchment level.

4.8 Variation in Time and Industry Fixed Effects

In all reported tables, we account for firm and year fixed effects, with standard errors clustered at the firm level. Our primary findings remain robust when we incorporate more granular industry fixed effects (e.g., 2-digit or higher SIC levels), omit industry and year fixed effects, or cluster standard errors by industry or year instead of by firm. In an unreported table, the results from models using more disaggregated industry fixed effects, like those in Table 3 (Panels A and B), are consistent with our baseline findings. The qualitative outcomes are also robust when applying the 3-digit NAICS or the Hoberg and Phillips (2010) industry classifications. Furthermore, double clustering by year and industry, or by firm and year, yields similar qualitative results. We also confirm that our main findings hold if we exclude the tech-crash years (2000-2001), high-tech firms, the financial crisis period (2007-2009) or the post-crisis years (2007 onward).⁴⁰

We address potential confounding effects in the SOX period related to the impact of the option backdating scandals prevalent in this period, particularly at firms with a higher fraction of inside directors (see Veld and Wu, 2014). We identify firm-years with backdating from the Corporate Library and include an indicator for these firm-years in our baseline regression. Our unreported results are robust to whether we exclude backdating firm-years or include a backdating indicator.

5. Conclusions

Two key issues in corporate governance involve the impact of CEO overconfidence and the benefits of board gender diversity. Prior research highlights both the significant advantages and drawbacks of overconfident CEOs. On the positive side, overconfident CEOs drive rapid product innovation and capture higher market shares (e.g., Hirshleifer et al., 2012; Galasso and Simcoe,

⁴⁰ Following Loughran and Ritter (2002), we define high-tech firms by industry: computer hardware (SIC: 3571, 3572, 3575, 3577, 3578), communication equipment (SIC: 3661, 3663, 3669), electronics (SIC: 3671, 3672, 3674, 3675, 3677- 3679), navigation (SIC: 3812), measuring instruments (SIC: 3823, 3825-3827, 3829), medical equipment (SIC: 3841, 3845), telecommunications equipment (SIC: 4812, 4813), communication services (SIC: 4899), and software (SIC: 7371-7374, 7375, 7378, 7379).

2011; Simsek et al., 2010). On the negative side, overconfidence leads to over-investment and excessive risk-taking (e.g., Malmendier and Tate, 2008, 2005). We argue that a more gender-diverse board, particularly among independent directors, brings diverse perspectives that enhance the board's ability to monitor and advise, ultimately improving corporate governance, firm performance, and valuation. Specifically, we hypothesize that increasing the gender diversity of independent directors helps curb the less profitable expansionary activities that overconfident CEOs often pursue. Also, the presence of female independent directors amplifies the positive impacts of CEO overconfidence on firm value and operating performance.

To address endogeneity concerns, we analyze the impact of female independent director departures due to unexpected exogenous events such as death or illness. These departures negatively affect the performance of firms led by overconfident CEOs, especially when they reduce gender diversity among independent directors. Conversely, appointing female independent directors improves performance in firms with overconfident CEOs. Notably, female independent directors, rather than female affiliated or executive directors, primarily drive the governance benefits of board gender diversity. Our results also suggest stronger positive effects when female independent directors are socially independent from senior management, actively serve as executives, avoid being overly busy, and regularly attend board meetings. These directors likely command greater credibility in the boardroom. Overall, our findings indicate that female independent directors enhance the effectiveness of internal corporate governance and help mitigate the detrimental effects of CEO overconfidence.

While our study provides robust evidence on the positive impact of female independent directors on firm performance, particularly in firms led by overconfident CEOs, the specific mechanisms through which female independent directors influence boardroom dynamics and decision-making processes remain an important area for further investigation. Future research could explore these mechanisms in greater depth.

References:

- Adams, R., and Funk, P., 2012. Beyond the glass ceiling: Does gender matter? *Management Science* 58 (2), 219–235.
- Adams, R. B., and Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics* 94 (2), 291–309.
- Ahern, K. R., and Dittmar, A. K., 2012. The changing of the boards: The impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics* 127 (1), 137–197.
- Ahmed, A., McAnally, M., Rasmussen, S., and Weaver, C., 2010. How costly is the Sarbanes Oxley act? Evidence on the effects of the act on corporate profitability. *Journal of Corporate Finance* 16(3), 352-369.
- An, H., Chen, C.R., Wu, Q. and Zhang, T., 2021. Corporate innovation: do diverse boards help? *Journal of Financial and Quantitative Analysis* 56(1), 155-182.
- Arellano, M., and Bond, S., 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies* 58(2), 277.
- Arping, S., and Sautner, Z., 2013. Did the Sarbanes-Oxley Act of 2002 make firms less opaque? Evidence from analyst earnings forecasts. *Contemporary Accounting Research* 30 (3), 1133–65.
- Ashbaugh-Sakife, H., Collins, D., Kinney, W., and Lafond, R., 2009. The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research* 47(1), 1–43.
- Ashbaugh-Skaife, H., Collins, D.W., Kinney, W.R, Jr., and LaFond, R., 2008. The effect of SOX internal control deficiencies and their remediation on accrual quality. *The Accounting Review* 83, 217–250
- Balsam, S., Puthenpurackal, J. and Upadhyay, A., 2016. The determinants and performance impact of outside board leadership. *Journal of Financial and Quantitative Analysis*, 51(4), 1325-1358.
- Bandiera, O., Prat, A., Hansen, S. and Sadun, R., 2020. CEO behavior and firm performance. *Journal of Political Economy* 128(4), 1325-1369.
- Banerjee, S., Humphery-Jenner, M., and Nanda, V., 2015. Restraining overconfident CEOs through improved governance: Evidence from the Sarbanes-Oxley Act. *Review of Financial Studies* 28 (10), 2812–2858.
- Banerjee, S., Huang, S., Nanda, V., and Xiao, C., 2023. Managerial Overconfidence and Market Feedback Effects. *Management Science* 69(12), 7285-7305.
- Barber, Brad M. and Odean Terrance, 2001. Boys will be Boys: Gender, Overconfidence, and Common Stock Investment, *Quarterly Journal of Economics*, 116 (1), 261–292.
- Bebchuk, L., Cohen, A., and Ferrell, A., 2009. What matters in corporate governance? *Review of Financial Studies* 22 (2), 783–827.
- Bedard, J., and L. Graham. 2011. Detection and severity classification of Sarbanes-Oxley Section 404 internal control deficiencies. *Accounting Review* 86(3), 825–855.
- Ben-David, I., Graham, J. R., and Harvey, C. R., 2013. Managerial miscalibration. *Quarterly Journal of Economics* 128 (4), 1547–1584.

- Bernile, G., Bhagwat, V. and Yonker, S., 2018. Board diversity, firm risk, and corporate policies. *Journal of Financial Economics* 127(3), 588-612.
- Byrd, D.T. and Mizruchi, M.S., 2005. Bankers on the board and the debt ratio of firms. *Journal of Corporate Finance*, 11(1-2), 129-173.
- Cain, M. D., and S. B. McKeon. 2016. CEO Personal Risk-Taking and Corporate Policies. *Journal of Financial and Quantitative Analysis* 51(1), 139-164.
- Coles, J. L., Daniel, N. D., and Naveen, L., 2008. Boards: Does one size fit all? *Journal of Financial Economics* 87 (2), 329–356.
- Coles, J. L., Daniel, N. D., and Naveen, L., 2014. Co-opted boards. *Review of Financial Studies* 27 (6), 1751–1796.
- Core, J. E., Guay, W. R., and Rusticus, T. O., 2006. Does weak governance cause weak stock returns? an examination of firm operating performance and investor's expectations. *Journal of Finance* 61 (2), 655–687.
- Croson, R. and Gneezy, U., 2009. Gender differences in preferences. *Journal of Economic Literature* 47(2), 448-474.
- Cross, C.P., Copping, L.T. and Campbell, A., 2011. Sex differences in impulsivity: a meta-analysis. *Psychological bulletin*, 137(1), p.97
- Dechow, P.M., and Dichev, I.D., 2002. The quality of accruals and earnings: The role of accrual estimation errors. *Accounting Review* 77, 35–59.
- Deshmukh, S., Goel, A.M., and Howe, K.M., 2013. CEO Overconfidence and Dividend Policy. *Journal of Financial Intermediation* 22, 440–463.
- Dhir, A. A., 2015. Challenging boardroom homogeneity: Corporate law, governance, and diversity. Cambridge University Press.
- Donaldson, J.R., Malenko, N. and Piacentino, G., 2020. Deadlock on the Board. *Review of Financial Studies* 33(10), 4445-4488.
- Doyle, J.T., Ge, W., and McVay, S., 2007. Accruals quality and internal control over financial reporting. *Accounting Review* 82, 1141–1170.
- Duarte, J., Kong, K., Young, L., and Siegel, S., 2014. The impact of the Sarbanes-Oxley Act on shareholders and managers of foreign firms. *Review of Finance* 18(1), 417–55.
- Duchin, R., Matsusaka, J. G. and Ozbas, O., 2010. When are outside directors effective? *Journal of Financial Economics* 96, 195-214.
- Eckbo, B. E., Nygaard, K. and Thorburn, K. S., 2022. Valuation Effects of Norway's Board Gender-Quota Law Revisited. *Forthcoming Management Science*.
- Eyrich, N., Quin, R. and Fessell, D., 2019. How One Person Can Change the Conscience of an Organization. *Harvard Business Review*.
- Falato, A., Kadyrzhanova, D. and Lel, U., 2014. Distracted directors: Does board busyness hurt shareholder value? *Journal of Financial Economics* 113(3), 404-426.

- Fang, L. H. and S. Huang, 2017, Gender and Connections among Wall Street Analysts, *Review of Financial Studies* 30(9), 3305-3335.
- Fich, E. M., 2005. Are some outside directors better than others? evidence from director appointments by fortune 1000 firms. *Journal of Business* 78(5), 1943–1972.
- Francis, J.J., LaFond, R., Olsson, P., and Schipper, K. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics* 39, 295–327.
- Gabaix, X. and Landier, A., 2008. Why has CEO pay increased so much? *Quarterly Journal of Economics* 123(1), 49-100.
- Galasso, A., and Simcoe, T., 2011. CEO overconfidence and innovation. *Management Science* 57(8), 1469–84.
- Garlappi, L., Giammarino, R. and Lazrak, A., 2017. Ambiguity and the corporation: Group disagreement and underinvestment. *Journal of Financial Economics*, 125(3), 417-433.
- Gervais, S., Heaton, J. and Odean, T., 2011, Overconfidence, compensation contracts, and capital budgeting, *Journal of Finance* 66, 1735–1777.
- Gompers, P., Ishii, J., and Metrick, A., 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* 118(1), 107–55.
- Goel, A. M., and Thakor, A. V. (2008). Overconfidence, CEO Selection, and Corporate Governance. *Journal of Finance*, 63(6), 2737–2784
- Griffin, D., Li, K. and Xu, T., 2021, Board Gender Diversity and Corporate Innovation: International Evidence, *Journal of Financial and Quantitative Analysis* 56(1), 123–154
- Gul, F. A., Srinidhi, B., and Ng, A. C., 2011. Does board gender diversity improve the informativeness of stock prices? *Journal of Accounting and Economics* 51(3), 314–338.
- Guo, L. and Masulis, R., 2015. Board structure and monitoring: New evidence from CEO turnovers. *Review of Financial Studies* 28(10), 2770-2811.
- Hall, B., and Murphy, K., 2000. Optimal exercise prices for executive stock options. *American Economic Review* 90, 209–214.
- Hall, B., and Murphy, K., 2002. Stock options for undiversified executives. *Journal of Accounting and Economics* 33, 3–42.
- Hao, Jinji, 2024. "Disclosure regulation, cost of capital, and firm values," *Journal of Accounting and Economics* 77(1), 101605.
- Harford, J., Humphery-Jenner, M., and Powell, R., 2012. The sources of value destruction in acquisitions by entrenched managers. *Journal of Financial Economics* 106 (2), 247–61.
- Hermalin, B. E., and M. S. Weisbach, 1998. Endogenously chosen boards of directors and their monitoring of the CEO. *American Economic Review* 88, 96-118.
- Hermalin, B. E., and M. S. Weisbach. 2003. Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature. *Federal Reserve Bank of New York Economic Policy Review* 9(1), 7–26.

- Hillman, A.J., 2005. Politicians on the board of directors: Do connections affect the bottom line? *Journal of Management*, 31(3), 464-481.
- Hirshleifer, D., Low, A., and Teoh, S., 2012. Are overconfident CEOs better innovators? *Journal of Finance* 67(4), 1457–98.
- Hoberg, G., and G. Phillips. 2010. Real and Financial Industry Booms and Busts. *Journal of Finance* 65, 45–86.
- Hollis, A., Collins, D., Kinney Jr, W., and LaFond, R., 2008. The effect of sox internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research* 27(1), 1–43.
- Hribar, Paul and Yang, Holly I., 2016. CEO Overconfidence and Management Forecasting. *Contemporary Accounting Research*. 33(1), 204-227
- Huang, J., and D. J. Kisgen, 2013. Gender and corporate finance: are male executives overconfident relative to female executives? *Journal of Financial Economics* 108, 822-839.
- Huffington, A., May 2003. Would things be any different if women ran corporate America? CommonDreams.org.
- Huson, M.R., Parrino, R. and Starks, L.T., 2001. Internal monitoring mechanisms and CEO turnover: A long-term perspective. *Journal of Finance* 56(6), 2265-2297.
- Hwang, S., Shivdasani, A., and Simintzi, E. 2019. Mandating women on boards: evidence from the United States. University of North Carolina Working Paper.
- Iliev, P., 2010. The effect of SOX Section 404: Costs, earnings quality, and stock prices. *Journal of Finance* 65(3), 1163–96.
- Jo, H. and Harjoto, M.A., 2011. Corporate governance and firm value: The impact of corporate social responsibility. *Journal of Business Ethics*, 103(3), 351-383.
- Kim, D., and Starks, L. T., 2016. Gender diversity on corporate boards: Do women contribute unique skills? *The American Economic Review* 106(5), 267–271.
- Kennedy, J.A. and Kray, L.J., 2015. A pawn in someone else's game? The cognitive, motivational, and paradigmatic barriers to women's excelling in negotiation. *Research in Organizational Behavior*, 35, 3-28.
- Kennedy, J.A., Kray, L.J. and Ku, G., 2017. A social-cognitive approach to understanding gender differences in negotiator ethics: The role of moral identity. *Organizational Behavior and Human Decision Processes*, 138, 28-44.
- Kirk, M., and Gwin, B., April 2009. A diverse corporate board is more important than ever. *Corporate Board Member*.
- Knyazeva, A., Knyazeva, D., and Masulis, R. W., 2013. The supply of corporate directors and board independence. *Review of Financial Studies* 26(6), 1561–1605.
- Kothari, S., Leone, A., and Wasley, C., 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39, 163–197.
- Lambert, R., Larcker, D., and Verrecchia, R., 1991. Portfolio considerations in valuing executive compensation. *Journal of Accounting Research* 29, 129–149.

- Leuz, C., Triantis, A., Yue and Wang, T., 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC Deregistration. *Journal of Accounting and Economics* 45(2-3), 181–208.
- Levi, M., Li, K., and Zhang, F., 2010. Deal or no deal: Hormones and the mergers and acquisitions game. *Management Science* 56 (9), 1462–83.
- Levi, M., Li, K., and Zhang, F., 2014. Directors' gender and mergers and acquisitions. *Journal of Corporate Finance* 28, 185-200.
- Lie, E. (2005), On the Timing of CEO Stock Option Awards, *Management Science* 51(5), 802-12.
- Linck, J., Netter, J., and Yang, T., 2009. The effects and unintended consequences of the Sarbanes-Oxley act on the supply and demand for directors. *Review of Financial Studies* 22 (8), 3287–3328.
- Low, A. 2009. Managerial risk-taking behavior and equity-based compensation. *Journal of Financial Economics* 92, 470–490.
- Kaplan, S., Klebanov, M., and Sorensen, M., 2012. Which CEO characteristics and abilities matter? *Journal of Finance* 67(3), 973-1007.
- Malmendier, U., and Tate, G., 2005. CEO overconfidence and corporate investment. *Journal of Finance* 60(6), 2661–700.
- Malmendier, U., and Tate, G., 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics* 89, 20–43.
- Masulis, R., W. Tham and Y. Yao, 2024, Bridging Research and Development: The Strategic Role of Scientists on the Board, UNSW Working Paper.
- Masulis, R., Wang, C., and Xie, F., 2007. Corporate governance and acquirer returns. *Journal of Finance* 62(4), 1851–89.
- Masulis, R.W. and Zhang, E.J., 2019. How valuable are independent directors? Evidence from external distractions. *Journal of Financial Economics*, 132(3), 226-256.
- Masulis, R., 2020, A Survey of Recent Evidence on Boards of Directors and CEO Incentives. *Asia-Pacific Journal of Financial Studies* 49, 7-35.
- Matsa, D. A., and Miller, A. R., 2013. A female style in corporate leadership? Evidence from quotas. *American Economic Journal: Applied Economics* 5(3), 136–69.
- McCahery, J. A., and Vermeulen, E. P. M., 2005. Does the European company prevent the Delaware effect? *European Law Journal* 11(6), 785–801.
- McLeish, K.N. and Oxoby, R.J., 2007. Gender, affect and intertemporal consistency: An experimental approach. Institute for the Study of Labor (IZA) Discussion Paper, Bonn.
- Meulbroek, L., 2001. The efficiency of equity-linked compensation: Understanding the full cost of awarding executive stock options. *Financial CEOs* 30, 5–30.
- Niu, J., 2010. The effect of CEO Overconfidence on Bank Risk Taking, *Economics Bulletin* 30, 3288-3299.
- Nguyen, B.D. and Nielsen, K.M., 2010. The value of independent directors: Evidence from sudden deaths. *Journal of Financial Economics*, 98(3), 550-567.

- O'Connor, Marleen, 2003. The Enron Board: The Perils of Groupthink (2003). University of Cincinnati Law Review 71, 1233-1320.
- O'Connor, M., and Rafferty, M., 2012. Corporate governance and innovation. *Journal of Financial and Quantitative Analysis* 47(2), 397–413.
- Phillips, K. W., Liljenquist, K. A., and Neale, M. A. (2009). Is the pain worth the gain? The advantages and liabilities of agreeing with socially distinct newcomers. *Personality and Social Psychology Bulletin* 35(3), 336-350.
- Powell, Melanie and Ansic, David, 1997. "Gender differences in risk behavior in financial decision-making: An experimental analysis," *Journal of Economic Psychology*, Elsevier, vol. 18(6), 605-628.
- Roll, R., 1986. The hubris hypothesis of corporate takeovers. *Journal of Business* 59(2), 197–216.
- Schrand, C. M., and Zechman, S. C., 2012. Executive Overconfidence and the Slippery Slope to Financial Misreporting. *Journal of Accounting and Economics* 53(1-2), 311-329.
- Schwartz, S. H., and Rubel, T., 2005. Sex Differences in Value Priorities: Cross-Cultural and Multimethod Studies. *Journal of Personality and Social Psychology*, 89, 1010-1028.
- Shu, P.-G., Yeh, Y.-H., Chiang, T.-L., and Hung, J.-Y., 2013. Managerial overconfidence and share repurchase. *International Review of Finance* 13(1), 39–65.
- Silverman, I.W., 2003. Gender Differences in Delay of Gratification: A Meta-Analysis. *Sex Roles* 49, 451–463.
- Simsek, Z., Heavy, C., and Veiga, J., 2010. The impact of CEO core self-evaluation on the firm's entrepreneurial orientation. *Strategic Management Journal* 31 (1), 110–19.
- Srinidhi, B., Gul, F. A., and Tsui, J., 2011. Female directors and earnings quality. *Contemporary Accounting Research* 28(5), 1610–1644.
- Stahl, G. K.; M. L. Maznevski; A. Voigt; and K. Jonsen, 2009. Unraveling the Effects of Cultural Diversity in Teams: A Meta-Analysis of Research on Multicultural Work Groups. *Journal of International Business Studies* 20, 1–20.
- Tsoutsoura, M. (2015), The Effect of Succession Taxes on Family Firm Investment: Evidence from a Natural Experiment. *Journal of Finance* 70, 649-688.
- Turban, S., Wu, D., and Zhang, L., 2019. When Gender Diversity Makes Firms More Productive. *Harvard Business Review*, February.
- Veld, C., and Wu, B., 2014. What Drives Executive Stock Option Backdating? *Journal of Business Finance and Accounting* 41, 1042–1070.
- Wintoki, M., 2007. Corporate boards and regulation: The effect of the Sarbanes–Oxley Act and the exchange listing requirements on firm value. *Journal of Corporate Finance* 13(2-3), 229–250.
- Wintoki, M.B., Linck, J.S., Netter, J.M. 2012. Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics* 105, 581-606.
- Yermack, D., 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics* 40(2), 185–211.

Appendix: Variable Definitions

We define the variables used in the analysis and specify their respective data sources.

1. Beta: The coefficient estimates from a one factor market model of daily stock returns and the CRSP equally weighted market index over the course of the year. Source: CRSP
2. Board Independence: Ratio of independent directors to board size > 50%. Source: RiskMetrics
3. Board Size: The number of directors at the start of the year. Source: ISS/RiskMetrics
4. CAPEX/Sales: Capital expenditures scaled by Total Sales. Source: COMPUSTAT
5. CEO Age: CEO Age measured in years. Source: ExecuComp
6. CEO Bonus/Salary: Annual CEO Bonus/Annual Salary. Source: ExecuComp
7. CEO Holder67: =1 if CEO Overconfidence>67th percentile value, zero otherwise. Source: ExecuComp, and COMPUSTAT
8. CEO Overconfidence (CEO OC): Ratio of value of all unexercised exercisable options (ExecuComp: opt unex_exer_est_val) by the number of options (ExecuComp: opt unex_exer_num), scaled by end of fiscal year stock price (COMPUSTAT: prcc f)
9. CEO Resid OC: Residual overconfidence measure extracted from an OLS regression model of CEO overconfidence measure using 1-year lead equity return as a predictor of CEO insider information along with firm and year fixed effects.
10. CEO Overconfidence TopQ = 1 if CEO overconfidence is greater than the 3rd quartile value of the sample in any given year, and zero otherwise. Source: ExecuComp, and COMPUSTAT
11. CEO Tenure: The number of years a CEO has been in office. Source: ExecuComp
12. CEO Turnover: Change of CEO due to voluntary or forced retirement, excluding CEOs aged > 64, major accidents, illnesses or deaths. Source: ExecuComp, and WRDS
13. Co-opted Board = 1, if the number of board members appointed during current CEO's tenure exceeds 50% (a variant uses 40% as well). Source: ISS/RiskMetrics
14. County Ratio of Firms with Female IDs: The proportion of number of firms with at least one female independent director (except sample firm) to number of all firms in the sample firm's county computed yearly. Source: ExecuComp, COMPUSTAT, and Proxy statements
15. County # of Female Senior Executives: Natural log of the number of top executives (except sample firm) in the county of the sample firm in a given year. Source: ExecuComp
16. Diversification: A firm's number of industry segments. Source: COMPUSTAT
17. Female CEO: Indicator variable that takes a value of 1 if firm's CEO is female in a given year, zero otherwise. Source: ExecuComp
18. Female ID: = 1 if a board has at least one female independent director, zero otherwise. Source: ISS/RiskMetrics
19. Female ID Ratio: Ratio of the number of female independent directors to board size. Source: ISS/RiskMetrics
20. Female Executive Director: Indicator variable =1 if a firm has at least one employee female director, zero otherwise. Source: ISS/RiskMetrics
21. Female Affiliated Director: Indicator variable = 1 if a firm has at least one affiliated/gray female director, zero otherwise. Source: ISS/RiskMetrics

22. Firm Age: The number of years that a firm has been in the CRSP database. Source: CRSP
23. Firm Size: Book value of total assets. Source: COMPUSTAT
24. Fully independent board committee: All members are independent directors. Sources: ISS / RiskMetrics
25. Independent director: Outside director with no familial or financial connection to senior management, i.e. not affiliated directors. Sources: ISS / RiskMetrics
26. Insider Ownership: Percentage of outstanding shares held by the directors and officers, excluding the CEO. Source: RiskMetrics
27. Institutional Ownership: Percentage of outstanding shares held by institutional investors. Source: Thomson Financial
28. Intangible Assets: Intangible assets scaled by total assets. Source: COMPUSTAT
29. Leverage: A firm's long-term debt scaled by total assets measured at the beginning of the year. Source: COMPUSTAT
30. MSE: The mean squared error from the estimation of a one factor market model of daily stock returns over the course of that year. Source: CRSP
31. Major board committees: Audit, compensation, nominating committees
32. Operating Cash Flow: A firm's Net Operating Cash Flow scaled by Total Assets (COMPUSTAT)
33. R&D Intensity: A firm's R&D expenses scaled by Total Assets. Source: COMPUSTAT
34. ROA: Annual operating income scaled by total assets. Source: COMPUSTAT
35. SOX = 1 if the observation occurs in 2002 or later and equals zero otherwise.
36. SOX-Compliant: An indicator variable that equals one if a firm meets the new 2002 listing rule requirements (fully independent audit, compensation, nominating committees and majority of independent directors), or zero otherwise.
37. Stock Volatility: Standard deviation of monthly stock return over the prior 60 months. Source: CRSP
38. Stock Return: A 1-year holding period return beginning at the start of the year. Source: CRSP
39. Tobin's Q: Ratio of (market value of equity + book value of debt) scaled by book value of assets. Source: COMPUSTAT

Table 1: Descriptive Statistics of Dependent and Control Variables**Panel A: Female IDs, Male IDs, CEO Characteristics, Firm Characteristics, and Market Characteristics**

This table documents descriptive statistics of different variables over a sample period of 1998-2018. All dollars figures are reported in millions of dollars. The appendix provides detailed variable definitions.

	Mean	Median	Max	Min	Std. Dev.	N
Female ID Ratio	0.108	0.111	0.667	0.000	0.098	22116
Female ID	0.662	1.000	1.000	0.000	0.473	22116
Female ID Non-committee	0.001	0.000	1.000	0.000	0.027	18752
Female ID Non-leader	0.315	0.000	1.000	0.000	0.465	14151
Retired Corp Female ID	0.179	0.000	1.000	0.000	0.383	19048
Truant Female ID	0.010	0.000	1.000	0.000	0.099	18684
Non-corporate Female ID	0.456	0.000	1.000	0.000	0.498	19046
CEO Female ID	0.057	0.000	1.000	0.000	0.231	18684
Truant Male ID Ratio	0.008	0.000	0.167	0.000	0.031	18684
CEO Male ID Ratio	0.066	0.000	0.417	0.000	0.101	18684
Retired Corporate Male ID Ratio	0.164	0.125	0.600	0.000	0.163	19048
Ratio of Firms with Female IDs in a County	0.588	0.600	1.000	0.000	0.254	19728
Number of Corporate Female Executives in a County	2.057	2.079	4.357	0.000	1.142	21858
Female CEO	0.027	0.000	1.000	0.000	0.163	22116
CEO Tenure	7.858	6.000	36.000	1.000	7.099	21621
CEO Age	56.150	56.000	77.000	40.000	1.135	21556
CEO Equity Compensation Ratio	0.642	0.734	0.993	0.000	0.271	22116
CEO Bonus/Salary Ratio	0.528	0.000	6.790	0.000	0.965	22034
Board Size	8.838	9.000	32.000	2.000	1.289	22116
Male ID Ratio	0.616	0.625	0.889	0.167	0.156	22116
Independent Board Ratio	0.723	0.750	1.000	0.000	0.163	22116
CEO Holder ⁶⁷	0.435	0.000	1.000	0.000	0.496	19865
CEO TopQ	0.227	0.000	1.000	0.000	0.419	22116
CEO Overconfidence (CEO OC)	0.260	0.200	0.926	0.000	0.258	22116
Insider Ownership	0.075	0.026	0.999	0.000	0.129	22017
Institutional Ownership	0.754	0.785	1.149	0.010	0.207	21485
Tobin's Q	2.074	1.669	19.549	0.460	1.308	22116
ROA	0.111	0.103	0.410	-0.173	0.095	21565
Ln(Firm Size)	7.673	7.503	12.979	4.103	1.531	21565
Ln(Market Cap)	7.765	7.595	11.886	3.359	1.571	22080
Ln(Firm Age)	2.968	3.045	4.466	0.000	0.832	22078
Leverage	0.226	0.216	3.892	0.000	0.186	22034
R&D Intensity	0.031	0.004	0.576	0.000	0.051	22116
CAPX	0.076	0.036	5.251	0.000	0.172	18985
PPE Growth	0.067	0.036	1.020	-0.577	0.218	18578
Intangibles/Assets	0.205	0.154	0.747	0.000	0.194	20897
Equity Return (%)	0.100	0.058	7.000	-0.900	0.480	22073
Return Volatility (%)	11.125	9.816	104.400	0.003	6.759	21960
Beta	1.170	1.080	4.061	-0.683	0.645	21908
MSE	0.024	0.021	0.205	0.004	0.012	21908

Panel B: Characteristics of Female versus Male Independent Directors

This table compares the following characteristics of female independent directors and male independent directors: age, board tenure, share ownership, number of external board seats, and percentage of directors with attendance problems (<75%). *P*-values are reported for *t*-tests comparing differences in means and Wilcoxon signed-rank tests comparing differences in medians.

Characteristics	Female IDs		Male IDs		<i>p</i> -Value for Diff.	
	Mean	Median	Mean	Median	Mean	Median
Age (years)	57.913	58.000	62.583	63.000	0.000	0.000
Tenure (years)	6.777	5.000	8.567	7.000	0.000	0.000
Ownership (%)	0.177	0.000	0.402	0.000	0.000	0.000
No. of External Board Seats	1.043	1.000	0.996	1.000	0.000	0.000
Attendance Problems	0.011	0.000	0.013	0.000	0.000	0.000

Table 2: Announcement Returns of Female ID and Overconfident CEO Appointments**Panel A: Announcement Returns of Female ID Appointments at Firms Led by Overconfident CEOs**

This table presents results from an event study of Female/Male IDs appointments. The table presents the average 5-day cumulative abnormal return around the announcements of such directors' appointments. Abnormal return is computed after subtracting predicted returns from realized returns. The predicted returns are computed using the market model and the value-weighted market index. The appendix provides detailed variable definitions. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Event Study Returns						
	Female ID Appointment		Male ID Appointment			
	Sample Size	Mean (1)	Sample Size	Mean (2)	Difference (1-2)	<i>p</i> -value
(a) Non-Holder67 Led Firm	1531	0.003	3872	0.002	0.001	0.447
(b) CEO Holder67 Led Firm	276	0.014***	2134	0.003	0.011***	0.000
Difference between (a) & (b)		0.011***		0.001	0.010***	0.009
<i>p</i> -value		0.000		0.336		

Panel B: Announcement Returns of Overconfident and Non-overconfident Appointments with and without Female IDs

This table presents results of an event study analysis of overconfident CEO appointments in firms with at least one female ID or no Female ID on the firm's board respectively in the year before CEO appointment. The table presents the average 5-day cumulative abnormal return around the announcements of such directors' appointments. Abnormal return is computed after subtracting predicted returns from realized returns. The predicted returns are computed using the market model and the value-weighted market index. The appendix provides detailed variable definitions. The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Event Study Returns						
	Holder67 Appointment		Non-Holder67 Appointment			
	Sample Size	Mean (1)	Sample Size	Mean (2)	Difference (1-2)	<i>p</i> -value
(a) Firms with Female ID	138	0.009**	3077	0.001	0.008**	0.043
(b) Firms without Female ID	56	0.002	988	0.002	0.000	0.879
Difference between (a) & (b)		0.007**		-0.001	0.008**	
<i>p</i> -value		0.046		0.501	0.041	

Table 3: Female Independent Directors, Overconfident CEOs and Firm Performance

Panel A: Stock Performance

This table reports estimates of the relation between female IDs and an appointing firm's performance. The appendix provides detailed variable definitions. All models include industry/firm and year fixed effects, and standard errors are clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(Tobin's Q) _{t+1}							
	(1)	(2)	(5)	(6)	(3)	(4)	(7)	(8)
Female ID	-0.026 (-0.626)	0.024 (0.646)	0.018 (0.440)	0.050 (1.295)				
Female ID*CEO Overconfidence	0.336*** (3.186)		0.229** (2.189)					
Female ID*CEO TopQ		0.176*** (3.071)		0.115** (2.142)				
Female ID Ratio					-0.349 (-1.456)	-0.183 (-0.885)	-0.148 (-0.680)	-0.027 (-0.137)
Female ID Ratio*OC CEO					1.527** (2.573)		1.106** (2.007)	
Female ID Ratio*CEO TopQ						0.785** (2.533)		0.580** (2.072)
Male ID Ratio	0.077 (0.563)	-0.024 (-0.210)	0.085 (0.603)	-0.011 (-0.096)	0.019 (0.137)	-0.088 (-0.757)	0.039 (0.268)	-0.057 (-0.498)
Male ID Ratio*OC CEO	-0.781* (-1.771)		-0.511 (-1.505)		-0.728 (-1.560)		-0.467 (-1.328)	
Male ID Ratio*CEO TopQ		-0.410* (-1.898)		-0.198 (-1.158)		-0.384* (-1.697)		-0.172 (-0.987)
CEO Overconfidence	1.095*** (3.535)		0.842*** (3.337)		1.120*** (3.310)		0.846*** (3.223)	
CEO TopQ		0.518*** (3.358)		0.355*** (2.753)		0.534*** (3.230)		0.354*** (2.716)
Ln[CEO Tenure]	0.020 (1.119)	0.030* (1.678)	-0.016 (-0.531)	-0.004 (-0.126)	0.020 (1.130)	0.030* (1.692)	-0.015 (-0.510)	-0.003 (-0.093)
Ln[CEO Age]	0.116 (0.678)	0.074 (0.427)	0.841 (0.800)	0.857 (0.807)	0.125 (0.731)	0.081 (0.470)	0.855 (0.814)	0.867 (0.816)
CEO Salary/Bonus Ratio	0.043*** (2.629)	0.047*** (2.770)	0.040** (2.389)	0.045*** (2.628)	0.045*** (2.692)	0.048*** (2.803)	0.040** (2.435)	0.045*** (2.655)
Female CEO	0.044 (0.441)	0.030 (0.298)	-0.090 (-1.302)	-0.079 (-1.218)	0.047 (0.466)	0.031 (0.316)	-0.082 (-1.217)	-0.072 (-1.111)
Ln[Board Size]	-0.168* (-1.771)	-0.178** (-2.007)	-0.142* (-1.505)	-0.154* (-1.560)	-0.143 (-1.560)	-0.154* (-1.697)	-0.112 (-1.328)	-0.125 (-1.328)

	(-1.867)	(-1.982)	(-1.740)	(-1.881)	(-1.634)	(-1.759)	(-1.375)	(-1.532)
Ln[Firm Size]	-0.513***	-0.508***	-0.484***	-0.474***	-0.511***	-0.505***	-0.481***	-0.471***
	(-9.030)	(-8.875)	(-8.290)	(-8.050)	(-8.966)	(-8.814)	(-8.181)	(-7.957)
Ln[Firm Age]	-0.084	-0.087	-0.228***	-0.233***	-0.079	-0.081	-0.226***	-0.231***
	(-1.354)	(-1.387)	(-3.305)	(-3.335)	(-1.273)	(-1.296)	(-3.295)	(-3.327)
Leverage Ratio	-0.134	-0.192	-0.080	-0.138	-0.135	-0.193	-0.082	-0.139
	(-0.924)	(-1.311)	(-0.594)	(-1.021)	(-0.932)	(-1.311)	(-0.611)	(-1.030)
Firm Diversification	-0.012**	-0.014***	-0.013***	-0.014***	-0.012**	-0.014***	-0.013***	-0.014***
	(-2.321)	(-2.650)	(-2.790)	(-3.041)	(-2.296)	(-2.589)	(-2.787)	(-3.007)
Intangibles/Assets	-0.591***	-0.562***	-0.547***	-0.522***	-0.597***	-0.571***	-0.555***	-0.531***
	(-3.296)	(-3.104)	(-2.875)	(-2.716)	(-3.327)	(-3.156)	(-2.923)	(-2.771)
Insider Holdings	-0.273**	-0.224**	-0.112	-0.071	-0.286**	-0.238**	-0.120	-0.080
	(-2.383)	(-1.967)	(-1.174)	(-0.738)	(-2.477)	(-2.075)	(-1.246)	(-0.825)
Stock Return	0.151***	0.188***	0.143***	0.170***	0.151***	0.188***	0.144***	0.171***
	(6.570)	(8.041)	(6.651)	(7.809)	(6.569)	(8.031)	(6.682)	(7.821)
Volatility	-0.007**	-0.008**	-0.010***	-0.011***	-0.007**	-0.008**	-0.010***	-0.011***
	(-2.110)	(-2.300)	(-3.185)	(-3.364)	(-2.145)	(-2.331)	(-3.220)	(-3.397)
Institutional Ownership	0.044	0.074	0.052	0.085	0.045	0.075	0.052	0.084
	(0.631)	(1.050)	(0.886)	(1.409)	(0.661)	(1.077)	(0.889)	(1.407)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE			Yes	Yes			Yes	Yes
Firm FE	Yes	Yes	No	No	Yes	Yes		
Industry*Year FE	Yes	Yes			Yes	Yes		
CEO*Firm FE			Yes	Yes			Yes	Yes
Observations	19,342	19,342	18,826	18,826	19,342	19,342	18,826	18,826
R-squared	0.708	0.704	0.774	0.772	0.708	0.704	0.774	0.772

Panel B: Firm Operating Performance

This table reports estimates of the relation between female IDs and an appointing firm's performance. The dependent variable is ROA two-periods ahead. Female ID is an indicator that equals one if at least one female ID is on the board and equals zero otherwise. Female ID Ratio is the number of female IDs to board size. We use the term "CEO OC" to identify the CEO Overconfidence measure defined in the variable appendix. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

VARIABLES	(ROA) _{t+2}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female ID	0.001 (0.290)	0.003 (1.083)	0.005 (1.168)	0.006 (1.614)				
Female ID*CEO OC	0.018** (2.495)		0.014* (1.759)					
Female ID*CEO TopQ		0.011*** (2.820)		0.012*** (2.736)				
Female ID Ratio					-0.026 (-1.440)	-0.011 (-0.679)	-0.022 (-1.087)	-0.014 (-0.779)
Female ID Ratio*CEO OC					0.127*** (3.358)		0.086** (2.048)	
Female ID Ratio*CEO TopQ						0.069*** (3.484)		0.056*** (2.684)
Male ID Ratio	0.001 (0.065)	-0.001 (-0.133)	0.006 (0.539)	0.002 (0.251)	-0.005 (-0.449)	-0.006 (-0.648)	-0.003 (-0.257)	-0.006 (-0.589)
Male ID Ratio*CEO OC	-0.013 (-0.651)		-0.009 (-0.380)		-0.004 (-0.201)		-0.003 (-0.127)	
Male ID Ratio*CEO TopQ		-0.005 (-0.451)		0.004 (0.342)		-0.000 (-0.032)		0.006 (0.516)
CEO OC	0.037** (2.409)		0.029 (1.567)		0.030* (1.880)		0.025 (1.322)	
CEO TopQ		0.013* (1.651)		0.003 (0.296)		0.010 (1.259)		0.003 (0.319)
Ln[CEO Tenure]	0.001 (1.111)	0.002 (1.587)	-0.003 (-1.349)	-0.002 (-1.000)	0.001 (1.116)	0.002 (1.601)	-0.003 (-1.273)	-0.002 (-0.930)
Ln[CEO Age]	0.008 (0.702)	0.005 (0.472)	0.152** (2.385)	0.153** (2.369)	0.008 (0.714)	0.006 (0.487)	0.155** (2.403)	0.155** (2.388)
CEO Salary/Bonus Ratio	0.002 (1.314)	0.002 (1.452)	0.003** (2.565)	0.004*** (2.827)	0.002 (1.404)	0.002 (1.518)	0.003*** (2.613)	0.004*** (2.845)
Female CEO	-0.001 (-0.152)	-0.002 (-0.281)	-0.014 (-1.288)	-0.013 (-1.227)	-0.001 (-0.087)	-0.002 (-0.230)	-0.013 (-1.207)	-0.012 (-1.124)
Ln[Board Size]	-0.005 (-0.862)	-0.005 (-0.934)	-0.002 (-0.390)	-0.003 (-0.488)	-0.003 (-0.490)	-0.003 (-0.548)	0.001 (0.096)	0.000 (0.007)

Ln[Firm Size]	-0.034***	-0.033***	-0.044***	-0.044***	-0.034***	-0.033***	-0.044***	-0.043***
	(-7.560)	(-7.505)	(-6.828)	(-6.692)	(-7.425)	(-7.367)	(-6.641)	(-6.510)
Ln[Firm Age]	-0.006*	-0.007*	-0.010**	-0.011**	-0.006	-0.006*	-0.010**	-0.010**
	(-1.718)	(-1.760)	(-2.113)	(-2.200)	(-1.634)	(-1.659)	(-2.037)	(-2.127)
Leverage Ratio	-0.009	-0.012	-0.001	-0.004	-0.009	-0.012	-0.001	-0.005
	(-0.952)	(-1.300)	(-0.087)	(-0.471)	(-0.966)	(-1.303)	(-0.113)	(-0.501)
Firm Diversification	-0.001*	-0.001*	-0.001***	-0.001***	-0.001	-0.001*	-0.001***	-0.001***
	(-1.682)	(-1.901)	(-2.658)	(-2.810)	(-1.639)	(-1.827)	(-2.642)	(-2.764)
Intangibles/Assets	-0.032***	-0.030**	-0.010	-0.008	-0.033***	-0.031**	-0.011	-0.010
	(-2.620)	(-2.448)	(-0.688)	(-0.593)	(-2.614)	(-2.466)	(-0.763)	(-0.674)
Insider Holdings	-0.006	-0.004	-0.001	0.001	-0.007	-0.005	-0.002	-0.001
	(-0.610)	(-0.360)	(-0.109)	(0.082)	(-0.721)	(-0.479)	(-0.235)	(-0.054)
Stock Return	0.009***	0.011***	0.007***	0.009***	0.009***	0.011***	0.007***	0.009***
	(5.689)	(6.900)	(4.565)	(5.576)	(5.726)	(6.903)	(4.623)	(5.592)
Volatility	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-3.515)	(-3.541)	(-3.314)	(-3.346)	(-3.506)	(-3.538)	(-3.322)	(-3.368)
Institutional Ownership	0.002	0.004	0.004	0.006	0.002	0.004	0.004	0.006
	(0.295)	(0.596)	(0.605)	(0.947)	(0.362)	(0.652)	(0.664)	(0.996)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Firm FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry*Year FE	Yes	Yes	No	No	Yes	Yes	No	No
CEO*Firm FE	No	No	Yes	Yes	No	No	Yes	Yes
Observations	19,342	19,342	18,826	18,826	19,342	19,342	18,826	18,826
R-squared	0.708	0.704	0.774	0.772	0.708	0.704	0.774	0.772

Panel C: Female IDs, CEO Holder 67 and Firm Performance

This table reports estimates of the relation between female IDs and an appointing firm's performance. The appendix provides detailed variable definitions. All models include industry/firm and year fixed effects, and standard errors are clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}	(ROA) _{t+2}	(Tobin's Q) _{t+1}	(ROA) _{t+2}
Female ID	0.009 (0.229)	0.003 (0.704)	-0.002 (-0.062)	0.001 (0.399)
Female ID*CEO Holder67	0.143** (2.336)	0.012** (2.391)	0.160*** (2.669)	0.011** (2.245)
Male ID Ratio	-0.080 (-0.593)	-0.002 (-0.155)	-0.083 (-0.636)	0.003 (0.262)
Male ID Ratio*CEO Holder67	-0.069 (-0.347)	0.001 (0.068)	-0.034 (-0.172)	-0.006 (-0.474)
CEO Holder67	0.266* (1.662)	0.011 (1.010)	0.190 (1.163)	0.013 (1.180)
Ln[CEO Tenure]	-0.011 (-0.647)	0.000 (0.358)	-0.004 (-0.207)	0.000 (0.053)
Ln[CEO Age]	0.210 (1.272)	0.004 (0.369)	0.184 (1.079)	0.008 (0.696)
CEO Salary/Bonus Ratio	0.042*** (2.660)	0.004*** (3.241)	0.046*** (2.759)	0.002* (1.799)
Female CEO	-0.058 (-0.608)	-0.007 (-1.065)	-0.010 (-0.101)	-0.004 (-0.641)
Ln[Board Size]	-0.243*** (-2.698)	0.000 (0.002)	-0.207** (-2.323)	-0.003 (-0.543)
Ln[Firm Size]	-0.426*** (-8.335)	-0.038*** (-9.121)	-0.483*** (-8.643)	-0.034*** (-7.834)
Ln[Firm Age]	-0.177*** (-2.815)	-0.008** (-2.042)	-0.146** (-2.225)	-0.008** (-2.020)
Leverage Ratio	-0.162 (-1.037)	-0.010 (-1.097)	-0.168 (-1.108)	-0.011 (-1.103)
Firm Diversification	-0.020*** (-3.932)	-0.001*** (-2.880)	-0.020*** (-3.541)	-0.001** (-2.519)
Intangibles/Assets	-0.567*** (-3.381)	-0.009 (-0.762)	-0.566*** (-3.052)	-0.025** (-2.020)
Insider Holdings	-0.149 (-1.415)	-0.004 (-0.359)	-0.180 (-1.577)	-0.004 (-0.399)
Stock Return	0.231*** (9.866)	0.015*** (9.008)	0.223*** (9.104)	0.013*** (8.003)
Volatility	-0.009*** (-2.842)	-0.001*** (-5.080)	-0.008** (-2.270)	-0.001*** (-3.125)
Institutional Ownership	0.104 (1.625)	0.004 (0.593)	0.037 (0.564)	0.002 (0.339)
Constant	5.686*** (7.173)	0.416*** (6.876)	6.114*** (7.166)	0.381*** (6.062)
Firm and Year	Yes	Yes	No	No
Firm and Ind.*Year FE	No	No	Yes	Yes
Observations	17,365	15,033	17,326	14,986
R-squared	0.682	0.644	0.721	0.709

Panel D: Controlling for Lagged Firm Performance

This table reports estimates of the relation between female IDs and an appointing firm's performance. The appendix provides detailed variable definitions. All models include industry/firm and year fixed effects, and standard errors are clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	(Tobin's Q) _{t+1}			(ROA) _{t+2}		
Female ID	-0.049*	-0.002	0.012	0.001	0.003	0.002
	(-1.893)	(-0.105)	(0.520)	(0.262)	(1.069)	(0.499)
Female ID*CEO OC	0.350***			0.020***		
	(4.684)			(2.706)		
Female ID*CEO TopQ		0.196***			0.013***	
		(4.584)			(3.240)	
Female ID*CEO Holder67			0.075**			0.011**
			(2.173)			(2.295)
Male ID Ratio	-0.010	0.003	0.056	0.004	0.002	0.005
	(-0.120)	(0.042)	(0.721)	(0.405)	(0.209)	(0.556)
Male ID Ratio*CEO OC	0.085			-0.008		
	(0.347)			(-0.437)		
Male ID Ratio*CEO TopQ		0.054			-0.000	
		(0.403)			(-0.025)	
Male ID Ratio*CEO Holder67			-0.080			-0.005
			(-0.687)			(-0.466)
CEO Overconfidence	-0.224			0.021		
	(-1.210)			(1.469)		
CEO TopQ		-0.148			0.004	
		(-1.469)			(0.536)	
Holder67			0.129			0.010
			(1.439)			(1.070)
Ln[CEO Tenure]	0.000	0.001	-0.014	0.000	0.001	-0.000
	(0.014)	(0.121)	(-1.452)	(0.351)	(0.687)	(-0.293)
Ln[CEO Age]	0.155	0.156	0.170*	0.012	0.010	0.010
	(1.585)	(1.597)	(1.746)	(1.087)	(0.917)	(0.933)
CEO Salary/Bonus Ratio	0.013	0.013	0.012	0.001	0.001	0.001
	(1.296)	(1.353)	(1.250)	(0.598)	(0.668)	(0.862)
Female CEO	0.000	-0.004	0.001	-0.004	-0.005	-0.004
	(0.002)	(-0.065)	(0.017)	(-0.616)	(-0.709)	(-0.654)
Ln[Board Size]	-0.115**	-0.114**	-0.118**	-0.000	-0.000	-0.001
	(-2.261)	(-2.239)	(-2.306)	(-0.011)	(-0.001)	(-0.196)
Ln[Firm Size]	-0.296***	-0.294***	-0.291***	-0.036***	-0.037***	-0.037***
	(-9.469)	(-9.451)	(-9.402)	(-9.552)	(-9.596)	(-9.772)
Ln[Firm Age]	-0.032	-0.033	-0.032	-0.004	-0.004	-0.005
	(-0.874)	(-0.881)	(-0.853)	(-1.246)	(-1.290)	(-1.551)
Leverage Ratio	0.130	0.124	0.123	0.010	0.008	0.007
	(1.326)	(1.257)	(1.249)	(1.145)	(0.946)	(0.812)
Firm Diversification	-0.008**	-0.008***	-0.008**	-0.001*	-0.001*	-0.001*
	(-2.544)	(-2.655)	(-2.563)	(-1.715)	(-1.817)	(-1.809)
Intangibles/Assets	0.138	0.142	0.133	-0.009	-0.006	-0.006
	(1.289)	(1.326)	(1.266)	(-0.805)	(-0.596)	(-0.577)
Insider Holdings	0.040	0.044	0.051	-0.006	-0.004	-0.003
	(0.552)	(0.611)	(0.712)	(-0.621)	(-0.439)	(-0.327)
Stock Return	-0.051**	-0.048**	-0.049**	0.009***	0.010***	0.011***
	(-2.299)	(-2.217)	(-2.269)	(5.865)	(6.725)	(7.152)
Volatility	-0.003	-0.003	-0.003	-0.001**	-0.001**	-0.001**

Institutional Ownership	(-1.089) -0.032	(-1.106) -0.029	(-1.080) -0.032	(-2.430) -0.000	(-2.415) 0.001	(-2.332) 0.001
Tobin's Q	(-0.699) 0.628***	(-0.638) 0.630***	(-0.688) 0.626***	(-0.044)	(0.165)	(0.255)
ROA	(19.567)	(20.147)	(20.628)	0.180*** (6.357)	0.186*** (6.482)	0.191*** (6.603)
Constant	2.812*** (5.753)	2.762*** (5.710)	2.621*** (5.360)	0.335*** (5.622)	0.347*** (5.863)	0.347*** (6.037)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,326	17,326	17,326	14,986	14,986	14,986
R-squared	0.812	0.811	0.812	0.723	0.722	0.722

Table 4, Panel A: Exogeneous Director Departures, CEO Holder67 and Firm Performance

We focus on a subsample of firms that experience a departure of a female ID either due to death or serious illness. The Female (Male) ID Exogenous Departure Indicator = 1 if a firm loses a female (male) ID and is zero otherwise. We limit our analysis to those firms whose CEOs are tenured for at least three years. Estimates are based on firm and ind.*year fixed effects regressions and use standard errors clustered by firm. The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}		(ROA) _{t+2}	
	CEO Holder67=1	CEO Holder67=0	CEO Holder67=1	CEO Holder67=0
Female ID Exogeneous Departure	-0.169*	-0.095	-0.008	0.000
	(-1.824)	(-1.299)	(-1.128)	(0.011)
Male ID Exogeneous Departure	-0.033	0.026	-0.001	0.004
	(-0.538)	(0.600)	(-0.215)	(0.825)
CEO Holder67	-0.032	-0.052	-0.004	-0.003
	(-0.308)	(-1.524)	(-0.821)	(-1.136)
Ln[CEO Tenure]	0.677	0.522*	0.024	0.044*
	(0.757)	(1.814)	(0.584)	(1.933)
Ln[CEO Age]	0.086**	0.037*	0.009***	0.006***
	(2.189)	(1.892)	(4.515)	(2.655)
CEO Salary/Bonus Ratio	0.168	-0.334***	-0.005	-0.014
	(0.577)	(-2.607)	(-0.322)	(-1.484)
Female CEO	-0.336	-0.072	-0.014	-0.001
	(-1.464)	(-0.669)	(-1.004)	(-0.101)
Ln[Board Size]	-0.440***	-0.591***	-0.000	-0.024***
	(-3.376)	(-7.094)	(-0.024)	(-3.278)
Ln[Firm Size]	-0.298*	-0.159*	-0.021**	0.002
	(-1.687)	(-1.742)	(-2.117)	(0.256)
Ln[Firm Age]	-0.595**	-0.289	-0.043**	0.008
	(-2.227)	(-1.544)	(-2.513)	(0.378)
Leverage Ratio	-0.023*	-0.019**	-0.002**	-0.002**
	(-1.816)	(-2.085)	(-2.392)	(-2.468)
Firm Diversification	-0.608	0.111	-0.051**	-0.015
	(-1.469)	(0.362)	(-2.278)	(-0.816)
Intangibles/Assets	-0.304	-0.312**	0.008	0.008
	(-1.190)	(-2.193)	(0.517)	(0.214)
Insider Holdings	0.265***	0.178***	0.022***	0.020***
	(3.831)	(5.258)	(8.369)	(6.185)
Stock Return	-0.019**	-0.003	-0.001*	-0.000
	(-2.458)	(-0.794)	(-1.899)	(-0.338)
Volatility	0.204	-0.046	-0.004	-0.008
	(1.337)	(-0.487)	(-0.368)	(-0.584)
Institutional Ownership	4.897	5.150***	0.149	0.109
	(1.272)	(3.670)	(0.791)	(1.038)
Constant	-0.169*	-0.095	-0.008	0.000
	(-1.824)	(-1.299)	(-1.128)	(0.011)
Firm and Year FE	Yes	Yes	Yes	Yes
Observations	5,243	4,654	4,873	4,235
R-squared	0.768	0.788	0.752	0.708

Table 4 Panel B: Exogeneous Female ID Departures, CEO Holder67 and Firm Performance with Alternative Definition of Exogenous Departures

We focus on a subsample of firms that experience a departure of a female ID either due to death or serious illness. Female ID Exogenous Departure indicator variable = 1 if a firm loses a female ID and is zero otherwise. We limit our analysis to those firms that had at least one director departure due to death or serious illness. Estimates are based on ind.*year fixed effects regressions and use standard errors clustered by firm. The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	(Tobin's Q) _{t+1} -(Tobin's Q) _{t-1}	(ROA) _{t+1} -(ROA) _{t-1}
Female ID Exogeneous Departure	0.224 (1.408)	-0.022 (-0.545)
Female ID Exogeneous Departure*CEO Holder67	-0.758** (-2.032)	0.023 (0.475)
CEO Holder67	0.190*** (2.768)	0.022*** (2.701)
Ln[CEO Tenure]	0.044 (0.993)	-0.004 (-0.711)
Ln[CEO Age]	-0.460 (-0.458)	-0.016 (-0.270)
CEO Salary/Bonus Ratio	-0.019 (-0.486)	0.012** (2.185)
Female CEO	0.365 (0.817)	-0.003 (-0.047)
Ln[Board Size]	0.430 (1.508)	0.014 (0.447)
Ln[Firm Size]	-1.041*** (-3.377)	0.135*** (3.332)
Ln[Firm Age]	-0.517 (-1.253)	-0.128* (-1.766)
Leverage Ratio	0.435 (0.521)	-0.117 (-1.599)
Firm Diversification	-0.019 (-1.279)	0.000 (0.142)
Intangibles/Assets	-0.201 (-0.082)	0.105 (0.212)
Insider Holdings	0.592 (1.029)	-0.064 (-0.862)
Stock Return	0.346 (0.723)	-0.008 (-0.226)
Volatility	0.523*** (6.793)	0.031*** (3.631)
Institutional Ownership	0.004 (0.227)	0.002 (0.846)
Constant	0.011 (0.032)	0.002 (0.038)
Industry*Year FE	Yes	Yes
Observations	449	449
R-squared	0.577	0.492

Table 5: Female ID Affiliations, CEO Holder67 and Firm Performance

This table reports firm fixed effects estimates of the relationship between female IDs with different affiliation types and the appointing firm's performance. Female Executive (Affiliated) Director=1 if a firm has at least one female inside (affiliated) director, zero otherwise. The dependent variables are Tobin's Q one-period ahead and ROA two-period ahead. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	(Tobin's Q) _{t+1}	(ROA) _{t+2}
Female ID	-0.001 (-0.037)	0.002 (0.460)
Female ID*CEO Holder67	0.162*** (2.692)	0.011** (2.240)
Female Executive Director	0.052 (0.506)	0.004 (0.608)
Female Executive Director*CEO Holder67	-0.174 (-1.252)	0.002 (0.247)
Female Affiliated Director	0.121 (0.428)	0.020 (0.818)
Female Affiliated Director*CEO Holder67	-0.304 (-0.623)	-0.039 (-0.878)
Male ID Ratio	-0.065 (-0.496)	0.003 (0.328)
Male ID Ratio*CEO Holder67	-0.059 (-0.292)	-0.006 (-0.494)
CEO Holder67	0.214 (1.293)	0.013 (1.189)
Ln[CEO Tenure]	-0.004 (-0.235)	0.000 (0.057)
Ln[CEO Age]	0.186 (1.093)	0.008 (0.675)
CEO Salary/Bonus Ratio	0.045*** (2.711)	0.002* (1.784)
Female CEO	-0.016 (-0.135)	-0.009 (-1.134)
Ln[Board Size]	-0.204** (-2.269)	-0.004 (-0.605)
Ln[Firm Size]	-0.483*** (-8.647)	-0.034*** (-7.812)
Ln[Firm Age]	-0.148** (-2.221)	-0.008** (-2.043)
Leverage Ratio	-0.176 (-1.162)	-0.011 (-1.124)
Firm Diversification	-0.020*** (-3.578)	-0.001** (-2.491)
Intangibles/Assets	-0.566*** (-3.045)	-0.025** (-2.012)
Insider Holdings	-0.171 (-1.503)	-0.004 (-0.397)
Stock Return	0.223*** (9.105)	0.013*** (8.001)
Volatility	-0.008** (-2.271)	-0.001*** (-3.110)
Institutional Ownership	0.034 (0.519)	0.002 (0.358)
Constant	6.097*** (7.140)	0.382*** (6.075)
Firm and Ind*Year FE	Yes	Yes
Observations	17,326	14,986
R-squared	0.721	0.709

Table 6: Female ID Board Leadership Positions, CEO Holder67 and Firm Performance

This table reports firm fixed effects estimates of the relationship between female IDs holding important board roles and the appointing firm's performance. Female ID Committee Member (Non-Committee Member) =1 if a firm has at least one female ID (No female ID) serving on important monitoring committees (audit/compensation/nominating), zero otherwise. Female ID Board Leader (Non-Leader) =1 if a firm has at least one female ID (No female ID) serving as the chair of the board or one of its monitoring committees, and zero otherwise. The dependent variables are Tobin's Q one-period ahead and ROA two-periods ahead. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}		(ROA) _{t+2}	
Female ID Committee Member	-0.003 (-0.076)		0.002 (0.445)	
Female ID Committee Member*CEO Holder67	0.161*** (2.652)		0.011** (2.148)	
Female ID Non-Committee Member	0.107 (0.765)		0.009 (0.392)	
Female ID Non-Committee Member*CEO Holder67	0.045 (0.109)		-0.011 (-0.308)	
Female ID Board Leader		-0.099 (-1.623)		-0.003 (-0.562)
Female ID Board Leader*CEO Holder67		0.232** (2.565)		0.019** (2.391)
Female ID Board Non-Leader		-0.047 (-0.946)		0.002 (0.426)
Female ID Board Non-Leader*CEO Holder67		0.186* (1.919)		0.009 (1.276)
Male ID Ratio	-0.077 (-0.571)	-0.337* (-1.809)	0.003 (0.287)	-0.006 (-0.440)
Male ID Ratio*CEO Holder67	-0.055 (-0.265)	-0.158 (-0.518)	-0.007 (-0.493)	0.001 (0.046)
CEO Holder67	0.206 (1.230)	0.104 (0.424)	0.013 (1.240)	0.001 (0.083)
Ln[CEO Tenure]	-0.004 (-0.232)	0.041* (1.908)	-0.000 (-0.043)	0.001 (0.419)
Ln[CEO Age]	0.189 (1.093)	-0.088 (-0.536)	0.008 (0.685)	-0.010 (-0.677)
CEO Salary/Bonus Ratio	0.047*** (2.751)	0.003 (0.128)	0.002* (1.835)	-0.002 (-1.047)
Female CEO	-0.019 (-0.188)	-0.045 (-0.401)	-0.005 (-0.697)	-0.010 (-1.321)
Ln[Board Size]	-0.216** (-2.362)	-0.027 (-0.243)	-0.003 (-0.577)	0.005 (0.629)
Ln[Firm Size]	-0.477*** (-8.376)	-0.425*** (-6.452)	-0.033*** (-7.414)	-0.048*** (-8.446)
Ln[Firm Age]	-0.143** (-2.173)	-0.228*** (-2.719)	-0.008** (-2.035)	-0.011 (-1.575)
Leverage Ratio	-0.169 (-1.095)	0.393* (1.763)	-0.011 (-1.086)	0.007 (0.544)
Firm Diversification	-0.020*** (-3.663)	-0.039*** (-2.690)	-0.001*** (-2.652)	-0.002* (-1.896)
Intangibles/Assets	-0.581*** (-3.104)	-0.999*** (-3.656)	-0.029** (-2.339)	-0.001 (-0.047)
Insider Holdings	-0.180 (-1.563)	-0.267** (-2.256)	-0.004 (-0.370)	0.005 (0.446)
Stock Return	0.225*** (9.001)	0.270*** (7.695)	0.013*** (7.801)	0.012*** (5.409)
Volatility	-0.008** (-2.197)	-0.011*** (-3.317)	-0.001*** (-3.211)	-0.000** (-2.062)
Institutional Ownership	0.047 (0.690)	-0.082 (-0.997)	0.003 (0.465)	-0.014** (-1.970)
Constant	6.050*** (6.972)	7.086*** (7.548)	0.372*** (5.829)	0.562*** (7.658)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes
Observations	17,018	9,796	14,763	8,424
R-squared	0.721	0.795	0.710	0.781
F	16.83	10.05	17.85	9.816

Table 7: Female ID Professional Experience, CEO Holder67 and Firm Performance

This table reports OLS estimates of the relationship between female IDs and the appointing firm's performance. The dependent variables are Tobin's Q one-period ahead and ROA two-periods ahead. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}		(ROA) _{t+2}	
Female ID	0.014 (0.289)	0.006 (0.135)	-0.000 (-0.060)	0.000 (0.005)
Female ID*CEO Holder67	0.249*** (3.217)	0.184*** (2.837)	0.014** (2.405)	0.013** (2.425)
Non-Corp Female ID	-0.021 (-0.649)		0.000 (0.132)	
Non-Corp Female ID*CEO Holder67	-0.092 (-1.353)		-0.001 (-0.324)	
Retired Corp Female ID		-0.044 (-1.305)		-0.001 (-0.460)
Retired Corp Female ID*CEO Holder67		-0.008 (-0.137)		-0.002 (-0.598)
Male ID Ratio	-0.062 (-0.376)	-0.129 (-0.936)	0.005 (0.382)	0.005 (0.503)
Male ID Ratio*CEO Holder67	0.094 (0.366)	0.068 (0.336)	-0.007 (-0.430)	-0.009 (-0.671)
Non-Corp Male ID Ratio	-0.013 (-0.120)		-0.001 (-0.097)	
Non-Corp Male ID Ratio*CEO Holder67	-0.111 (-0.668)		0.000 (0.010)	
Retired Corp Male ID Ratio		0.233** (2.144)		-0.013 (-1.634)
Retired Corp Male ID Ratio*CEO Holder67		-0.395** (-2.576)		0.005 (0.499)
CEO Holder67	0.136 (0.808)	0.172 (1.041)	0.013 (1.155)	0.013 (1.194)
Ln[CEO Tenure]	-0.005 (-0.300)	-0.006 (-0.316)	0.000 (0.155)	0.000 (0.204)
Ln[CEO Age]	0.226 (1.311)	0.228 (1.313)	0.005 (0.388)	0.004 (0.295)
CEO Salary/Bonus Ratio	0.039** (2.291)	0.039** (2.307)	0.002* (1.696)	0.002* (1.695)
Female CEO	-0.042 (-0.449)	-0.042 (-0.452)	-0.004 (-0.619)	-0.005 (-0.629)
Ln[Board Size]	-0.200** (-2.205)	-0.193** (-2.141)	-0.002 (-0.363)	-0.002 (-0.289)
Ln[Firm Size]	-0.466*** (-8.142)	-0.466*** (-8.135)	-0.035*** (-7.822)	-0.035*** (-7.816)
Ln[Firm Age]	-0.149** (-2.260)	-0.151** (-2.269)	-0.007* (-1.925)	-0.007* (-1.891)
Leverage Ratio	-0.152 (-0.980)	-0.152 (-0.979)	-0.014 (-1.404)	-0.014 (-1.422)
Firm Diversification	-0.020*** (-3.602)	-0.020*** (-3.624)	-0.001*** (-2.741)	-0.001*** (-2.780)
Intangibles/Assets	-0.641*** (-3.386)	-0.647*** (-3.408)	-0.025** (-1.965)	-0.024* (-1.941)
Insider Holdings	-0.255** (-2.427)	-0.258** (-2.443)	-0.007 (-0.656)	-0.006 (-0.643)
Stock Return	0.223*** (8.860)	0.225*** (8.904)	0.012*** (7.290)	0.012*** (7.307)
Volatility	-0.008** (-2.214)	-0.008** (-2.221)	-0.001*** (-2.885)	-0.001*** (-2.893)
Institutional Ownership	0.038 (0.568)	0.038 (0.566)	0.005 (0.798)	0.005 (0.829)
Constant	5.834*** (6.783)	5.819*** (6.746)	0.392*** (6.146)	0.397*** (6.222)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes
Observations	16,340	16,342	14,199	14,199
R-squared	0.725	0.725	0.716	0.717

Table 8: Female ID Busyness, CEO Holder67 and Firm Performance

This table reports OLS estimates of the relationship between female IDs and the appointing firm's performance. The dependent variables are Tobin's Q one-period ahead and ROA two-period ahead. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}		(ROA) _{t+2}	
Female ID	-0.002 (-0.046)	-0.001 (-0.029)	0.002 (0.489)	0.001 (0.384)
Female ID*CEO Holder67	0.173*** (2.837)	0.163*** (2.670)	0.011** (2.165)	0.011** (2.054)
Inattentive Female ID	0.026 (0.429)		-0.010** (-2.286)	
Inattentive Female ID*CEO Holder67	0.050 (0.388)		0.012 (1.295)	
CEO Female ID		-0.039 (-0.728)		-0.001 (-0.155)
CEO Female ID*CEO Holder67		0.142 (1.130)		0.009 (1.412)
Male ID Ratio	-0.084 (-0.636)	-0.097 (-0.751)	0.002 (0.239)	0.002 (0.208)
Male ID Ratio*CEO Holder67	-0.042 (-0.206)	-0.038 (-0.186)	-0.006 (-0.460)	-0.007 (-0.523)
Inattentive Male ID Ratio	-0.165 (-0.584)		0.030 (1.342)	
Inattentive Male ID Ratio*CEO Holder67	0.534 (0.974)		-0.065 (-1.442)	
CEO Male ID Ratio		0.290* (1.762)		0.033*** (2.689)
CEO Male ID Ratio*CEO Holder67		-0.289 (-1.194)		-0.046*** (-2.835)
CEO Holder67	0.185 (1.110)	0.205 (1.234)	0.013 (1.212)	0.017 (1.545)
Ln[CEO Tenure]	-0.004 (-0.235)	-0.004 (-0.204)	-0.000 (-0.107)	-0.000 (-0.068)
Ln[CEO Age]	0.169 (0.980)	0.161 (0.938)	0.008 (0.654)	0.007 (0.563)
CEO Salary/Bonus Ratio	0.045*** (2.607)	0.045*** (2.621)	0.002* (1.735)	0.002* (1.722)
Female CEO	-0.019 (-0.194)	-0.020 (-0.208)	-0.005 (-0.680)	-0.005 (-0.652)
Ln[Board Size]	-0.224** (-2.435)	-0.218** (-2.354)	-0.003 (-0.585)	-0.003 (-0.519)
Ln[Firm Size]	-0.467*** (-8.209)	-0.470*** (-8.305)	-0.033*** (-7.359)	-0.033*** (-7.422)
Ln[Firm Age]	-0.143** (-2.172)	-0.147** (-2.239)	-0.008** (-2.084)	-0.008** (-2.161)
Leverage Ratio	-0.167 (-1.076)	-0.166 (-1.067)	-0.009 (-0.929)	-0.009 (-0.924)
Firm Diversification	-0.021*** (-3.690)	-0.021*** (-3.767)	-0.001*** (-2.656)	-0.001*** (-2.706)
Intangibles/Assets	-0.588*** (-3.136)	-0.582*** (-3.112)	-0.028** (-2.317)	-0.028** (-2.267)
Insider Holdings	-0.182 (-1.589)	-0.173 (-1.517)	-0.004 (-0.386)	-0.003 (-0.332)
Stock Return	0.222*** (8.999)	0.222*** (8.995)	0.013*** (7.836)	0.013*** (7.783)
Volatility	-0.008** (-2.222)	-0.008** (-2.236)	-0.001*** (-3.184)	-0.001*** (-3.185)
Institutional Ownership	0.052 (0.768)	0.052 (0.771)	0.003 (0.408)	0.003 (0.438)
Constant	6.077*** (6.967)	6.121*** (7.078)	0.373*** (5.862)	0.378*** (5.940)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes
Observations	16,936	16,936	14,684	14,684
R-squared	0.722	0.722	0.710	0.710

Table 9: Female IDs, CEO Holder67 and Firm Performance: Pre-SOX Nominating Committee Independence

This table reports estimates of the relationship between female ID representation and the appointing firm's performance. During Pre-SOX implementation period from 1998 to 2006. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. A firm has an Independent Nominating Committee if the firm has a nominating or corporate governance committee with all independent directors. The appendix provides detailed variable definitions. All the estimates are based on regressions with firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)
	(Tobin's Q) _{t+1}	(Tobin's Q) _{t+1}	(ROA) _{t+2}	(ROA) _{t+2}
	Independent Nominating Committee	Non-Independent Nominating Committee	Independent Nominating Committee	Non-Independent Nominating Committee
Female ID	-0.117 (-1.445)	0.162 (1.329)	-0.005 (-0.810)	0.014 (1.052)
Female ID*CEO Holder67	0.229* (1.849)	-0.222 (-1.466)	0.020* (1.905)	-0.020 (-1.537)
Male ID Ratio	0.107 (0.376)	0.016 (0.045)	0.014 (0.707)	0.024 (0.757)
Male ID Ratio*CEO Holder67	0.242 (0.521)	0.507 (1.016)	0.001 (0.058)	-0.004 (-0.104)
CEO Holder67	0.265 (0.788)	0.199 (0.616)	0.008 (0.439)	0.026 (0.918)
Ln[CEO Tenure]	-0.009 (-0.238)	-0.033 (-0.687)	-0.003 (-1.389)	-0.002 (-0.547)
Ln[CEO Age]	0.282 (0.497)	-0.651 (-1.408)	0.012 (0.524)	0.003 (0.093)
CEO Salary/Bonus Ratio	0.067*** (2.662)	0.054** (1.974)	0.001 (0.678)	0.002 (0.401)
Female CEO	0.471** (2.576)	0.156 (0.422)	-0.002 (-0.163)	0.007 (0.430)
Ln[Board Size]	-0.233 (-1.316)	0.059 (0.213)	-0.017 (-1.610)	0.034 (1.609)
Ln[Firm Size]	-1.055*** (-6.311)	-0.710*** (-3.007)	-0.046*** (-3.877)	-0.058*** (-3.982)
Ln[Firm Age]	-0.284* (-1.708)	-0.014 (-0.050)	0.009 (1.087)	-0.015 (-0.887)
Leverage Ratio	0.010 (0.023)	0.108 (0.296)	0.008 (0.393)	0.020 (0.615)
Firm Diversification	-0.003 (-0.298)	-0.014 (-1.255)	0.000 (0.157)	-0.001 (-0.819)
Intangibles/Assets	0.381 (0.762)	0.079 (0.131)	0.007 (0.249)	0.051 (1.263)
Insider Holdings	0.212 (1.122)	0.420 (1.224)	0.022 (1.163)	-0.021 (-0.549)
Stock Return	0.154*** (3.343)	0.163*** (2.947)	0.004 (1.415)	0.006 (1.308)
Volatility	-0.027** (-2.016)	-0.035** (-2.101)	0.001 (0.871)	0.001 (0.791)
Institutional Ownership	0.426* (1.793)	0.459** (2.005)	0.010 (0.934)	0.026 (1.027)
Constant	9.815*** (4.084)	9.678*** (3.142)	0.392*** (3.095)	0.450*** (2.596)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes
Observations	4,110	1,343	3,690	1,192
R-squared	0.796	0.862	0.800	0.848

Table 10: Female ID, CEO Holder67 and CEO Forced Turnover Sensitivity to Firm Performance

This table presents results from logit models in columns 1-2. The dependent variable is one if a firm fires its CEO, zero otherwise. Female ID is an indicator that equals one if there is at least one female ID on the firm's board and equals zero otherwise. Models 1 and 2 presents results for sub-samples of firms that have poor (good) performance based on their annual industry adjusted stock return. We limit our analysis to those firms whose CEOs have at least 3 years of tenure. The appendix provides detailed variable definitions. All models include industry and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	Poor Performance	Good Performance
Female ID	-0.033*	-0.016
	(-1.790)	(-0.689)
Female ID*CEO Holder67	0.045**	0.008
	(2.258)	(0.368)
Male ID Ratio	0.062	-0.016
	(1.211)	(-0.285)
Male ID Ratio*CEO Holder67	-0.098*	0.021
	(-1.733)	(0.397)
CEO Holder67	-0.028	-0.040
	(-0.716)	(-0.892)
Ln[CEO Tenure]	0.000	-0.001
	(0.074)	(-0.131)
CEO Age>62	-0.021***	-0.007
	(-3.588)	(-1.144)
CEO Salary/Bonus Ratio	0.003	0.002
	(1.130)	(0.553)
Female CEO	-0.023	0.041
	(-0.859)	(0.995)
Ln[Board Size]	0.046**	-0.005
	(2.179)	(-0.242)
Ln[Firm Size]	0.007	0.006
	(0.843)	(0.715)
Ln[Firm Age]	-0.017	0.010
	(-1.275)	(0.756)
Leverage Ratio	0.001	0.026
	(0.051)	(1.005)
Firm Diversification	-0.002	0.000
	(-1.469)	(0.341)
Intangibles/Assets	-0.203	0.123
	(-1.387)	(1.012)
Insider Holdings	-0.061*	-0.013
	(-1.945)	(-0.388)
Stock Return	-0.022	0.018
	(-0.929)	(0.743)
Volatility	0.000	0.000
	(0.614)	(0.731)
Institutional Ownership	-0.005	0.008
	(-0.283)	(0.364)
ROA	-0.096***	0.001
	(-2.700)	(0.021)
Constant	-0.011	-0.035
	(-0.135)	(-0.436)
Firm and Ind.*Year FE	Yes	Yes
Observations	6,754	5,207
R-squared	0.389	0.433

Table 11: Female ID, CEO Holder67 and CEO Compensation Policy

This table presents results from fixed effects models in columns 1-2. The dependent variable is the change in 1-year leading CEO Compensation. Female ID is an indicator that equals one if there is at least one female ID on the firm's board and equals zero otherwise. Models 1 and 2 presents results for sub-samples of firms that have poor (good) performance based on their annual industry adjusted stock return. We limit our analysis to those firms whose CEOs have at least 3 years of tenure. The appendix provides detailed variable definitions. All models include industry*year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	Poor Performance	Good Performance
Female ID	-0.010 (-0.162)	-0.143* (-1.774)
Female ID*CEO Holder67	-0.009 (-0.118)	0.201** (2.092)
Male ID Ratio	0.014 (0.078)	-0.146 (-0.705)
Male ID Ratio*CEO Holder67	0.052 (0.229)	0.218 (0.921)
CEO Holder67	-0.019 (-0.114)	-0.264 (-1.448)
Ln[CEO Tenure]	-0.025 (-1.131)	0.053** (2.082)
CEO Age>62	0.048 (1.291)	-0.019 (-0.461)
CEO Salary/Bonus Ratio	-0.079*** (-3.203)	-0.041** (-2.345)
Female CEO	0.036 (0.350)	-0.086 (-0.558)
Ln[Board Size]	0.191** (2.119)	-0.008 (-0.078)
Ln[Firm Size]	-0.085** (-1.999)	-0.139* (-1.816)
Ln[Firm Age]	0.052 (0.877)	-0.051 (-0.531)
Leverage Ratio	0.120 (0.900)	0.042 (0.277)
Firm Diversification	0.004 (0.625)	0.008 (0.992)
Intangibles/Assets	-0.050 (-0.323)	0.104 (0.510)
Insider Holdings	-0.387*** (-2.721)	-0.284 (-1.630)
Stock Return	-0.003 (-0.763)	-0.003 (-0.821)
Volatility	0.029 (0.457)	0.126** (2.345)
Institutional Ownership	-0.042 (-0.466)	0.083 (0.627)
ROA	-0.314 (-0.994)	-0.722** (-2.485)
Constant	0.263 (0.600)	1.400** (2.521)
Firm and Ind.*Year FE	Yes	Yes
Observations	4,893	3,740
R-squared	0.333	0.415

Table 12, Panel A: Female IDs, CEO Holder67 and Firm Risk Measures

This table contains models that analyze the relationship between female IDs and the appointing firm's future risk-taking strategies. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. The appendix provides detailed variable definitions. All models are based on OLS estimates that include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)
	(Total Risk) _{t+1}	(Market Risk) _{t+1}	(Idiosyncratic Risk) _{t+1}
Female ID	-0.000 (-0.080)	-0.003 (-0.100)	-0.000 (-0.118)
Female ID*CEO Holder67	-0.004* (-1.720)	-0.015 (-0.453)	-0.004** (-2.063)
Male ID Ratio	0.002 (0.497)	-0.025 (-0.311)	0.004 (0.953)
Male ID Ratio*CEO Holder67	-0.005 (-0.861)	-0.075 (-0.757)	-0.006 (-1.090)
CEO Holder67	0.007 (1.379)	0.052 (0.699)	0.007* (1.722)
Ln[CEO Tenure]	0.000 (0.502)	0.002 (0.205)	0.000 (0.235)
Ln[CEO Age]	-0.007 (-1.270)	-0.085 (-1.052)	-0.004 (-0.878)
CEO Salary/Bonus Ratio	-0.001 (-1.641)	-0.013* (-1.797)	-0.000 (-1.133)
Female CEO	-0.001 (-0.493)	0.006 (0.114)	-0.001 (-0.500)
Ln[Board Size]	-0.005* (-1.857)	-0.042 (-0.969)	-0.004 (-1.611)
Ln[Firm Size]	-0.012*** (-6.563)	-0.051** (-2.075)	-0.012*** (-7.921)
Ln[Firm Age]	-0.009*** (-4.154)	-0.080** (-2.563)	-0.007*** (-3.608)
Leverage Ratio	0.037*** (7.498)	0.359*** (5.069)	0.033*** (7.678)
Firm Diversification	-0.000 (-1.386)	-0.007** (-2.209)	-0.000 (-0.422)
Intangibles/Assets	-0.008 (-1.413)	-0.029 (-0.379)	-0.007 (-1.407)
Insider Holdings	-0.004 (-0.881)	-0.094 (-1.464)	-0.003 (-0.697)
Stock Return	0.002*** (3.083)	0.014 (1.633)	0.002*** (3.180)
Volatility	-0.016*** (-5.280)	-0.087** (-1.989)	-0.015*** (-5.554)
Constant	0.275*** (9.842)	2.317*** (6.183)	0.242*** (9.721)
Firm and Ind.*Year FE	Yes	Yes	Yes
Observations	17,972	17,972	17,972
R-squared	0.797	0.716	0.803

Table 12, Panel B: Female IDs, CEO Holder67 and Firm Risk: Impact of Firm Growth

This table contains models that analyze the relationship between female IDs and the appointing firm's future risk-taking strategies. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. High (Low) growth industries are those with above (below or equal) third quartile of industry sales growth. The appendix provides detailed variable definitions. All models are based on OLS estimates that include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Low Growth Industries			High Growth Industries		
	(Total Risk) _{t+1}	(Market Risk) _{t+1}	(Idiosyncratic Risk) _{t+1}	(Total Risk) _{t+1}	(Market Risk) _{t+1}	(Idiosyncratic Risk) _{t+1}
Female ID	0.002 (0.850)	0.011 (0.363)	0.001 (0.782)	-0.004 (-1.295)	-0.033 (-0.778)	-0.003 (-1.218)
Female ID # CEO Holder67	-0.005** (-2.004)	-0.027 (-0.642)	-0.006** (-2.392)	-0.001 (-0.305)	0.004 (0.073)	-0.001 (-0.413)
Male ID Ratio	0.002 (0.311)	-0.034 (-0.341)	0.003 (0.673)	0.006 (0.712)	0.008 (0.056)	0.007 (1.036)
Male ID Ratio* CEO Holder67	-0.006 (-0.742)	-0.120 (-0.966)	-0.005 (-0.846)	-0.009 (-0.771)	-0.023 (-0.138)	-0.009 (-0.988)
CEO Holder67	0.009 (1.475)	0.097 (1.045)	0.008* (1.728)	0.006 (0.665)	-0.009 (-0.074)	0.006 (0.888)
Ln[CEO Tenure]	0.000 (0.528)	0.008 (0.650)	-0.000 (-0.032)	0.000 (0.208)	-0.007 (-0.449)	0.000 (0.515)
Ln[CEO Age]	-0.001 (-0.120)	-0.082 (-0.816)	0.003 (0.576)	-0.021* (-1.948)	-0.092 (-0.692)	-0.021** (-2.144)
CEO Salary/Bonus Ratio	-0.001 (-1.177)	-0.014 (-1.546)	-0.000 (-0.655)	-0.001 (-1.212)	-0.011 (-1.021)	-0.001 (-1.016)
Female CEO	-0.001 (-0.235)	0.020 (0.342)	-0.001 (-0.384)	-0.003 (-0.707)	-0.056 (-0.646)	-0.001 (-0.326)
Ln[Board Size]	-0.002 (-0.653)	-0.032 (-0.554)	-0.001 (-0.367)	-0.010*** (-2.683)	-0.069 (-1.122)	-0.009*** (-2.605)
Ln[Firm Size]	-0.010*** (-4.943)	-0.048 (-1.486)	-0.011*** (-6.344)	-0.014*** (-4.422)	-0.062 (-1.642)	-0.014*** (-4.890)
Ln[Firm Age]	-0.011*** (-4.099)	-0.116*** (-2.892)	-0.008*** (-3.630)	-0.006 (-1.573)	0.003 (0.066)	-0.005 (-1.413)
Leverage Ratio	0.036*** (6.046)	0.345*** (3.635)	0.032*** (6.374)	0.036*** (4.104)	0.337*** (3.399)	0.032*** (4.001)
Firm Diversification	-0.000 (-0.770)	-0.007 (-1.644)	0.000 (0.347)	-0.001 (-1.336)	-0.009 (-1.621)	-0.000 (-1.135)
Intangibles/Assets	-0.004 (-0.523)	0.010 (0.091)	-0.003 (-0.533)	-0.010 (-1.137)	-0.058 (-0.527)	-0.008 (-1.087)
Insider Holdings	-0.002 (-0.382)	-0.075 (-0.959)	-0.000 (-0.008)	-0.009 (-0.954)	-0.116 (-1.102)	-0.009 (-1.071)
Stock Return	0.002*** (3.016)	0.011 (1.037)	0.002*** (3.287)	0.001 (1.131)	0.019 (1.457)	0.001 (1.069)
Institutional Ownership	-0.019*** (-5.110)	-0.137** (-2.422)	-0.016*** (-5.216)	-0.011** (-2.076)	0.014 (0.215)	-0.011** (-2.458)
Constant	0.237*** (8.090)	2.401*** (5.149)	0.199*** (7.843)	0.351*** (6.073)	2.176*** (3.456)	0.330*** (6.234)
Firm and Ind.*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,083	12,083	12,083	5,880	5,880	5,880
R-squared	0.795	0.728	0.796	0.809	0.697	0.822

Table 13: Female IDs, Overconfident CEOs and Financial Reporting Quality

This table presents results from regressions with firm fixed effects. Female ID is an indicator that equals one if at least one female ID is on the firm's board, zero otherwise. Reporting quality measures absolute value of discretionary accruals and S&P Quality rankings. Discretionary accruals are calculated following Jones model (1993) as modified in Kothari, Leone and Wasley (2005) using an analogous ROA approach. S&P Quality is taken from COMPUSTAT. The appendix provides detailed variable definitions. All models include firm/industry and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	S&P Quality	Abs(Discretionary Accruals)
Female ID	-0.022 (-1.199)	0.068 (0.851)
Female ID*CEO Holder67	0.069*** (2.596)	-0.168* (-1.733)
Male ID Ratio	-0.077 (-1.327)	0.094 (0.373)
Male ID Ratio*CEO Holder67	0.008 (0.101)	-0.215 (-0.717)
CEO Holder67	0.016 (0.263)	0.197 (0.972)
Ln[CEO Tenure]	-0.010 (-1.406)	-0.015 (-0.512)
Ln[CEO Age]	0.098 (1.593)	0.223 (0.722)
CEO Salary/Bonus Ratio	0.016** (2.162)	-0.010 (-0.238)
Female CEO	-0.036 (-1.051)	-0.012 (-0.092)
Ln[Board Size]	0.025 (0.643)	0.002 (0.010)
Ln[Firm Size]	0.024*** (2.653)	0.055 (0.827)
Ln[Firm Age]	0.035*** (2.874)	0.008 (0.086)
Leverage Ratio	-0.143*** (-2.971)	0.123 (0.619)
Firm Diversification	0.006** (2.108)	0.025** (2.425)
Intangibles/Assets	0.138** (2.441)	-0.479* (-1.904)
Insider Holdings	-0.044 (-0.644)	-0.155 (-0.793)
Stock Return	0.017*** (4.149)	-0.063 (-1.185)
Volatility	-0.012*** (-9.106)	0.001 (0.229)
Institutional Ownership	-0.132*** (-3.385)	-0.117 (-0.470)
Constant	-0.324 (-1.267)	-0.571 (-0.463)
Firm Fixed Effects	No	Yes
Industry*Year Fixed Effects	Yes	Yes
Observations	18,600	18,111
R-squared	0.213	0.491

Table 14: Female ID, CEO Holder67 and SOX: Announcements of Director Appointments: Difference-in-Differences of Female and Male Appointments in SOX Non-compliant Firms

Female ID Appointment equals one if a firm had no Female ID in year t-1 and appoints at least one Female ID in year t and is zero otherwise. Male ID Appointment equals one if a firm appoints one or more Male IDs in year t and is zero otherwise. Non-compliant =1 if a firm did not meet board, audit, compensation or nominating committee independence criteria at the end of 2001, zero otherwise. The regression sample is limited to those firms that have the same CEO from pre-SOX to post-SOX period (2001-2006). The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	(Tobin's Q) _{t+1}	(ROA) _{t+2}
Female ID Appointment	0.298** (2.333)	0.066* (1.843)
Female ID Appointment*CEO Holder67*SOX Non-compliant	0.629*** (2.682)	0.072* (1.815)
Female ID Appointment*SOX Non-compliant	-0.532*** (-2.916)	-0.074* (-1.914)
Male ID Appointment	0.043 (0.234)	0.026 (1.424)
Male ID Appointment*CEO Holder67 *SOX Non-compliant	0.349 (1.628)	0.026 (1.186)
Male ID Appointment*CEO Holder67	-0.255 (-1.273)	-0.016 (-0.824)
Male ID Appointment*SOX Non-compliant	-0.058 (-0.307)	-0.023 (-1.185)
Ln[CEO Tenure]	0.850 (1.553)	0.106* (1.959)
Ln[CEO Age]	7.636 (0.842)	0.166 (0.320)
CEO Salary/Bonus Ratio	0.050* (1.909)	0.007** (2.248)
Ln[Board Size]	0.047 (0.230)	-0.074*** (-2.730)
Ln[Firm Size]	-0.422** (-2.149)	-0.077*** (-4.139)
Ln[Firm Age]	0.492 (0.743)	0.069 (1.093)
Leverage Ratio	-0.137 (-0.327)	-0.059 (-1.193)
Firm Diversification	-0.013 (-0.896)	0.000 (0.134)
Intangibles/Assets	0.389 (0.680)	0.036 (0.524)
Insider Holdings	-0.022 (-0.082)	0.075 (1.206)
Stock Return	0.053 (0.913)	0.007 (1.099)
Volatility	0.018 (1.355)	0.001 (0.446)
Institutional Ownership	-0.074 (-0.280)	-0.007 (-0.233)
Constant	-29.712 (-0.802)	-0.364 (-0.178)
Firm and Year FE	Yes	Yes
Observations	738	679
R-squared	0.840	0.818

Online Appendix (OA)

Table OA1: Alternative Measures of CEO Overconfidence

This table reports estimates of the relation between female IDs and an appointing firm's performance. The dependent variables are Tobin's Q/ROA. Female ID is an indicator that equals one if at least one female ID is on the board and equals zero otherwise. CEO TopQ =1 if a CEO is in the top quartile of CEO Overconfidence measure in at least 2 years during her tenure, zero otherwise. CEO TopQ Alt =1 if a CEO is in the top quartile of CEO Overconfidence measure in at least 3 years during her tenure, zero otherwise. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

VARIABLES	(Tobin's Q) _{t+1}				(ROA) _{t+2}			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Full Sample		CEO Tenure>3	CEO Tenure>5	Full Sample		CEO Tenure>3	CEO Tenure>5
Female ID	0.013 (0.336)	-0.000 (-0.005)	0.009 (0.165)	-0.036 (-0.580)	0.002 (0.708)	0.001 (0.438)	0.000 (0.064)	0.001 (0.245)
Female ID*CEO TopQ	0.134** (2.059)		0.168* (1.902)		0.009* (1.882)		0.013** (1.991)	
Female ID*CEO TopQ Alt		0.211*** (2.760)		0.287** (2.511)		0.014** (2.375)		0.016* (1.925)
Male ID Ratio	0.034 (0.276)	-0.002 (-0.017)	0.145 (0.859)	-0.086 (-0.525)	0.002 (0.162)	-0.002 (-0.230)	-0.004 (-0.303)	-0.007 (-0.604)
Male ID Ratio *CEO TopQ	-0.328 (-1.578)		-0.416 (-1.569)		-0.007 (-0.535)		0.001 (0.060)	
Male ID Ratio *CEO TopQ Alt		-0.325 (-1.238)		-0.195 (-0.559)		0.002 (0.154)		0.007 (0.353)
CEO TopQ	0.457*** (2.732)		0.565** (2.574)		0.019* (1.895)		0.012 (0.979)	
CEO TopQ Alt		0.402* (1.930)		0.425 (1.431)		0.006 (0.523)		0.007 (0.454)
Controls: CEO Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls: Market Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept and Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,342	19,342	13,513	10,508	16,828	16,828	11,902	9,265
R-squared	0.701	0.700	0.717	0.741	0.697	0.695	0.717	0.746

Table OA2: Female IDs, CEO Holder67 and Firm Performance in the Recent Period

This table reports estimates of the relation between female IDs and an appointing firm's performance. We limit this analysis to a sample period of 2011-2018. The dependent variables are Tobin's Q/ROA. Female ID is an indicator that equals one if at least one female ID is on the board and equals zero otherwise. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(1)	(2)
	(Tobin's Q) _{t+1}	(ROA) _{t+2}
Female ID	-0.045 (-0.774)	-0.002 (-0.430)
Female ID*CEO Holder67	0.233** (2.236)	0.014* (1.677)
Male ID Ratio	-0.247 (-1.127)	-0.012 (-0.731)
Male ID*CEO Holder67	-0.196 (-0.565)	-0.006 (-0.272)
CEO Holder67	0.043 (0.155)	-0.000 (-0.021)
Ln[CEO Tenure]	0.052** (2.104)	0.001 (0.453)
Ln[CEO Age]	-0.227 (-1.135)	-0.015 (-1.020)
CEO Salary/Bonus Ratio	0.009 (0.290)	-0.002 (-0.804)
Female CEO	0.030 (0.237)	-0.005 (-0.528)
Ln[Board Size]	-0.054 (-0.418)	0.001 (0.084)
Ln[Firm Size]	-0.642*** (-7.096)	-0.050*** (-7.807)
Ln[Firm Age]	-0.299** (-2.314)	-0.016 (-1.477)
Leverage Ratio	0.640** (2.491)	0.014 (0.841)
Firm Diversification	-0.020 (-1.459)	-0.001* (-1.661)
Intangibles/Assets	-0.647* (-1.910)	0.013 (0.630)
Insider Holdings	-0.367 (-1.004)	-0.025 (-1.285)
Stock Return	0.310*** (5.794)	0.012*** (3.537)
Volatility	-0.007** (-2.163)	-0.000 (-1.052)
Institutional Ownership	-0.178** (-1.966)	-0.008 (-1.003)
Constant	9.599*** (7.411)	0.625*** (8.112)
Firm and Ind.*Year FE	Yes	Yes
Observations	7,094	5,744
R-squared	0.833	0.826

Table OA3: Press-based CEO Overconfidence Measure, Female IDs and Firm Performance

This table contains models that analyze the relationship between Female IDs, press-based measure of CEO overconfidence and firm's performance. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. The estimates are from OLS regression with industry & year fixed effects, and use standard errors clustered by firm. The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(Tobin's Q) _{t+1}	(ROA) _{t+2}
	(1)	(2)
Female ID	0.010 (0.124)	0.011 (1.573)
Female ID*Press-based OC Measure	0.060** (2.421)	0.001 (0.695)
Male ID Ratio	-0.577** (-2.338)	-0.014 (-0.681)
Male ID Ratio*Press-based OC Measure	0.093 (1.425)	-0.001 (-0.194)
Press-based OC Measure	0.019 (0.389)	0.006* (1.783)
Controls: CEO Characteristics	Yes	Yes
Controls: Firm Characteristics	Yes	Yes
Controls: Market Characteristics	Yes	Yes
Intercept, Industry and Year Fixed Effects	Yes	Yes
Observations	4,441	3,980
R-squared	0.299	0.336

Table OA4: Propensity Score Matching of Female IDs, OC CEOs and Firm Performance

This table presents results from a sub-sample of treatment and control firms that are matched based on the variables listed in Panel A below, year and 2-digit SIC codes. Treatment firms have at least one female ID and their CEOs have overconfidence level in the top quartile. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. The estimates are based on OLS regression models that include firm and year fixed effects, and use standard errors clustered by firm. The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

Panel A: Matched Sample Characteristics

Variable	Mean Value		Difference in Means	t-Stats.	p>t
	Treated	Control			
Ln[CEO Tenure]	1.872	1.847	0.025	1.41	0.159
Ln[CEO Age]	4.031	4.028	0.003	1.41	0.160
CEO Salary/Bonus Ratio	0.553	0.565	-0.012	-0.58	0.564
Female CEO	0.025	0.022	0.003	0.96	0.338
Firm Size	8.083	8.108	-0.025	-0.82	0.410
Firm Age	3.044	3.030	0.015	0.93	0.352
Leverage	0.202	0.197	0.005	1.53	0.125
Diversification	3.538	3.655	-0.117*	-1.79	0.073
Intangible/Assets	0.230	0.228	0.002	0.53	0.595
Insider Holdings	0.063	0.060	0.003	1.20	0.232
Stock Return	0.126	0.138	-0.012	-1.23	0.220
Stock Return Volatility	9.763	9.872	-0.109	-1.04	0.297
Institutional Ownership	0.787	0.783	0.003	0.9	0.369

Panel B: Regression Estimates Using a Matched Sample

	(Tobin's Q) _{t+1}	(ROA) _{t+2}
	(1)	(2)
Female ID	-0.078 (-0.790)	-0.003 (-0.490)
Female ID*CEO Holder67	0.247** (2.058)	0.014* (1.768)
Male ID Ratio	0.022 (0.091)	0.009 (0.620)
Male ID Ratio*CEO Holder67	-0.228 (-0.678)	-0.005 (-0.260)
CEO Holder67	0.307 (1.072)	0.010 (0.697)
Controls: CEO Characteristics	Yes	Yes
Controls: Firm Characteristics	Yes	Yes
Controls: Market Characteristics	Yes	Yes
Intercept and Firm Fixed Effects	Yes	Yes
Industry*Year Fixed Effects	Yes	Yes
Number of Observations	8,396	7,425
R-Squared	0.744	0.742

Table OA5: Arellano-Bond Estimation of Female IDs, CEO Overconfidence and Firm Performance

The dependent variables are Tobin's Q one-period and ROA two-period ahead. Female ID is an indicator that equals one if there is at least one female ID is on the board and is zero otherwise. The appendix provides detailed variable definitions. All models include firm and year fixed effects, and use standard errors clustered by firm. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(Tobin's Q) _{t+1}	(ROA) _{t+2}
	(1)	(2)
Female ID	-0.037 (-1.072)	0.000 (0.018)
Female ID*CEO Holder67	0.093** (2.117)	0.007* (1.688)
Male ID Ratio	-0.044 (-0.423)	-0.006 (-0.608)
Male ID Ratio*CEO Holder67	-0.200 (-1.419)	0.005 (0.378)
CEO Holder67	0.161 (1.471)	-0.011 (-1.115)
Tobin's Q	0.583*** (42.470)	
(Tobin's Q) _{t-1}	-0.092*** (-9.095)	
(Tobin's Q) _{t-2}	0.011 (1.360)	
(ROA) _{t+1}		0.546*** (29.191)
ROA		-0.090*** (-8.168)
(ROA) _{t-1}		0.001 (0.060)
Controls: CEO Characteristics	Yes	Yes
Controls: Firm Characteristics	Yes	Yes

Controls: Market Characteristics	Yes	Yes
Intercept, Year and Arellano-Bond Effects	Yes	Yes
Observations	11,084	9,796
Wald-Chi Squared	3922.80	2278.52

Table OA6: Female IDs, CEO Residual Overconfidence, and Firm Performance

This table contains models that analyze a stock return adjusted measure of CEO overconfidence, female IDs and stock market performance. Female ID is an indicator that equals one if there is at least one female ID on the board and is zero otherwise. The estimates are based on OLS regression models that include firm and year fixed effects, and use standard errors clustered by firm. The appendix provides detailed variable definitions. Statistical significance at the 1%, 5%, and 10% levels are denoted by ***, ** and * respectively.

	(Tobin's Q) _{t+1}	(ROA) _{t+2}
	(1)	(2)
Female ID	0.018 (0.418)	0.003 (1.004)
Female ID*CEO Resid OC	0.140** (2.393)	0.010** (2.524)
Male ID Ratio	-0.016 (-0.132)	-0.001 (-0.061)
Male ID Ratio*CEO Resid OC	-0.588*** (-2.743)	-0.006 (-0.578)
CEO Resid OC	0.662*** (4.196)	0.016* (1.906)
Controls: CEO Characteristics	Yes	Yes
Controls: Firm Characteristics	Yes	Yes
Controls: Market Characteristics	Yes	Yes
Intercept and Firm Fixed Effects	Yes	Yes
Industry*Year Fixed Effects	Yes	Yes
Number of Observations	15,666	15,310
R-Squared	0.721	0.701