THREE ESSAYS IN CORPORATE FINANCE

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To myself, for reaching this significant milestone, and to my family and friends, whose unwavering support has been my anchor.

Disclaimer

I hereby declare that the work undertaken in this thesis has been conducted by me alone, except where indicated in the text. This thesis, in whole or any part of it, has not been submitted to this or any other university for a degree.

Hedda

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Abstract

This thesis consists of three chapters. The first chapter is titled 'The Glass Cliff: Are Promotions to CEOs Precarious for Women?' This study investigates the 'glass cliff' phenomenon, wherein female CEOs are disproportionately appointed to precarious leadership positions. Our analysis demonstrates that female CEOs are approximately 19% more likely than their male counterparts to be appointed under such challenging conditions. We empirically test two competing hypotheses for the glass cliff: discrimination and preference. We find that the sensitivity of female CEO appointments to firm performance varies with product market competitiveness; it diminishes when industry competition intensifies. Contrary to the preference hypothesis, which suggests that firms may appoint female CEOs for performance recovery, our finding does not support superior post-appointment performance for firms led by women compared with those led by men. Our further analysis shows that while the presence of female directors on the board is associated with an increased likelihood of female CEO appointments, it does not mitigate the glass cliff effect, suggesting that boardroom gender diversity alone is insufficient to address deeper issues related to gender bias in leadership appointments. Overall, our findings imply that the glass cliff is primarily a consequence of gender discrimination rather than a strategic preference for female leadership during precarious situations.

The second chapter is titled 'Corporate Governance and Performance of Australian Family Firms'. While the performance of family firms has been extensively studied in international markets, there is limited understanding of their corporate governance structures and impact on firm performance within the Australian context. In this study, we analyse a large sample of Australian firms to assess the performance of family firms from a corporate governance perspective. We first compare key governance mechanisms between family and non-family firms, including board independence, board size, managerial power concentration, and overall governance quality. Our findings reveal a significant substitutive relationship between family control and conventional governance mechanisms, indicating that family firms often rely on internal governance practices rather than external oversight. When examining performance, we find that family firms exhibit higher profitability; however, this advantage diminishes for market-based valuation once governance heterogeneity is considered. Our results remain robust across various tests, including propensity score matching (PSM) and instrumental variable (IV) analyses.

The third chapter is titled 'Bank CEOs' Financial Distress Experience and Risk Inertia in Risk-Taking'. This study investigates the relationship between banks' risk-taking behaviour and bank CEOs' experience of financial distress under regular market conditions. We document strong evidence showing the relationship to be positive: banks of high-risk levels are associated with CEOs with distress experiences. This finding contrasts previous studies that report a negative influence of CEOs' experiences in crises or early career disasters. Our results remain robust through propensity score matching (PSM) and are further validated with placebo tests. To understand the mechanisms behind the positive relationship, we compare risk levels before and after the appointment of distress-experienced CEOs. Our results show that bank risk-taking does not significantly change following the appointment, suggesting that these CEOs do not actively escalate risk. Instead, the evidence suggests a role of matching in top-management appointments, whereby risk-prone banks strategically choose CEOs with distress experience to align with their existing risk culture.

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'Sois heureux un instant. Cet instant c'est ta vie.' – Omar Khayyam

Chapter 1

The Glass Cliff: Are Promotions to CEOs Precarious for Women?

'It took me quite a long time to develop a voice, and now that I have it, I am not going to be silent.'
– Madeleine Albright

ABSTRACT

This study investigates the 'glass cliff' phenomenon, wherein female CEOs are disproportionately appointed to precarious leadership positions. Our analysis demonstrates that female CEOs are approximately 19% more likely than their male counterparts to be appointed under such challenging conditions. We empirically test two competing hypotheses for the glass cliff: discrimination and preference. We find that the sensitivity of female CEO appointments to firm performance varies with product market competitiveness; it diminishes when industry competition intensifies. Contrary to the preference hypothesis, which suggests that firms may appoint female CEOs for performance recovery, our finding does not support superior post-appointment performance for firms led by women compared with those led by men. Our further analysis shows that while the presence of female directors on the board is associated with an increased likelihood of female CEO appointments, it does not mitigate the glass cliff effect, suggesting that boardroom gender diversity alone is insufficient to address deeper issues related to gender bias in leadership appointments. Overall, our findings imply that the glass cliff is primarily a consequence of gender discrimination rather than a strategic preference for female leadership during precarious situations.

Keywords: CEO appointment; firm performance; discrimination; preference

JEL classification: G30; G32; G34; J16; J71

1.1 Introduction

Gender equity has been one of the most heated social topics for decades, and in recent times, women's representation in leadership positions has made significant progress. In the corporate sector, the proportion of female Chief Executive Officers (CEOs) in Standard and Poor's (S&P) 500 firms has increased from 0.4% in 2000 to 5.8% in 2020 (Catalyst 2020). However, those women who manage to break through the glass ceiling – the invisible social barrier that prevents women from being promoted and occupying top-level leadership positions – continue to face more hurdles to excelling than men. Recent evidence suggests that successful women are more likely to be promoted to leadership positions in more risky and precarious – a phenomenon known as the glass cliff (e.g., Ryan and Haslam 2005, 2007a,b).

Despite a growing body of literature on the glass cliff, significant gaps remain. Specifically, it is unclear how widespread this practice is in CEO appointments and, perhaps more critically, what drives these high-risk appointments for female leaders. While some studies affirm the existence of the glass cliff across various contexts, such as political elections (Kulich et al. 2014), public organisations (Smith 2015), and board-level appointments (Cook and Glass 2014; Sun et al. 2015), others challenge its prevalence or question its theoretical foundations (Adams and Ferreira 2009; Bechtoldt et al. 2019). These mixed findings highlight a need for deeper investigation, particularly in examining CEO-level appointments, the most influential roles within the corporate hierarchy.

Anecdotal evidence offers some insight, suggesting that when reaching the upper ranks of power, women are more likely to be put in precarious positions. For example, Mary Barra's appointment as the CEO of General Motors – making her the first woman to lead a major global automobile company – occurred just weeks before the company faced a major crisis involving the recall of 1.6 million cars owing to electrical faults that were allegedly linked to 13 deaths (McGrath 2013). Similarly, Marissa Mayer was appointed as the sixth CEO of Yahoo after it lost a significant market share to Google and faced mounting pressure to turn it around (Marcovitch 2018). In her interview with Quartz (2019), Christine Lagarde, the first female president of the European Central Bank (ECB) in its 20-year history, highlighted this, stating that she 'has noticed, time and again, that when it's bad, you call women to the rescue'. This anecdotal evidence raises critical questions: Are these isolated event? Or do they represent a broader trend in female CEO appointments under precarious conditions? If so, what drives this pattern?

This study seeks to address these questions by exploring two competing hypotheses regarding the underlying mechanisms of the glass cliff: the discrimination and preference hypotheses. The discrimination hypothesis suggests that gender bias restricts career opportunities for women, potentially pushing them towards higher-risk roles avoided by men. In line with Becker (1957), discrimination is costly and unsustainable in competitive markets. Thus, discrimination is more likely to occur where competition is limited, as firms face fewer economic penalties for discriminatory practices. Conversely, the preference hypothesis posits that women may be perceived as better suited to manage crises owing to societal stereotypes of women as nurturing or conservative, qualities that could be advantageous as a 'saviour' (Lamb and Tamis-Lemonda 2004; Ryan and Haslam 2007b). This perception could result in a strategic preference for appointing women to lead in times of corporate distress, though it assumes superior post-appointment performance for female-led firms.

To investigate these hypotheses, we examine a sample of 5,315 US-listed firms from 2000 to 2019, with a total of 43,789 firm-year observations. Of these, 42,406 firm-year observations (96.8%) were under male CEOs, while only 1,383 firm-years (3.2%) had female CEOs, leading to 5,501 appointments of male CEOs and 248 of female CEOs. We find that the appointments of female CEOs are significantly negatively correlated with firm performance. This negative relationship is economically strong. For a one-standard-deviation decrease in a firm's industry-adjusted return on assets, the likelihood of appointing a new female CEO increases by 61 basis points, representing a 19% increase in the sample average of female appointments. This result is obtained from the total sample and further verified with a matched sample; the matched sample based on propensity scores removes substantial differences in firm characteristics between female and male CEO appointments.

Next, we examine the underlying drivers of gender disparities in CEO appointments and focus on two major competing hypotheses: discrimination and preference. To test the discrimination hypothesis, we examine how the relationship between firm performance and female CEO appointments varies with the degree of product market competition. Consistent with the prediction of Becker (1957), we find that the likelihood of female CEO appointment is highly sensitive to firm performance in monopolistic industries but insensitive to firm performance in competitive industries. This finding suggests that market competition helps deter discriminatory practices in CEO appointments. By contrast, the preference hypothesis would predict that women are more likely to be appointed as 'saviours' during periods of corporate distress since, presumably, they are more effective in rehabilitating underperforming firms than their male counterparts. Hence, the preference hypothesis predicts the superior performance of firms after appointing female CEOs. However, our results from this test are inconsistent with this prediction, showing that female CEO-led firms do not exhibit superior post-appointment performance relative to those led by male CEOs. This observation is obtained after controlling for prior firm performance and other key characteristics through a matching approach.

Our results show that female CEOs are more likely to be appointed under precarious conditions and that this phenomenon is driven by gender discrimination rather than strategic considerations in leadership appointments. Then, a further question is whether female representation on the corporate board helps mitigate this effect. Some previous studies, such as Matsa and Miller (2011) and Farrell and Hersch (2005), suggest that boards with a higher fraction of female directors are more likely to appoint female CEOs owing to networking effects or familiarity preferences. In contrast, other studies propose the 'tokenism' hypothesis (e.g., Smith et al. 2013), arguing that the presence of one or more women on the board may limit further gender diversity and hence create a ceiling on female leadership appointments. Consistent with the networking and familiarity hypotheses, our analysis confirms that the likelihood of appointing a female CEO increases as the proportion of female directors increases. Conversely, despite this positive effect on female CEO appointments, the increased presence of women on the board does not meaningfully alleviate the glass cliff effect. Therefore, while female representation on the board promotes gender diversity in the management team, it does not protect female executives from being placed in riskier leadership roles.

This study contributes to the literature in three important ways. First, it provides large-sample empirical evidence of the glass cliff phenomenon in the context of CEO appointments, using publicly listed firms between 2000 and 2019. This approach moves beyond prior work that has largely relied on small samples, experimental designs (e.g., Bruckmüller and Branscombe 2010; Haslam et al. 2010), or focused on board-level dynamics (e.g., Ryan and Haslam 2005; Sun et al. 2015).

Second, this study explicitly contrasts two competing theoretical explanations for the glass cliff: the discrimination hypothesis, which posits that women are disproportionately appointed to failing firms due to underlying gender bias; and the preference hypothesis, which suggests that firms strategically select women in crises due to perceived stabilising traits. This approach complements and extends the synthesis by Ryan et al. (2016) who review a decade of literature and identify the need for empirical tests of these underlying mechanisms. It also diverges from Elsaid and Ursel (2018), who focus on post-appointment tenure outcomes and find that female CEOs are less likely to be dismissed—perhaps due to reputational costs of termination. In contrast, this study focuses on pre-appointment dynamics. It identifies that women are more likely to be selected under conditions of firm underperformance, especially in low-competition industries. This distinction highlights that the mechanism of bias lies at the point of selection, and that the existence of post-appointment retention does not negate the existence of precarious entry points.

Third, the study evaluates whether increasing female representation on corporate boards affects the likelihood or nature of female CEO appointments. The results show that while more gender-diverse boards are associated with higher likelihood of appointing a female CEO—consistent with networking and familiarity effects (Farrell and Hersch 2005; Matsa and Miller 2011) — this does not mitigate the glass cliff effect. These findings challenge tokenism arguments and suggest that representation alone may not be sufficient to overcome underlying structural biases.

The remainder of this paper is organised as follows: Section 1.2 develops our main hypotheses. Section 1.3 describes the data sources, and samples we used in this study.

Section 1.4 provides empirical evidence for the glass cliff phenomenon and discusses potential explanations. Section 1.5 provides further evidence by examining the role of female directors in the glass cliff. Finally, Section 2.6 concludes the study.

1.2 Literature Review and Hypotheses Development

This section briefly reviews the literature and develops the hypotheses. We start with the branch of literature on the existence of the glass cliff phenomenon and then discuss studies that examine the factors that cause this phenomenon.

1.2.1 Glass Cliff in Female CEO Appointments

Women face significant challenges in climbing the corporate ladder, a manifestation of persistent gender inequalities in the workplace. This backdrop sets the stage for the 'glass cliff' phenomenon, a term introduced by Ryan and Haslam (2005) and further explored by Ryan et al. (2007), which posits that female CEOs are more likely to be appointed during times of poor firm performance.

Two key theories offer insights into this phenomenon. The book *A Behavioural Theory of the Firm* suggests that organisations under stress may seek change by appointing leaders who are perceived as different from previous leadership, which may explain the propensity to appoint female CEOs during downturns (Cyert and March 2015). Similarly, *Role Congruity Theory* (Eagly and Karau 2002) argues that individuals are selected for roles that align with societal stereotypes. Female leaders are often viewed as more cautious, prudent nurturing, and communicative than their male counterparts – traits that might be perceived as advantageous during a crisis. This stereotype may drive the appointment of female CEOs when firms are underperforming, as boards believe these attributes will help navigate the firm through turbulent times.

It is proposed that the 'opportunity scarcity' for women could also influence the acceptance of precarious CEO positions. According to Ryan and Haslam (2007b), these individuals may accept high-risk leadership roles out of concern that no better opportunities are perceived as potentially their 'only' or 'first and only' chance for significant advancement. This perspective suggests that the appointment of female CEOs in underperforming firms might not only be a matter of stereotype-driven expectations but also a consequence of the systemic limitations in the career trajectories of these executives. Thus, these precarious appointments may be one of the few available paths to leadership for women, compounding the risks associated with the glass cliff.

Despite these theoretical frameworks, empirical evidence on the glass cliff remains mixed. Prior studies suggested that women tend to be overrepresented on boards of companies experiencing financial distress or facing scandals, potentially signalling a preference for appointing women to precarious roles (Ryan and Haslam 2005; Brady et al. 2011; Mulcahy and Linehan 2014; Sun et al. 2015). This pattern extends beyond the corporate sector to other areas, such as politics and public organisations, where women are similarly placed in challenging leadership roles (Kulich et al. 2014; Smith 2015). However, other studies challenge this view. For instance, Bechtoldt et al. (2019) and Santen and Donker (2009) find no significant link between firm performance and female appointments to board or executive roles in certain European contexts, suggesting that the glass cliff may not be a universal phenomenon and may vary across regions and sectors.

At the CEO level, rigorous studies remain scarce, and evidence is inconclusive. Two management studies have reported mixed results, often relying on limited sample sizes or univariate analyses. Cook and Glass (2014) examine a sample of 100 firms, identifying only six female CEO appointments, and observe a tendency for these appointments to occur during periods of weak performance. This finding aligns with the glass cliff hypothesis, suggesting that women may be appointed to leadership roles under precarious circumstances. In contrast, Adams et al. (2009b) employ a univariate approach, studying a larger sample of 200 firms with 48 female CEOs, and report that firms with upcoming female CEO appointments performed better before the leadership transition. This evidence challenges the glass cliff narrative by implying that women may not necessarily be selected for struggling firms.

Further complicating the picture, some studies suggest that female CEOs are associated with different turnover regularities from male ones. Elsaid and Ursel (2018) find that female CEOs generally have lower returns prior to turnover but are less likely to face dismissal than male CEOs, challenging a core aspect of the glass cliff hypothesis. However, Gupta et al. (2020) found the opposite: female CEOs are more likely to be dismissed, even when their firm's performance is comparable to male-led firms, suggesting a double-bind for women in leadership.

The mixed evidence on board and CEO appointments illustrates the complexity of the glass cliff phenomenon and underscores the need for further investigation (Adams et al. 2009b). This study aims to address these gaps by providing large-sample evidence on the glass cliff at the top management level, analysing over 5,000 firms across a 10-year period. Based on the discussion above, we propose our first hypothesis:

Hypothesis 1. Female CEOs are more likely than male CEOs to be appointed when a firm's performance deteriorates.

1.2.2 Discrimination

Despite the ongoing interest in female CEO appointments, few studies have empirically examined the origins and processes underlying the glass cliff phenomenon. Ryan and Haslam (2009) emphasise the importance of exploring organisational processes to understand when and why women are appointed to precarious leadership positions. The glass cliff phenomenon may be attributed to systemic discrimination in executive appointments, where female leaders are selected not based on merit or suitability, but rather owing to gender biases that limit their career advancement to precarious positions.

Empirical research suggests that female executives frequently face workplace discrimination, manifesting in various forms. For example, despite similar qualifications and performance records, they are often perceived as less competent than their male counterparts (Geiler and Renneboog 2015; Bowen et al. 2000; Heilman 2001; Schein 2001). Eagly and Karau (2002) supports this by illustrating that societal expectations of leadership align more with masculine traits, placing women in a double bind. They may either conform to male leadership stereotypes, face criticism for not being 'feminine enough,' or exhibit stereotypically feminine behaviours, which are often seen as incompatible with leadership roles.

This systemic gender discrimination can limit career advancement opportunities for women, forcing them into roles that are riskier and less stable than those typically occupied by men (Simon and Landis 1989; Bowen et al. 2000). These may explain why women accept precarious CEO positions, as such roles are often seen as their only opportunity to reach the top leadership echelons. Selection bias, driven by discriminatory hiring practices, leads to women being appointed to these roles, particularly when firms are underperforming and the risks of leadership failure are heightened.

The *Economic Theory of Discrimination* (Becker 1957) posits that discrimination imposes operational costs on firms, making it difficult to sustain in highly competitive markets. In competitive industries, where firms must optimise efficiency and performance to survive, discriminatory practices that result in suboptimal leadership choices are less likely to persist. Market pressures force firms to prioritise merit and performance over biased decision-making. Studies by Black and Strahan (2001) and Black and Brainerd (2002) highlight how competitive forces from deregulation have been shown to reduce discriminatory practices, including wage gaps and gender biases in hiring and promotions.

We argue that market competition moderates the extent to which firms can act on discriminatory preferences in CEO appointments. Specifically, in line with Becker's (1957) theory of discrimination, firms in less competitive (monopolistic) industries face weaker external pressures and therefore possess greater latitude to engage in suboptimal or biased decision-making, such as appointing female CEOs during periods of poor performance. In contrast, competitive industries, where efficiency is critical for survival, constrain such behaviour through stronger market discipline. It is not that monopolistic firms are uniquely incentivised to make symbolic or crisis-driven leadership changes, but rather that they can afford to act on existing biases under less scrutiny. Hence, our framework treats market competition as an exogenous moderator of discriminatory hiring, not as a driver of leadership change incentives per se.

If the glass cliff phenomenon were primarily a result of discrimination, we would expect to observe it more frequently in monopolistic industries, where these biased practices can be sustained without the financial penalties that competitive industries impose on inefficiency. The lack of external competition allows firms to continue engaging in discriminatory practices, including appointing women to high-risk leadership positions during periods of poor performance. Conversely, in competitive industries, where firms are more focused on survival and maximising profitability, the propensity for discrimination – and thus the likelihood of the glass cliff – should diminish.

Hence, if discrimination drives the glass cliff phenomenon, the effect should be more pronounced in monopolistic industries and less so in highly competitive markets. This leads to the following hypothesis:

Hypothesis 2. The glass cliff phenomenon is more pronounced as competition decreases.

1.2.3 Preference in CEO Appointments: The Female Saviour Hypothesis

Leadership appointments during times of crisis often deviate from those made under more stable conditions. In precarious situations, women are frequently perceived as having attributes that are particularly effective in navigating difficult periods. This belief has contributed to the notion of women as *'saviours'* during corporate crises (Ryan et al. 2016). When a company is underperforming or in turmoil, boards may turn to female leaders to symbolise a break from past leadership and to address challenges with a fresh perspective. This idea is encapsulated in the *Think Crisis – Think Female (TCTF)* concept introduced by Ryan and Haslam (2007b), which posits that women are often selected for leadership during crises owing to stereotypical attributes traditionally associated with femininity, such as empathy, communication, and risk aversion.

This phenomenon is built on the psychological bias known as Think Manager – Think Male (TMTM) (Heilman et al. 1989; Schein 1975), suggesting that leadership roles are traditionally associated with masculine traits such as assertiveness, competitiveness, and decisiveness. Under normal circumstances, these masculine traits are perceived as aligning with the qualities necessary for effective leadership. However, in times of crisis, these perceptions can change. The Think Crisis – Think Female bias suggests that during periods of distress, feminine qualities – such as being nurturing, cautious, and collaborative – are seen as advantageous for leading the firm through recovery. Boards may view female CEOs as better suited to manage these situations because their perceived attributes are expected to bring stability to struggling firms.

This stereotype-driven decision-making is supported by studies such as Bruckmüller and Branscombe (2010), who found that psychology students were more likely to recommend female candidates for leadership in firms facing crises, attributing this choice to the belief that women would be more effective in addressing complex and precarious circumstances. Conversely, male candidates were favoured for leadership roles in companies that were already successful, reflecting the perceived alignment of masculine traits with maintaining growth and stability.

While these perceptions might lead to female leaders being appointed in times of corporate distress, they also contribute to the glass cliff phenomenon, wherein women are placed in risky leadership roles without adequate structural support. This precarious positioning may arise from the belief that women, as 'saviours,' can repair the damage done by their predecessors. However, it raises the question of whether female CEOs are indeed more effective at turning around struggling firms or if they are simply being appointed based on unfounded stereotypes.

To empirically test the 'female saviour' hypothesis, we examine whether firms that appoint female CEOs during periods of poor performance experience improved post-appointment outcomes. If female leaders are appointed under the expectation that their leadership traits will drive recovery, we would expect to see a measurable improvement in firm performance following their appointments. This leads to the following hypothesis:

Hypothesis 3. Female CEO appointments elevate the performance of poorly performing firms.

1.2.4 Female Directors and the Glass Cliff

The composition of a firm's board of directors plays a critical role in shaping leadership appointments, particularly during times of uncertainty or corporate distress. As previously discussed, the glass cliff phenomenon suggests that women are more likely to be appointed to precarious leadership positions. Given this context, the presence of female directors on a board might influence the likelihood of appointing female CEOs. However, the relationship between boardroom gender diversity and CEO appointments is complex and has produced mixed results in the literature.

Female Directors and Female CEO Appointments

Several studies suggest that an increase in the proportion of female directors on a board correlates with a higher likelihood of female CEO appointments. 'Networking or familiarity effects' (Matsa and Miller 2011; Farrell and Hersch 2005) argue that women on boards may help create a more inclusive environment, which broadens the pool of potential female candidates for CEO roles. These directors may also play a role in advocating for gender diversity in leadership, thus making the board more open to considering female executives for the CEO position. Moreover, female directors might reduce bias in the selection process, as they may be more aware of the challenges and obstacles that female executives face in climbing the corporate ladder.

This perspective aligns with the resource dependence theory (Pfeffer and Salancik 2015), which posits that diverse boards provide access to broader networks and resources. Female directors can draw from their professional networks, making identifying and promoting qualified female candidates for top leadership roles easier. Additionally, having women in influential board positions may challenge traditional gender norms and stereotypes, making female CEO appointments more likely.

However, the literature also highlights potential barriers to this effect. Some scholars suggest that increased female representation on boards may lead to 'tokenism' (Smith et al. 2013), where appointing one or a few women fulfils diversity expectations without challenging deeper structural barriers. In this scenario, the presence of one or more women on a board might paradoxically decrease the likelihood of further female leadership appointments, as companies feel they have satisfied external pressures for diversity with limited female representation. This phenomenon could limit the extent to which female directors can influence the appointment of female CEOs.

Female Directors and Mitigating the Glass Cliff

In addition to influencing the likelihood of female CEO appointments, female directors may also play a role in mitigating the glass cliff phenomenon. The presence of more women in the boardroom may introduce a diversity of perspectives that could help firms avoid reactionary or biased decision-making when appointing CEOs during times of crisis. Agency theory (Meckling and Jensen 1976) suggests that diverse boards can enhance governance quality by providing stronger monitoring and oversight, thus potentially reducing the likelihood that women are selected for precarious leadership positions based on stereotypical assumptions about their crisis management skills.

Furthermore, female directors may help shape board discussions around CEO appointments in ways that mitigate the risks associated with the glass cliff. For example, they might advocate for ensuring that female CEO candidates have the necessary support and resources to succeed, thereby reducing the chance that female leaders are positioned for failure in high-risk roles. Research by Adams et al. (2009b) finds that gender-diverse boards exhibit greater monitoring intensity, which may result in more rigorous decision-making processes when appointing female CEOs. This increased scrutiny could prevent firms from hastily selecting women to lead during downturns simply to signal change, without a clear strategy for recovery.

However, it is also possible that female directors, while improving gender diversity in leadership, may not fully mitigate the risks associated with the glass cliff. Tokenism may still come into play, where female CEOs are appointed to satisfy diversity pressures, but without substantive efforts to address underlying challenges. Moreover, while gender-diverse boards are generally associated with stronger governance, overmonitoring by such boards could potentially strain firm performance, as Adams et al. (2009b) noted, leading to mixed outcomes in terms of mitigating the glass cliff effect.

Thus, more women in the boardroom may increase the likelihood of female CEO appointments and influence whether these appointments are associated with precarious circumstances.

Given the theoretical and empirical considerations discussed, we propose the following hypotheses:

Hypothesis 4a. The presence of female directors in the boardroom increases the likelihood of female CEO appointments.
Hypothesis 4b. The presence of female directors in the boardroom mitigates the likelihood of female CEOs being appointed in glass cliff situations.

1.3 Data

This section outlines the data sources, describes the sample construction, and presents descriptive statistics. Univariate analyses are conducted to compare key variables between firms led by female and male CEOs, with particular attention to differences in firm characteristics, CEO attributes, and board composition.

1.3.1 Sample

We begin with the base sample, which includes 25,586 industrial firms and yields 244,594 firm-year observations from 1992 to 2019. Firm-level data are obtained from Compustat and CRSP, while CEO characteristics are derived from Execucomp and BoardEx, and CEO nationality data are manually supplemented from NNDB.com.

To align with established literature, the CEO is assumed to be the apex position within the firm. Any executive concurrently serving as president, COO, or board chair is only included if these roles overlap with the CEO title. In cases where multiple CEOs are recorded in a fiscal year, the individual with the longest tenure is retained for analysis. Data from BoardEx, which lacks specific annual CEO information, are augmented with role descriptions excluding titles such as 'Co-CEO', 'Acting CEO', 'CEO Emeritus', and 'Interim CEO' to ensure consistency.

The sample begins in 2000 to coincide with the availability of comprehensive data from BoardEx (Adams et al. 2016; Francis et al. 2021). The study focuses on industrial firms and excludes firms in the utility (SIC codes 4900-4949) and financial sectors (6000-6999). Firms without CEO gender data or other essential variables are removed, yielding a final sample of 5,315 firms with 43,789 firm-year observations. Of these, 96.8% are led by male CEOs, and 3.2% are led by female CEOs, corresponding to 5,501 new male CEO appointments and 248 new female CEO appointments, involving 8,808 unique male CEOs and 348 unique female CEOs, respectively.

The analysis retains firms with at least two consecutive years of data to study CEO appointments in year t based on firm data from year $t-1$. This results in 5,240 CEO appointments, comprising 5,022 male and 218 female CEO appointments. The number of regression observations varies owing to difficulty measures, multicollinearity, and perfect prediction of the dependent variable. Continuous variables are winsorised at the 1st and 99th percentiles to mitigate the impact of outliers on the analysis.

Variable definitions are provided in Table 1.A.1. The primary variable of interest, the firm performance proxy (Ind-ROA), is calculated as income before extraordinary items divided by book assets, minus the industry average (4-digit SIC) for that year. Following Francis et al. (2021), ROA is adjusted to control for survival bias.[1] Other control variables include the natural logarithm of total assets (Size), the ratio of total debt to total assets (Leverage), sales growth (Sales Growth), the ratio of net property, plant, and equipment to total assets (Tangibility), Tobin's Q (the market value to book value ratio of assets), and the ratio of research and development expenditures to total assets (R&D Spending). The proportion of female directors on the board is also a key variable of interest, capturing

[1] Firms that continue to exist and are included in sample datasets may not represent the full spectrum of potential outcomes, especially those of firms that failed and exited the industry.

boardroom gender diversity.

1.3.2 Summary statistics

Table 1.1 provides summary statistics for the key variables in the sample, including firm characteristics and CEO demographics. The table reports the mean, standard deviation, minimum, maximum, median, and 10th and 90th percentile values for each variable. All continuous variables are winsorised at the 1st and 99th percentiles to mitigate the influence of extreme values.

[Insert Table 1.1 about here]

The average firm size, measured by the natural logarithm of total assets, is 6.27, which aligns closely with other studies examining large industrial firms. For example, Adams et al. (2016) and Faccio et al. (2016) report similar firm sizes in their samples. The leverage ratio in our sample averages 22%, comparable to the 21% reported by Adams et al. (2009b) and Adams et al. (2016). Sales growth averages 17%, while the industry-adjusted return on assets (Ind-ROA) has a mean of 1.86%. Tobin's Q, which measures the market value to book value ratio of assets, averages 2.17 in our sample. This value is consistent with other corporate finance literature, where high Tobin's Q ratios are typically associated with firms that have significant growth opportunities or intangible assets. Studies by Adams et al. (2009b) and Benmelech and Frydman (2015) report Tobin's Q values in the 1.8-2.2 range, suggesting that the firms in our dataset have comparable market valuations to those in related research. Firms in our sample allocate an average of 6% of their assets to R&D spending, with a tangible assets ratio (Tangibility) of 24%. This is somewhat higher than the average R&D expenditure reported by Faccio et al. (2016), where R&D investment averaged around 4-5%. These values are consistent with findings reported in the extant literature.[2]

[2] For comparative reference, see Adams et al. (2016); Dittmar and Duchin (2016); Benmelech and Frydman (2015); Adams et al. (2009b)

Regarding board composition, the average board size in our sample is 8.13 members, which is consistent with the board sizes reported by Dittmar and Duchin (2016) and Benmelech and Frydman (2015). Female directors constitute 10% of the board on average, slightly below the 12% reported by Adams et al. (2016), but comparable to the findings of Dittmar and Duchin (2016), who report that female board representation has been increasing but remains relatively low in many industrial sectors.

CEO demographics indicate that the average CEO in the sample is 55.65 years old, with an average tenure of 4.72 years at the current firm. Female CEOs account for 3.2% of the sample, which aligns closely with the findings of Faccio et al. (2016), who reported that female CEOs constitute only 3% of top leadership positions in Scandinavian firms and 4.8% of Fortune 500 companies. Similar underrepresentation of female CEOs is noted in Dittmar and Duchin (2016) and Adams et al. (2009b), further emphasising the glass ceiling that persists in corporate leadership.

In terms of CEO nationality, 92% of the CEOs in our sample are US nationals, with only 8% being international. This is slightly lower than the international CEO proportion reported by Adams et al. (2016), who found that approximately 10-12% of CEOs in their global sample were non-US nationals.

Table 1.2 offers further insights into the representation and appointment of male and female CEOs across different industries and over time. Panel A reveals that female CEO representation varies significantly by industry. Tobacco products, for instance, have the highest proportion of female CEOs at 15.8%, largely owing to extended female leadership.[3] In contrast, industries such as metal mining report minimal female CEO representation, at just 0.3%. This industry-specific variation in female leadership is consistent with findings in previous research, which shows that female CEO representation tends to be higher in consumer-facing industries and lower in capital-intensive sectors like mining and manufacturing (Faccio et al. 2016; Adams et al. 2016).

[3] Susan M. Cameron served as CEO of Reynolds American Inc. from 2005 to 2010 and again from 2014, followed by Debra A. Crew's tenure beginning in 2016.

[Insert Table 1.2 about here]

Panel B of Table 1.2 documents the upward trend in female CEO representation over the sample period, rising from 1.6% in 2000 to 5.1% in 2019 – an increase of 218%. The proportion of female CEO appointments has similarly grown, with women comprising 9% of all CEO appointments by 2019. As shown in Figure 1.1, the number of male CEO appointments peaked between 2003 and 2007, followed by a sharp decline during the Global Financial Crisis (GFC) and subsequent stabilisation. In contrast, female CEO appointments saw a significant uptick after 2011, peaking in 2019. These trends are consistent with prior studies that document a gradual increase in the representation of women in top corporate positions over time (Faccio et al. 2016; Adams et al. 2016).

[Insert Figure 1.1 about here]

Table 1.3 provides univariate comparisons of firm and CEO characteristics by gender. Panel A reveals that firms led by female CEOs tend to have lower leverage (19%) than those led by male CEOs (22%). Additionally, firms with female CEOs exhibit lower Ind-ROA but higher Tobin's Q, suggesting that these firms may be perceived as having greater growth potential despite weaker profitability. R&D spending is also higher in firms led by female CEOs, consistent with findings by Faccio et al. (2016) and Adams et al. (2009b), who report similar trends in firms with female leadership. Female-led firms also tend to have larger boards and a higher proportion of female directors, suggesting that board diversity might influence CEO appointments.

[Insert Table 1.3 about here]

Personal characteristics of CEOs are also compared, revealing that female CEOs are generally younger with shorter tenures, aligning with the notion of comparatively less entrenched leadership and less powerful (Francis et al. 2021; Adams et al. 2016). However, they tend to have larger professional networks and are predominantly US nationals. These findings indicate that CEO characteristics could also influence the propensity for female CEO appointments, which is accounted for in this study's analysis.

Panel B of Table 1.3 compares firm characteristics in the year prior to CEO appointments. Firms that appoint female CEOs exhibit lower industry-adjusted ROA and leverage in the year preceding the appointment than those appointing male CEOs. However, they tend to have a higher proportion of female directors on the board. These results align with prior studies, such as Dittmar and Duchin (2016), which suggest that firms with more gender-diverse boards are more likely to appoint female CEOs, particularly when the firm is undergoing significant changes in performance or strategy.

Overall, the summary statistics suggest that firms led by female CEOs tend to differ from those led by male CEOs in several key ways. These differences underscore the importance of considering both firm and CEO characteristics in the analysis of CEO appointments, and the potential role of board composition in shaping leadership decisions.

1.4 Results

In this section, we begin by analysing a baseline empirical model to determine whether firms are more inclined to appoint a female CEO in precarious situations (Section 1.4.1). To ensure a robust comparison between firms led by female versus male CEOs, we apply a propensity score matching method, minimising potential biases arising from firm characteristics (Section 1.4.2). Finally, we explore the mechanisms underlying our findings, examining both the discrimination and preference hypotheses as potential drivers of the glass cliff effect (Sections 1.4.3 and 1.4.4).

1.4.1 Firm Performance and Female CEO Appointments - The Glass Cliff Phenomenon

Our baseline regression model is described as follows:

$$\begin{aligned} P(\textit{Appointment of Female CEOs}_{i,t}) =& L(\alpha_1 + \alpha_2 \textit{Ind-ROA}_{i,t-1} \\ & + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t) \end{aligned} \tag{1.1}$$

This is a logit regression model, where L is the logistic distribution, *Appointment of Female CEOs*$_{i,t}$ is a dummy variable that equals 1 if the firm appoints a female CEO and 0 if it appoints a male CEO. The key independent variable is *Ind-ROA*$_{i,t-1}$,representing firm performance, measured as the industry-adjusted return on assets. Control variables include firm-specific factors $Z_{i,t-1}$ such as *Size*, *Leverage*, *Sales Growth*, *Tangibility*, *Tobin's Q*, *R&D* and *Fraction Female Directors*. CEO-specific characteristics ($O_{i,t-1}$) include *Age*, *Tenure*, *Network Size*, and *Non-US*.[4] v_i and μ_t capture year fixed effects and industry fixed effects, respectively. Variable definitions are provided in Table 1.A.1. This approach incorporates a one-year lag between observed firm performance (and other firm-specific variables) and the appointment of a female CEO, aligning with the hypothesis that performance downturns influence subsequent CEO appointments.

To account for the increasing trend of female representation over the years and across different industries, we include year dummies and industry-fixed effects in our models. Additionally, we adjust all standard errors for heteroskedasticity and, in most specifications, cluster the standard errors at the firm level to account for the within-firm correlation of residuals.

A key advantage of analysing CEO promotions is that individuals in these roles have self-selected into C-suite positions based on their demonstrated ability and ambition, suggesting a higher degree of homogeneity between male and female executives (Adams and Funk 2012; Adams et al. 2016; Kaplan and Sorensen 2017). This homogeneity provides a robust context for testing the glass cliff hypothesis, which posits that firms are more likely to appoint female CEOs when a firm's performance deteriorates.

Table 1.4 presents the baseline regression results. In the first specification (Column 1), which includes only firm characteristics and year fixed effects, the coefficient on *Ind-ROA* is -0.086 and statistically significant at the 1% level, indicating underperforming firms are more likely to appoint female CEOs in the subsequent year. We perform back-of-the-envelope calculations to assess the hypothetical effect of firm performance on the proba-

[4] The correlation coefficient matrix of the variables is reported in Appendix 1.A.2. The correlations between all variables are very low, making multicollinearity less of a concern.

bility of appointing female CEOs. For example, a one-standard-deviation decrease in firm performance correlates with a 147-basis-point increase in the probability of appointing a female CEO. Given that the baseline proportion of female CEO appointments in our sample is only 3.2%, this increase represents a relative rise of approximately 45.9%, suggesting statistical significance and substantial economic relevance.

[Insert Table 1.4 about here]

We further the analysis in Column 2 by incorporating the fraction of female directors on the board. Consistent with this literature, our results indicate that the fraction of female directors is positively associated with the likelihood of appointing a female CEO (Francis et al. 2021; Matsa and Miller 2011; Elkinawy and Stater 2011). The coefficient for Ind-ROA is -0.069, maintaining statistical significance at the 1% level, further supporting the glass cliff hypothesis. This specification increases the explanatory power of the model, as evidenced by the rise in the pseudo R-squared to 11.4%, highlighting the importance of board composition in the CEO appointment process.

Column 3 adds CEO-specific characteristics such as age, tenure, network size, and nationality. These factors account for potential individual differences that might influence CEO appointments. The coefficient on Ind-ROA remains negative (-0.060) and statistically significant, suggesting that the likelihood of appointing a female CEO is more closely tied to firm performance than individual CEO traits. This reinforces the idea that women are more likely to be selected for leadership roles in difficult situations.

In the fully specified model in Column 4, which includes all control variables and year- and industry-fixed effects, the *Ind-ROA* coefficient is -0.051, still negative and statistically significant. A one-standard-deviation decline in Ind-ROA increases the probability of appointing a female CEO by 60.84 basis points, or a 19.01% increase relative to the sample average. The R-squared value improves markedly from 11.6% to 16.8%, indicating that industry variations explain approximately 30.9% of the variation in CEO appointments.

The results in Table 1.4 suggest that after controlling for firm fundamentals, CEO personal characteristics, and time-/industry-invariant effects, firms are more likely to appoint female CEOs in precarious situations, confirming Hypothesis 1.

1.4.2 Propensity Score Matching

In our sample, only 3.2% of firms are led by female CEOs. To make firms with female CEOs more comparable to firms with male CEOs, we use a propensity score matching (PSM) methodology to select one matched male CEO firm for each female CEO firm in the sample based on observable firm characteristics and CEO characteristics. Female-led firms are considered 'treated', whereas male-led firms are considered 'untreated'. By matching female-led firms (treated) with male-led firms (untreated) based on observable characteristics, we mitigate the imbalance in sample size and reduce selection bias that could arise from differences in firm and CEO attributes. One advantage of this technique is that each female CEO firm-year observation is compared with the most similar male CEO firm-year observation in the sample, allowing for careful control of variations in firm characteristics.

Panel A of Table 1.5 presents the estimations of the linear probability model used to calculate the propensity scores to appoint a female CEO. The dependent variable is the female CEO, controlled for firm fundamentals and CEO characteristics. A chi-squared test confirms that the model's coefficients are statistically significant at the 1% level.

[Insert Table 1.5 about here]

Using the predicted propensity score from Panel A, we match each firm-year observation with a female CEO to another firm-year observation with a male CEO. The matching criterion requires that the difference in predicted propensity scores between matched pairs does not exceed 0.01, ensuring close similarity. We also require the matched pair to be from two distinct firms to avoid matching one firm-year observation with another firm-year observation from the same firm in a different year. This process results in 1,199 matched firm-year observations.

To validate the matching method, we conduct further tests assessing the quality of the matches, which is crucial for reliable analysis. Panel B of Table 1.5 shows the differences in control variables between the matched pairs. Columns 1 and 2 show the mean values for each control variable for female- and male-led firms, respectively, while Column 3 shows the percentage bias between the matched pairs. We use t-tests to examine if the differences are different from zero. Columns 4 and 5 show that none of the tests rejects the null hypothesis that the differences are zero at the 10% level, indicating that the two matched groups are comparable in all observable dimensions.[5]

Panel C shows the distributions of propensity scores for the treated (female-led) and untreated (male-led) firms, confirming that the differences are minimal and statistically insignificant.

Finally, Panel D presents the results of the multivariate regression analysis using the matched sample. The coefficients on *Ind-ROA* remain negative and statistically significant at the 5% level, reinforcing evidence of the glass cliff phenomenon.

1.4.3 Discrimination

To further explore the role of discrimination in female CEO appointments, we analyse whether market competition influences the relationship between firm performance and the likelihood of appointing a female CEO. This analysis draws from Becker's (1957) theory of discrimination, which suggests that discrimination imposes additional costs on firms and becomes unsustainable in highly competitive markets. If discrimination is a significant factor, we expect the glass cliff effect – where female CEOs are disproportionately appointed in underperforming firms – to be more pronounced in monopolistic industries and less so in competitive environments where efficiency is prioritised.

To assess market power, we use the Herfindahl-Hirschman Index (HHI), sourced from the Hoberg-Phillips data library (Hoberg and Phillips 2016; Hoberg et al. 2014). We classify firms into monopoly (low competition) or competitive sectors based on whether their industry concentration exceeds or falls below the mean of year-matched peers. Commonly, an HHI above 0.25 indicates high concentration. Our sample mean is about 0.274, greater

[5] Figure 1.2 shows the graphs of common support in propensity score matching.

than the cut-off 0.25 (monopoly), satisfying the high concentration threshold. Results remain the same if we use a stricter value cut-off point where the monopoly sector is identified if the firm's industry concentration is above 0.25. Using value measure, the competitive sector is identified if the firm's industry concentration is below 0.15, suggesting they are unconcentrated. Because market competition captures industry-wide characteristics, we cluster the standard errors at the industry level (results remain the same if we cluster at the firm level).

Table 1.6 shows the impact of firm performance on the appointment of female CEOs across monopolistic and competitive industries. In monopolistic industries (Columns 1 and 2), the coefficients on Ind-ROA are -0.199 and -0.222, both statistically significant at the 1% level. These findings indicate that firms in monopolistic sectors are more likely to appoint female CEOs when performance is poor, reflecting a heightened propensity to discriminate when competition is low. The magnitude of the coefficients in monopolistic industries is notably larger than those observed in the full sample (-0.051, as shown in Table 1.4), suggesting that firms in these industries are more inclined to select female CEOs under precarious circumstances, consistent with Becker's theory.

[Insert Table 1.6 about here]

The economic magnitudes in monopolistic industries are nontrivial: a one-standard-deviation decrease in firm performance is associated with a 3.12% increase in the probability of appointing a female CEO in monopolistic industries, nearly doubling the likelihood of female appointments relative to the sample mean. This suggests that firms insulated from competitive pressures have greater leeway to engage in biased hiring practices, further supporting the idea that discrimination plays a role in the glass cliff phenomenon.

In contrast, in competitive industries (Columns 3 and 4), the coefficients on Ind-ROA are small and statistically insignificant, indicating that the relationship between firm performance and female CEO appointments weakens in more competitive environments. These results imply that the pressures of competition limit firms' ability to engage in discriminatory practices, as market forces demand efficiency and performance over gender-based biases. This finding aligns with previous literature showing that market competition tends to reduce discriminatory behaviour (Becker 1957; Black and Strahan 2001).

These results confirm that discrimination contributes to the glass cliff phenomenon, particularly in monopolistic industries where firms have more freedom to make suboptimal hiring decisions. The reduced impact of firm performance on female CEO appointments in competitive industries reinforces Becker's (1957) argument that discrimination imposes higher costs on firms in competitive markets, where inefficiencies are penalised more heavily.

1.4.4 Female Preference

To test for Hypothesis 3, we investigate whether firms strategically appoint female CEOs under the expectation that they can reverse poor performance or navigate crisis periods better than their male counterparts. We analyse key performance indicators before and after CEO appointments, focusing on operating profitability, stock performance, and sales growth.

[Insert Table 1.7 about here]

Table 1.7 presents the results of univariate analysis of firm performance before and after the appointment of female and male CEOs. We track firm performance over a four-year window, beginning two years before the appointment and continuing until two years post-appointment. Panel A of the table highlights that firms appointing female CEOs tend to exhibit lower profitability in the years leading up to the appointment than firms appointing male CEOs. However, the two years following the appointment reveal a stronger increase in profitability for female-led firms, and these gains remain statistically significant after controlling for industry and year-fixed effects.

When analysing stock performance, both female- and male-CEO-appointed firms experience improvements post-appointment. However, the magnitude of the stock performance gains is more pronounced in female-led firms, which may indicate a positive market reaction to female leadership appointments during times of uncertainty. Similarly, sales growth shows positive post-appointment trends for both groups, with a slightly stronger recovery in female-led firms.

Given the glass cliff's association with underperforming firms hiring female CEOs (Ryan and Haslam 2005), it is critical to compare firms' subsequent performance conditional on previous bad performance.

Panel B focuses on firms in the bottom performance quartile before CEO appointments. These firms show more severe declines in profitability before and after the appointment of a female CEO. The profitability of female-led firms is significantly lower than that of male-led firms both before and after the appointment. While both male- and female-led firms experience an improvement in profitability post-appointment, the increase for female-led firms is significantly smaller. This suggests that female CEOs are appointed to firms in distress but struggle to generate significant performance improvements. The lack of significant changes in stock performance and sales growth in these firms reinforces the view that female CEOs face substantial challenges when appointed to lead the most distressed firms, and that these firms may be structurally disadvantaged.

Panel C analyses firms in the second bottom quartile, revealing that while the pre-appointment differences are negligible, female-led firms experience greater profitability and stock performance gains in the years following the CEO appointment. The findings suggest that the post-appointment performance improvements observed in Panel A are largely driven by firms that were not in the lowest performance quartile prior to the leadership transition.

Panel D focuses on firms in the third and top performance quartiles before CEO appointments. In these firms, female-led firms outperform male-led firms in terms of profitability post-appointment. The difference in Ind-ROA two years after the appointment is positive and statistically significant. These findings suggest that the 'saviour' effect of female leadership is most pronounced in firms that were not severely distressed prior to the CEO appointment. These results indicate that female CEOs can drive strong performance improvements when not burdened by the severe challenges present in firms within the lower performance quartiles.

To isolate the effects of CEO gender on post-appointment performance improvements, we estimate a regression model that examines changes in firm performance surrounding CEO transitions. The model specification is as follows:

$$\begin{aligned} \Delta \mathit{Performance} =& \alpha_1 + \alpha_2 \mathit{Female\ CEO}_{i,t} + \alpha_3 \mathit{Pre\text{-}appointment\ performance}_{i,t-1} \\ & + \beta' Z_{i,t} + \gamma' O_{i,t} + \upsilon_i + \mu_t \end{aligned} \tag{1.2}$$

We control for pre-appointment performance, firm characteristics, and CEO characteristics to ensure that performance differences post-appointment are not confounded by pre-existing trends or firm-specific factors. The dependent variable is the performance change, measured by ΔInd-ROA and ΔRet, which captures the difference in firm performance two years before and two years after the CEO appointment. The independent variable of interest is a dummy variable indicating whether the CEO is female.

[Insert Table 1.8 about here]

Consistent with previous findings, Table 1.8 shows that female CEOs are associated with greater performance improvements in firms that were not underperforming before the appointment. In the bottom quartile (Panel B), the coefficient on the female CEO variable is insignificant, indicating no meaningful performance differences between male- and female-led firms. In contrast, in the third and top quartiles (Panel D), the coefficient on the female CEO variable is positive and significant, suggesting that female CEOs may be more effective in firms that are not severely underperforming. Overall, firms facing substantial pre-appointment difficulties do not show significant performance improvements under female leadership, suggesting that the saviour hypothesis may not fully explain the glass cliff phenomenon.

In summary, while female CEOs are often appointed in challenging circumstances, the saviour hypothesis does not consistently hold in cases where firms are severely underperforming before the appointment. Instead, the evidence suggests that female CEOs may be more effective in driving performance improvements in firms that are not in extreme financial distress. These findings provide further support for the glass cliff hypothesis, indicating that women are more likely to be appointed to precarious leadership positions, but their ability to enact performance turnarounds may be conditional on the pre-existing state of the firm.

1.5 Female Directors and the Glass Cliff

Our findings in Tables 1.4 and 1.6 indicate that the presence of female directors increases the likelihood of appointing female CEOs. This supports Hypothesis 4a, which suggests that female directors facilitate female CEO appointments, likely owing to networking effects or familiarity preferences, consistent with Matsa and Miller (2011) and Farrell and Hersch (2005). These findings challenge the tokenism argument, which posits that having one woman on the board reduces the probability of additional women being appointed.

To further investigate, we explore Hypothesis 4b by conducting a logit regression to quantify the impact of female directors on the sensitivity of firm returns to the appointment of female CEOs:

$$\begin{aligned} P(\textit{App. of Female CEOs}_{i,t}) = L(&\alpha_1 + \alpha_2 \textit{Ind-ROA}_{i,t-1} \\ &+ \alpha_3 \textit{Frac Female Directors}_{i,t-1} \\ &+ \alpha_4 \textit{Frac Female Directors}_{i,t-1} \times \textit{Ind-ROA}_{i,t-1} \\ &+ \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t) \end{aligned} \tag{1.3}$$

where L is the logistic distribution, and *Appointment of Female CEOs*$_{i,t}$ is a dummy variable that equals 1 if the firm appoints a female CEO and 0 if it appoints a male CEO. *Ind-ROA*$_{i,t-1}$ represents firm performance measure. *Fraction Female Directors*$_{i,t-1}$ is the ratio of female directors on the board for firm i in year $t-1$. *Frac Female Directors* $\times$ *Ind-ROA*$_{i,t-1}$ is the interaction term between the fraction of female directors and firm performance for firm i in year $t-1$. $Z_{i,t-1}$ is a vector of control variables for firm i in year $t-1$, $O_{i,t-1}$ is a vector of control variables for CEO i in year $t-1$, υ_i and μ_t capture year-fixed effects and industry-fixed effects, respectively.

Table 1.9, extends the previous analysis by incorporating an interaction term between firm performance (Ind-ROA) and the fraction of female directors. This helps us determine whether the presence of female directors attenuates the tendency to appoint female CEOs in response to poor firm performance.

[Insert Table 1.9 about here]

In the full sample and competitive industries (Columns 1 and 3), the coefficients on the interaction terms are positive, implying that the presence of female directors reduces the sensitivity between poor performance and female CEO appointments. However, these results are not statistically significant. This suggests that, while female directors may mitigate the glass cliff effect, the evidence of this is weak in highly competitive markets.

By contrast, in monopolistic industries (Column 2), the interaction term between Ind-ROA and the fraction of female directors is negative, yet statistically insignificant. This result does not provide strong support for the idea that female directors in monopolistic industries either mitigate or exacerbate the glass cliff.

The findings from Table 1.9 suggest that while female directors increase the likelihood of appointing female CEOs, they do not appear to significantly mitigate the glass cliff phenomenon. This result challenges the assumption that female directors might protect female CEOs from being appointed in risky situations. Instead, the evidence suggests that while the presence of female directors facilitates the appointment of female leaders, this effect does not extend to reducing the appointment of women when a firm's performance deteriorates.

In unreported analyses, we further investigated the relationship between the fraction of female directors and the likelihood of appointing female CEOs by including a quadratic term (Frac Female Directors^2) to test for non-linearity. These results revealed a non-monotonic relationship, indicating that while an increase in the fraction of female directors initially raises the probability of appointing a female CEO, this effect diminishes at higher levels of female board representation. Specifically, the quadratic term was negative and significant, suggesting that the appointment likelihood peaks at a certain level of female representation before declining.

To visually assess these dynamics, we plot the predicted values, marginal effects, and elasticities of the fraction of female directors on the probability of appointing female and male CEOs, as shown in Figure 1.3. The top panel demonstrates that the probability of appointing a female CEO rises significantly as the proportion of female directors on the board increases.The middle panel shows the marginal effect of changes in the fraction of female directors on CEO appointments, indicating how each additional percentage of female directors affects the likelihood of appointing a female CEO. The marginal effect is more substantial at lower levels of board representation, such as when the proportion of female directors is below 20%. However, the marginal effect declines as the proportion of female directors rises. The bottom panel depicts the elasticities of female CEO appointments, which measure the percentage change in the probability of appointing a female CEO for a given percentage change in the fraction of female directors. Here, we observe a steep rise in elasticity at low levels of female board representation, indicating that female CEO appointments are highly sensitive to initial changes in the proportion of female directors. In contrast, elasticities level off and eventually decline at higher proportions of female directors, further confirming the non-linear relationship between female board representation and CEO appointments.

[Insert Figure 1.3 about here]

To better understand this non-monotonicity, we also conducted a piecewise analysis in an unreported table, where we divided the fraction of female directors into distinct ranges (0-0.1, 0.1-0.2, 0.2-0.3, and 0.3-0.4). This approach further confirmed the non-linear pattern. The results showed that the likelihood of appointing a female CEO increases significantly when the fraction of female directors ranges from 0.1 to 0.3. However, this effect diminishes as the fraction exceeds 0.3. At the highest level of female board representation (0.3-0.4), the relationship weakens, potentially indicating a saturation effect, where additional female directors no longer strongly influence CEO appointments.

Despite the presence of this non-monotonic relationship, the interaction term between firm performance and the fraction of female directors in both the quadratic function and piecewise analysis failed to show a significant mitigating effect on the glass cliff phenomenon. As shown in both sets of unreported results, while we initially hypothesised that female directors would reduce the likelihood of female CEOs being appointed in precarious situations, the interaction terms across different specifications.

This suggests that although female directors may influence the overall appointment of female CEOs, they do not appear to substantially mitigate the tendency of firms to appoint female CEOs when performance is poor.

1.6 Conclusion

This study investigates the 'glass cliff' phenomenon, where women are disproportionately appointed to precarious leadership roles, particularly when a firm's performance deteriorates, and examines the factors that may contribute to these appointments. Our research sheds light on the dynamics of female CEO appointments and the underlying mechanisms of discrimination, board composition, and perceptions of crisis leadership.

Our results reveal that the glass cliff is more pronounced in monopolistic industries, where lower competitive pressures allow discriminatory practices to persist with fewer consequences. In these environments, firms are more likely to appoint female CEOs in times of performance deteriorates. This supports Becker's theory of discrimination, which posits that firms facing less competition are more prone to discriminatory behaviour. This suggests that the appointment of female CEOs in these contexts may be driven less by merit and more by bias or opportunism, positioning women in roles with higher risks and lower chances of success.

We also examine the 'female saviour' hypothesis, which posits that women are appointed to leadership roles in times of performance deteriorates because of their perceived crisis management abilities. Our findings, however, challenge this narrative. Firms that appointed female CEOs during periods of performance deteriorates did not experience significant post-appointment improvements in performance. This suggests that women may be appointed to such roles not because of their superior crisis management skills but as a symbolic or last-resort decision, reinforcing the precarious nature of these appointments.

Additionally, our study highlights the role of female directors in influencing the appointment of female CEOs. We find a positive relationship between the proportion of female directors on boards and the likelihood of female CEO appointments, consistent with the networking hypothesis. However, the results suggest that even in environments with more female directors, they do not appear to significantly mitigate the glass cliff phenomenon.

The contributions of this paper are twofold. First, we provide empirical evidence of the glass cliff phenomenon in CEO appointments, particularly in monopolistic industries. Second, we offer a deeper understanding of the underlying mechanisms, highlighting the role of discrimination and the limited support for the 'female saviour' narrative. Our findings suggest that the glass cliff is driven more by entrenched biases and discriminatory practices than any strategic preference for female leaders.

These insights carry significant implications for corporate governance. As firms strive to enhance board diversity, it is crucial to recognise the systemic barriers that may limit the success of female leaders. Boards must ensure that leadership opportunities are genuinely equitable and not tied to disproportionate risks for women.

In conclusion, the glass cliff represents a critical challenge in corporate leadership dynamics. However, it also presents an opportunity for firms to reevaluate their appointment practices and create a more inclusive and supportive environment for female leaders. Addressing these biases and barriers is essential for fostering a corporate culture where leadership appointments are based on competence and potential, free from the weight of gendered expectations.

1.7 Figures

Figure 1.1: Male and Female CEO Appointments by Year

This figure illustrates the yearly distribution of male and female CEO appointments from 2000 to 2019. The top two panels display the proportion of CEO appointments by gender, with separate graphs for male and female CEOs. The bottom panel shows a combined graph comparing the annual proportion of male (blue) and female (red) CEO appointments. The blue bars represent the average proportion of firms appointing male CEOs, while the red bars represent the proportion of firms appointing female CEOs.

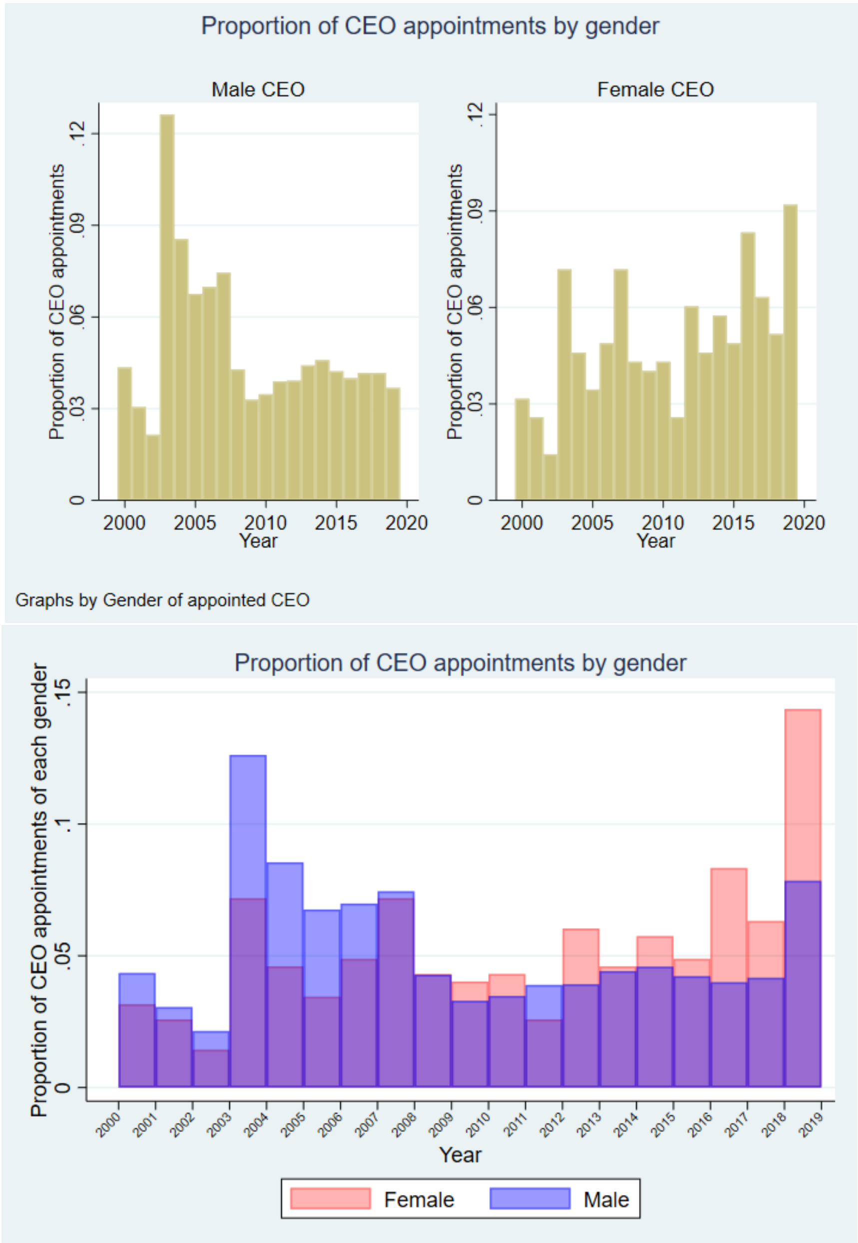


Figure 1.2: PSM

This figure shows common support in propensity score matching that is used in Panel B of Table 1.5.

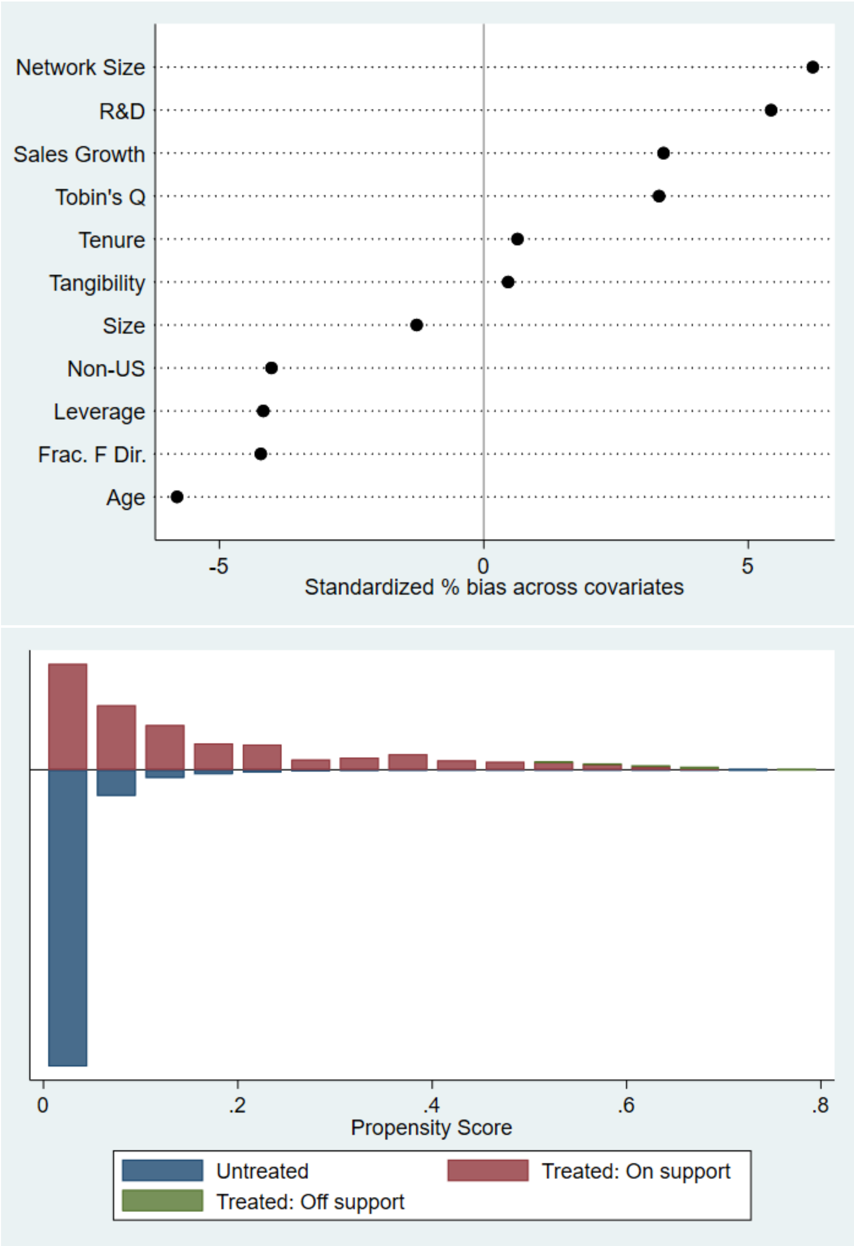
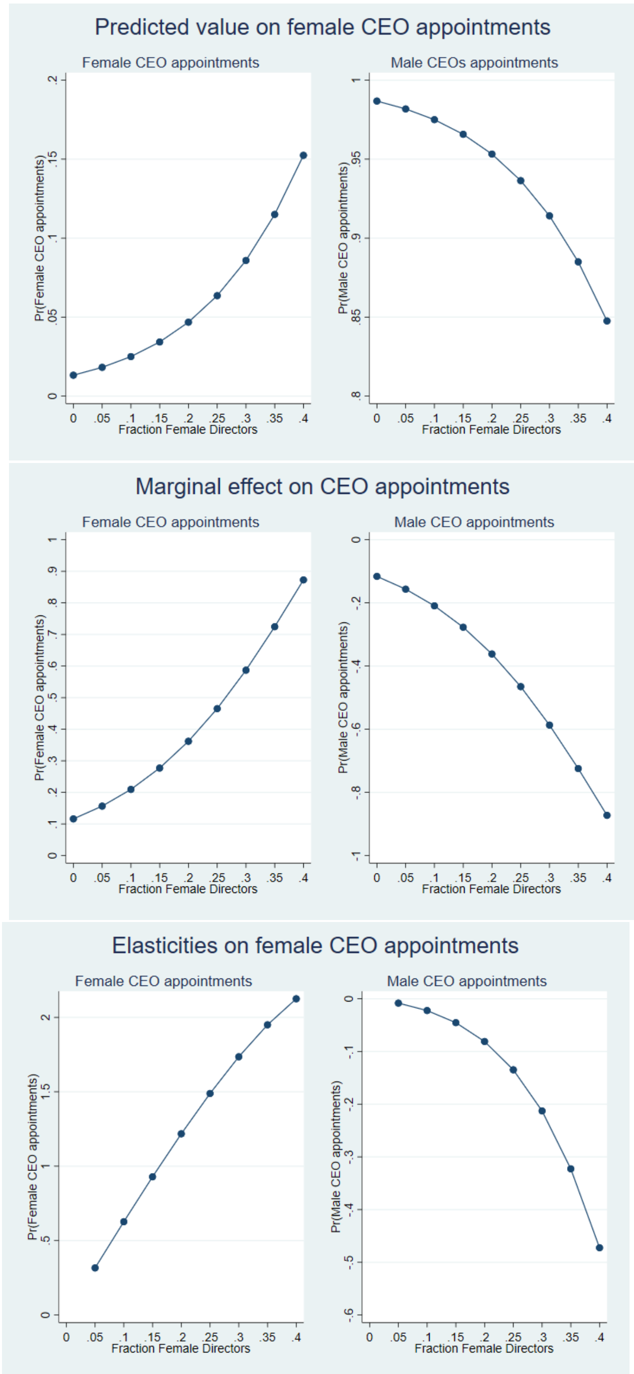


Figure 1.3: Predicted Probabilities, Marginal Effects, and Elasticities of Female CEO Appointments Based on the Fraction of Female Directors

This figure illustrates the relationship between the fraction of female directors and the probability of appointing female and male CEOs. The top panel shows predicted probabilities of appointing female and male CEOs as the fraction of female directors increases. The middle panel displays the marginal effect of changes in the fraction of female directors on the likelihood of CEO appointments. The bottom panel visualises the elasticities, revealing how responsive the probability of appointing female and male CEOs is to changes in the fraction of female directors. As shown, the probability of appointing female CEOs increases with a higher fraction of female directors, but at a diminishing rate. In contrast, male CEO appointments exhibit an inverse relationship.



1.8 Tables

Table 1.1 Full Sample Summary Statistics

This table presents summary statistics for the full sample, which consists of 5,315 firms and 43,789 firm-year observations between 2000 and 2019. The table includes both firm-level variables and CEO characteristics. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers.

Variable	Obs	Mean	Std. Dev.	Min	Max	P10	P50	P90
Firm characteristics								
Ind-ROA	43,789	1.86	5.07	-1.25	38.14	-0.03	0.29	4.36
Size	43,789	6.27	2.01	2.03	11.31	3.59	6.26	8.92
Leverage	43,789	0.22	0.22	0.00	0.97	0.00	0.18	0.51
Sales Growth	43,396	0.17	0.55	-0.68	3.89	-0.17	0.07	0.48
Tobin's Q	43,789	2.17	1.58	0.64	9.63	0.97	1.64	3.99
Tangibility	43,789	0.25	0.24	0.00	0.91	0.03	0.16	0.65
R&D	43,789	0.06	0.12	0.00	0.68	0.00	0.00	0.18
Stock Performance	43,667	0.01	0.05	-0.12	0.17	-0.04	0.01	0.06
Stock volatility	43,502	0.47	0.28	0.11	1.66	0.20	0.39	0.82
Board Size	43,789	8.13	2.20	4.00	15.00	5.00	8.00	11.00
Fraction Female Directors	43,789	0.10	0.10	0.00	0.40	0.00	0.10	0.25
CEO characteristics								
Female CEO	43,789	0.03	0.17	0.00	1.00	0.00	0.00	0.00
Age	43,789	55.65	7.95	38.00	77.00	46.00	56.00	66.00
Tenure	43,789	4.72	3.82	1.00	18.00	1.00	4.00	10.00
Tenure Role	43,789	5.28	5.74	0.00	30.00	0.50	3.30	12.70
Network Size	42,296	1,120.85	1,269.26	17.00	6,398.00	68.00	667.00	2,811.00
Non-US CEO	43,789	0.08	0.27	0.00	1.00	0.00	0.00	0.00

Table 1.2 Male and Female CEO Representation and Appointment by Industry and Year

This table presents the distribution of male and female CEO in the sample. Panel A shows male and female CEO representation and appointment in each industry. Panel B reports male and female CEO representation and appointment each year.

Panel A: Male and female CEO representations and appointments by industry

	CEO representation			CEO appointment		
Industry	Male No.	Female No.	Female %	Male No.	Female No.	Female %
Automotive Repair, Services and Parking	90	0	0	16	0	0
Building Materials, Hardware, Garden Supplies & Mobile Homes	86	0	0	20	0	0
Coal Mining	141	0	0	30	0	0
Construction - General Contractors & Operative Builders	219	0	0	25	0	0
Construction - Special Trade Contractors	84	0	0	21	0	0
Electric, Gas and Sanitary Services	333	0	0	70	0	0
Heamy Construction, Except Building Construction, Contractor	226	0	0	49	0	0
Legal Services	17	0	0	2	0	0
Local & Suburban Transit & Interurban Highway Transportation	34	0	0	11	0	0
Railroad Transportation	144	0	0	23	0	0
Textile Mill Products	110	0	0	7	0	0
Transportation Services	166	0	0	26	0	0
Transportation by Air	360	0	0	71	0	0
Metal Mining	702	2	0.3	132	1	0.8
Oil and Gas Extraction	2,296	11	0.5	445	3	0.7
Primary Metal Industries	512	3	0.6	97	1	1
Water Transportation	211	2	0.9	40	1	2.4
Wholesale Trade - Durable Goods	962	11	1.1	181	1	0.5
Automotive Dealers and Gasoline Service Stations	324	4	1.2	63	2	3.1
Lumber and Wood Products, Except Furniture	257	3	1.2	51	0	0
Food Stores	214	3	1.4	50	1	2
Miscellaneous Manufacturing Industries	361	5	1.4	89	4	4.3
Petroleum Refining and Related Industries	325	5	1.5	58	2	3.3
Electronic & Other Electrical Equipment & Components	4,004	66	1.6	776	13	1.6
Paper and Allied Products	420	7	1.6	76	1	1.3
Transportation Equipment	1,144	19	1.6	222	5	2.2
Health Services	916	17	1.8	182	5	2.7
Mining and Quarrying of Nonmetallic Minerals, Except Fuels	162	3	1.8	32	1	3
Measuring, Photographic, Medical, & Optical Goods, & Clocks	3,246	65	2	693	18	2.5
Nonclassifiable Establishments	239	5	2	66	1	1.5
Engineering, Accounting, Research, and Management Services	915	22	2.3	197	7	3.4
Motor Freight Transportation	385	10	2.5	68	1	1.4
Social Services	39	1	2.5	7	1	12.5
Wholesale Trade - Nondurable Goods	616	16	2.5	130	5	3.7
Industrial and Commercial Machinery and Computer Equipment	2,607	71	2.7	572	14	2.4
Apparel, Finished Products from Fabrics & Similar Materials	396	12	2.9	79	4	4.8
Business Services	5,740	170	2.9	1,359	44	3.1
Home Furniture, Furnishings and Equipment Stores	200	6	2.9	44	3	6.4
Hotels, Rooming Houses, Camps, and Other Lodging Places	117	4	3.3	29	2	6.5
Amusement and Recreation Services	453	16	3.4	93	3	3.1
Rubber and Miscellaneous Plastic Products	311	12	3.7	65	6	8.5
Fabricated Metal Products	623	27	4.2	108	1	0.9
Chemicals and Allied Products	5,265	275	5	1,132	68	5.7
Personal Services	128	7	5.2	29	1	3.3
Stone, Clay, Glass, and Concrete Products	192	11	5.4	38	3	7.3
Communications	1,294	75	5.5	228	19	7.7
Furniture and Fixtures	275	17	5.8	48	4	7.7
Eating and Drinking Places	676	46	6.4	136	12	8.1
General Merchandise Stores	276	19	6.4	53	9	14.5
Pipelines, Except Natural Gas	131	9	6.4	30	3	9.1
Printing, Publishing and Allied Industries	452	33	6.8	94	4	4.1
Educational Services	242	18	6.9	45	2	4.3
Food and Kindred Products	1,057	80	7	225	12	5.1
Leather and Leather Products	186	14	7	30	4	11.8
Motion Pictures	182	15	7.6	38	4	9.5
Apparel and Accessory Stores	537	63	10.5	108	19	15
Miscellaneous Retail	758	94	11	191	30	13.6
Tobacco Products	48	9	15.8	8	3	27.3
Total	42,406	1,383	3.2	8,808	348	3.8

Panel B: Male and female CEOs representation in each year

	CEO representation			CEO appointment			CEO app. w turnover		
	Male No.	Female No.	Female %	Male No.	Female No.	Female %	Male No.	Female No.	Female %
Year									
2000	877	14	1.6	383	11	2.8	90	2	2.2
2001	1,095	23	2.1	269	9	3.2	158	5	3.1
2002	1,159	28	2.4	189	5	2.6	155	5	3.1
2003	2,170	50	2.3	1,112	25	2.2	221	9	3.9
2004	2,664	60	2.2	753	16	2.1	289	6	2.0
2005	2,816	68	2.4	595	12	2.0	399	9	2.2
2006	2,773	61	2.2	615	17	2.7	449	13	2.8
2007	2,633	67	2.5	656	25	3.7	522	20	3.7
2008	2,423	73	2.9	377	15	3.8	310	11	3.4
2009	2,314	79	3.3	290	14	4.6	258	12	4.4
2010	2,275	82	3.5	306	15	4.7	227	12	5.0
2011	2,241	65	2.8	343	9	2.6	259	8	3.0
2012	2,184	70	3.1	345	21	5.7	255	19	6.9
2013	2,189	74	3.3	389	16	4.0	269	12	4.3
2014	2,182	82	3.6	404	20	4.7	267	10	3.6
2015	2,172	93	4.1	372	17	4.4	293	15	4.9
2016	2,132	98	4.4	352	29	7.6	276	22	7.4
2017	2,086	95	4.4	367	22	5.7	278	19	6.4
2018	2,059	95	4.4	367	18	4.7	270	12	4.3
2019	1,962	106	5.1	324	32	9.0	256	27	9.5
Total	42,406	1,383	3.2	8,808	348	3.8	5,501	248	4.3

Table 1.3 Univariate Comparison of Firm and CEO Characteristics by CEO Gender

This table provides a univariate comparison of firm and CEO characteristics based on the CEO's gender. Panel A compares firm-year observations by the current CEO's gender. Panel B compares firm characteristics in the year prior to CEO appointments, allowing for an assessment of whether firm performance and attributes differ for firms that appoint male versus female CEOs. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

Panel A: Firm and personal characteristics by current CEO gender

	No. of observations		Mean of the variables				
	Male	Female	Male	Female	Diff.	Std. Error	P-value
Firm characteristics							
Ind-ROA	42,406	1383	1.87	1.76	0.11	0.14	0.44
Size	42,406	1383	6.28	6.20	0.08	0.06	0.14
Leverage	42,406	1383	0.22	0.19	0.03***	0.01	0.00
Sales Growth	42,033	1363	0.17	0.17	0.00	0.02	0.84
Tobin's Q	42,406	1383	2.16	2.34	-0.17***	0.05	0.00
Tangibility	42,406	1383	0.25	0.22	0.03***	0.01	0.00
R&D	42,406	1383	0.06	0.08	-0.02***	0.00	0.00
Log(Market Value)	42,406	1383	6.39	6.39	-0.00	0.05	0.97
Stock Performance	42,287	1380	0.01	0.01	0.00	0.00	0.40
Stock Volatility (mthly)	42,128	1374	0.47	0.48	-0.02**	0.01	0.04
Board Size	42,406	1383	8.13	8.25	-0.12**	0.06	0.04
Fraction Female Directors	42,406	1383	0.09	0.25	-0.16***	0.00	0.00
HHI(value)	33,658	1120	0.50	0.43	0.07***	0.02	0.00
CEO characteristics							
Age	42,406	1383	55.71	53.74	1.96***	0.17	0.00
Tenure	42,406	1383	4.75	4.00	0.74***	0.09	0.00
Non-US CEO	42,406	1383	0.08	0.06	0.02***	0.01	0.00
Network Size	40,927	1369	1104.21	1618.44	-514.23***	44.20	0.00

Panel B: Firm characteristics in the year before CEO appointments

	No. of observations		Mean of the variables				
	Male	Female	Male	Female	Diff.	Std. Error	P-value
Ind-ROA (t-1)	5,132	223	1.59	0.94	0.65***	0.16	0.00
Size (t-1)	5,132	223	6.57	6.68	-0.11	0.13	0.42
Leverage (t-1)	5,118	223	0.22	0.19	0.03*	0.01	0.05
Sales Growth (t-1)	5,069	219	0.15	0.09	0.05*	0.03	0.08
Tobin's Q (t-1)	5,084	221	2.11	2.10	0.01	0.11	0.93
Tangibility (t-1)	5,131	223	0.24	0.25	-0.00	0.01	0.83
R&D (t-1)	5,132	223	0.06	0.05	0.00	0.01	0.56
Log(Market Value) (t-1)	5,085	221	6.65	6.79	-0.14	0.13	0.29
Stock Performance (t-1)	5,072	222	0.01	0.00	0.00	0.00	0.23
Stock Volatility (t-1)	5,082	222	0.50	0.49	0.01	0.02	0.61
Board Size (t-1)	4,721	205	8.49	8.61	-0.13	0.16	0.44
Fraction Female Directors (t-1)	4,721	205	0.10	0.20	-0.10***	0.01	0.00
HHI (t-1)	4,046	180	0.52	0.45	0.07*	0.04	0.09

Table 1.4 The Impact of Firm Performance on Female CEO Appointments

This table presents logit regression analyses of the appointment of female CEOs. Observations are at the CEO-year level over the period 2000 – 2019.

$$P(\textit{Appointment of Female CEOs}_{i,t}) = L(\alpha_1 + \alpha_2 \textit{Ind-ROA}_{i,t-1} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t)$$

where L is the logistic distribution, *Appointment of Female CEOs*$_{i,t}$ is a dummy variable that equals 1 if the firm appoints a female CEO, and 0 otherwise. *Ind-ROA*$_{i,t-1}$ represents the firm's performance in the previous year, adjusted for industry effects. $Z_{i,t-1}$ is a vector of control variables for firm i in year $t-1$, $O_{i,t-1}$ is a vector of control variables for CEO i in year $t-1$, υ_i and μ_t capture year-fixed effects and industry-fixed effects, respectively. Robust standard errors in parentheses are clustered at the firm level. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

VARIABLES	Appointment of Female CEOs			
	(1)	(2)	(3)	(4)
Ind-ROA (t-1)	-0.085***	-0.069***	-0.060**	-0.051**
	(0.031)	(0.026)	(0.025)	(0.024)
Size (t-1)	0.022	-0.087*	-0.057	-0.057
	(0.046)	(0.044)	(0.044)	(0.045)
Leverage (t-1)	-1.232***	-0.955**	-0.868*	-0.954**
	(0.443)	(0.474)	(0.447)	(0.418)
Sales Growth (t-1)	-0.290	-0.175	-0.192	-0.145
	(0.286)	(0.184)	(0.198)	(0.152)
Tangibility (t-1)	0.092	0.289	0.349	0.339
	(0.556)	(0.495)	(0.526)	(0.570)
Tobin's Q (t-1)	0.055	0.023	0.030	-0.006
	(0.056)	(0.059)	(0.061)	(0.070)
R&D (t-1)	-1.191	-0.761	-0.490	-0.229
	(1.599)	(1.154)	(0.939)	(0.505)
Fraction Female Directors (t-1)		7.484***	7.553***	6.494***
		(0.704)	(0.743)	(0.750)
Age (t-1)			-0.421	-0.283
			(0.542)	(0.497)
Tenure (t-1)			-0.059	-0.046
			(0.081)	(0.086)
Network Size (t-1)			-0.050	-0.015
			(0.080)	(0.082)
Non-US CEO (t-1)			-0.609*	-0.515
			(0.331)	(0.351)
Constant	-3.702***	-3.499***	-1.464	-2.321
	(1.096)	(0.795)	(2.583)	(2.416)
Observations	5,240	4,832	4,567	4,134
Year FE	YES	YES	YES	YES
Industry FE	NO	NO	NO	YES
Pseudo R-squared	0.038	0.114	0.116	0.168

Table 1.5 Propensity Score Matching

This table reports diagnostic tests and propensity score matching results. Using propensity scores estimated with a set of firm and CEO characteristics, we match each firm with a female CEO to a similar firm and similar CEO characteristics with a male CEO. Panel A reports the pre-match propensity score regression, with the dependent variable being the female CEO. Panel B presents the difference in control variables between matched pairs. Panel C shows the distributions of the estimated propensity score. Panel D presents the results of the multivariate regression using the matched sample. *Size*, *Age*, *Tenure* and *Network Size* are in natural logarithm. Robust standard errors in parentheses are clustered at the firm level. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

Panel A: Pre-match propensity score regression

VARIABLES	Female CEO
Size	-0.082***
	(0.011)
Leverage	-0.328
	(0.232)
Sales Growth	0.047**
	(0.021)
Tangibility	0.058
	(0.255)
Tobin's Q	-0.024**
	(0.011)
R&D	0.437***
	(0.162)
Fraction Female Directors	6.451***
	(0.235)
Age	-0.667***
	(0.244)
Tenure	-0.112***
	(0.037)
Network size	0.116***
	(0.035)
Non-US CEO	-0.157
	(0.145)
Constant	-0.961
	(1.086)
Observations	39,979
Year FE	YES
Industry FE	YES
Pseudo R-squared	0.282

Panel B: Difference in control variables

	Mean			t-test	
	Female CEO	Male CEO	%bias	t	p>t
VARIABLES	(1)	(2)	(3)	(4)	(5)
Size	6.375	6.400	-1.3	-0.31	0.757
Leverage	0.196	0.205	-4.2	-1.02	0.308
Sales Growth	0.147	0.129	3.4	0.85	0.393
Tangibility	0.228	0.227	0.5	0.12	0.903
Tobin's Q	2.261	2.208	3.3	0.83	0.405
R&D	0.075	0.068	5.4	1.27	0.206
Fraction Female Directors	0.249	0.253	-4.2	-1.06	0.291
Age	3.982	3.990	-5.8	-1.45	0.148
Tenure	1.189	1.184	0.6	0.15	0.877
Network size	6.829	6.747	6.2	1.60	0.109
Non-US CEO	0.057	0.067	-4.0	-1.02	0.309

Panel C: Estimated propensity score distributions

	N	Mean	S.D.	P10	P25	P50	P75	P90
Treatment	1199	0.1652	0.1465	0.0213	0.0454	0.1147	0.2458	0.3996
Control	1199	0.1654	0.1471	0.0213	0.0454	0.1147	0.2460	0.4024
Difference		-0.0002	-0.0006	0.0000	0.0000	0.0000	-0.0002	-0.0028

Panel D: Multivariate regression using the matched sample

	Appointment of Female CEOs			
VARIABLES	(1)	(2)	(3)	(4)
Ind-year ROA (t-1)	-0.100**	-0.101**	-0.096**	-0.105**
	(0.015)	(0.020)	(0.022)	(0.030)
Observations	436	406	395	371
Female board	NO	YES	YES	YES
CEO characteristics	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	NO	NO	NO	YES
Pseudo R-squared	0.0417	0.0823	0.0853	0.146

Table 1.6 The Impact of Firm Performance on Female CEO Appointments by Industry Competition

This table presents the results of logistic regressions examining the relationship between firm performance and the appointment of female CEOs, focusing on how this relationship differs between monopolistic and competitive industries. The sample covers the period from 2000 to 2019.

$$P(\textit{Appointment of Female CEOs}_{i,t}) = L(\alpha_1 + \alpha_2 \textit{Ind-ROA}_{i,t-1} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t)$$

where L is the logistic distribution, *Appointment of Female CEOs*$_{i,t}$ is a dummy variable that equals 0 if the firm appoints a female CEO, and 0 otherwise. *Ind-ROA*$_{i,t-1}$ represents the independent variable of the interest-firm performance measure. $Z_{i,t-1}$ is a vector of control variables for firm i in year $t-1$, $O_{i,t-1}$ is a vector of control variables for CEO i in year $t-1$, υ_i and μ_t capture firm-fixed effects and year-fixed effects, respectively. Beacuse market competition captures industry-wide characteristics, robust standard errors in parentheses are clustered at the industry level. The variable definitions are given in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

VARIABLES	Monopoly Industries		Competitive Industries	
	(1)	(2)	(3)	(4)
Ind-ROA (t-1)	-0.199***	-0.222***	-0.018	-0.007
	(0.062)	(0.048)	(0.037)	(0.024)
Size (t-1)	-0.181*	-0.184**	0.045	0.065
	(0.096)	(0.079)	(0.058)	(0.046)
Leverage (t-1)	-0.967	-1.451	-0.906	-0.725
	(0.822)	(1.088)	(0.632)	(0.525)
Sales Growth (t-1)	-0.175	-0.123	-0.494	-0.484**
	(0.374)	(0.156)	(0.349)	(0.231)
Tangibility (t-1)	0.480	0.324	0.143	0.023
	(0.824)	(1.321)	(0.595)	(0.919)
Tobin's Q (t-1)	0.042	-0.013	0.038	0.014
	(0.096)	(0.113)	(0.065)	(0.058)
R&D (t-1)	0.126	0.457	-0.828	-0.623
	(1.829)	(2.549)	(1.138)	(0.389)
Fraction Female Directors (t-1)	7.778***	7.283***	7.691***	6.278***
	(1.126)	(1.344)	(0.803)	(1.153)
Age (t-1)	-0.207	0.064	-0.955	-1.140**
	(0.957)	(0.592)	(0.790)	(0.518)
Tenure (t-1)	0.048	0.034	-0.131	-0.087
	(0.144)	(0.166)	(0.114)	(0.065)
Network Size (t-1)	0.102	0.117***	-0.181**	-0.139
	(0.118)	(0.043)	(0.090)	(0.085)
Non-US CEO (t-1)	-0.687	-0.656	-0.692	-0.623**
	(0.741)	(0.759)	(0.560)	(0.292)
Constant	-2.390	-3.707	0.788	2.328
	(4.154)	(2.799)	(3.257)	(2.037)
Observations	1,559	1,198	2,689	2,192
Year FE	YES	YES	YES	YES
Industry FE	NO	YES	NO	YES
Pseudo R-squared	0.142	0.193	0.133	0.181

Table 1.7 Performance Changes in Firms Before and After Male and Female CEO Appointments

This table reports the changes in firms' fundamentals before and after CEO appointments. Panels A, B, C, and D report the results for all firms, low-performance (bottom quartile) firms, performance in the second quartile, and performance in the third and top quartiles, respectively. Observations are at the CEO-year level over the period 2000 – 2019. Columns labelled 'Male' report variables for firms with male CEO appointments, while columns labelled 'Female' report variables for firms with female CEO appointments. Columns labelled 'Diff.' report the difference in variable levels between male- and female-led firms (Female – Male). Rows labeled '(t+1)-(t-1)' present the difference in the variables one year after the appointment of a CEO and one year before the appointment year. Rows labeled '(t+2)-(t-1)' present the difference in the variable level two years after the appointment year and one year before the appointment year. Rows labeled '(t+2)-(t-2)' present the difference in the variable level two years after the appointment year and two years before the appointment year. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

Panel A: All firms

	Ind-ROA			Stock Performance			Sales Growth		
Window year	Male	Female	Diff.	Male	Female	Diff.	Male	Female	Diff.
t-2	1.672	1.165	-0.507**	0.012	0.012	0.000	0.198	0.157	-0.041
t-1	1.594	0.941	-0.653***	0.006	0.002	-0.004	0.146	0.092	-0.053*
Appointment year	1.778	1.129	-0.649**	0.007	0.008	0.001	0.119	0.068	-0.051*
t+1	1.879	1.385	-0.493	0.009	0.012	0.003	0.102	0.073	-0.029
t+2	1.886	2.593	0.707	0.012	0.020	0.008**	0.079	0.125	0.046
(t+1)-(t-1)	0.272	0.399	0.126	0.003	0.010	0.007	-0.046	-0.018	0.028
(t+2)-(t-1)	0.292	1.621	1.329*	0.004	0.014	0.01**	-0.066	-0.002	0.064
(t+2)-(t-2)	0.304	1.582	1.278*	0.000	0.005	0.005	-0.121	-0.119	0.001

Panel B: Panel B: Performance in bottom quartile

	Ind-ROA			Stock Performance			Sales Growth		
Window year	Male	Female	Diff.	Male	Female	Diff.	Male	Female	Diff.
t-2	-0.158	-0.108	0.050*	-0.027	-0.031	-0.004	-0.141	-0.092	0.049**
t-1	-0.148	-0.076	0.072***	-0.037	-0.036	0.001	-0.155	-0.168	-0.014
Appointment year	0.175	-0.063	-0.238**	0.016	-0.001	-0.016**	0.070	-0.038	-0.108***
t+1	0.393	-0.060	-0.453***	0.009	0.035	0.026*	0.070	-0.028	-0.099**
t+2	0.735	-0.016	-0.751***	0.009	0.025	0.016	0.047	0.085	0.038
(t+1)-(t-1)	0.532	0.019	-0.514***	0.046	0.071	0.025	0.227	0.148	-0.079*
(t+2)-(t-1)	0.869	0.065	-0.804***	0.046	0.058	0.012	0.205	0.239	0.034
(t+2)-(t-2)	0.883	0.103	-0.780***	0.037	0.047	0.011	0.186	0.154	-0.032

Panel C: Performance in second bottom quartile

	Ind-ROA			Stock Performance			Sales Growth		
Window year	Male	Female	Diff.	Male	Female	Diff.	Male	Female	Diff.
t-2	0.107	0.089	-0.018**	0.013	0.012	-0.002	0.131	0.068	-0.063***
t-1	0.471	0.089	-0.382***	0.005	0.001	-0.004	0.097	0.022	-0.075***
Appointment year	0.541	0.610	0.069	0.009	0.006	-0.002	0.077	0.022	-0.054***
t+1	0.604	0.927	0.323	0.009	0.007	-0.002	0.057	0.032	-0.025
t+2	0.637	0.386	-0.251	0.012	0.026	0.015**	0.066	0.047	-0.019
(t+1)-(t-1)	0.111	0.832	0.721	0.003	0.006	0.003	-0.044	0.007	0.051*
(t+2)-(t-1)	0.156	0.295	0.139	0.004	0.023	0.018***	-0.035	0.016	0.051
(t+2)-(t-2)	0.529	0.308	-0.22	-0.002	0.013	0.014*	-0.068	-0.045	0.023

Panel D: Performance in third and top quartile

	Ind-ROA			Stock Performance			Sales Growth		
Window year	Male	Female	Diff.	Male	Female	Diff.	Male	Female	Diff.
t-2	3.421	2.965	-0.456	0.014	0.016	0.002	0.255	0.337	0.081
t-1	2.777	2.176	-0.601*	0.007	0.004	-0.003	0.173	0.197	0.024
Appointment year	3.104	2.236	-0.868*	0.005	0.008	0.003	0.158	0.084	-0.074
t+1	3.183	2.553	-0.630	0.009	0.018	0.009	0.133	0.165	0.032
t+2	3.125	6.187	3.062*	0.013	0.010	-0.003	0.088	0.229	0.141*
(t+1)-(t-1)	0.385	0.205	-0.180	0.002	0.015	0.013	-0.038	-0.041	-0.003
(t+2)-(t-1)	0.351	3.806	3.455*	0.004	0.004	0.000	-0.081	-0.031	0.05
(t+2)-(t-2)	-0.124	3.615	3.739**	-0.001	-0.008	-0.007	-0.168	-0.265	-0.097

Table 1.8 Multivariate Analysis of Firm Performance Changes Following Male and Female CEO Appointments

This table reports the changes in firms' fundamentals after CEO appointments. Panels A–D report multivariate regressions. Panels A, B, C, and D report the results for all firms, low performance (bottom quartile) firms, performance in the second quartile, and performance in the third and top quartiles, respectively. Observations are at the CEO-year level over the period 2000 – 2019.

$$\Delta \textit{Performance} = \alpha_1 + \alpha_2 \textit{Female CEO}_{i,t} + \alpha_3 \textit{Pre-appointment performance}_{i,t-1} + \beta' Z_{i,t} + \gamma' O_{i,t} + \upsilon_i + \mu_t$$

The dependent variable is the performance change, measured by ΔInd-ROA and ΔRet. ΔInd-ROA(t+1)-(t-1) and ΔRet(t+1)-(t-1) are the differences in the variables one year after the appointment of a CEO and one year before the appointment year. ΔInd-ROA(t+2)-(t-1) and ΔRet(t+2)-(t-1) are the differences in the variables two years after the appointment of a CEO and one year before the appointment year. ΔInd-ROA(t+2)-(t-2) and ΔRet(t+2)-(t-2) are the differences in the variables two years after the appointment of a CEO and two years before the appointment year. The independent variable in all columns, *Female CEO*, is a dummy variable equal to one if a CEO is female. We control for lagged operating and stock performance, firm characteristics, and CEO characteristics to examine post-appointment performance improvements while holding pre-appointment performance constant. $Z_{i,t-1}$ is a vector of control variables for firm i in year $t-1$, $O_{i,t-1}$ is a vector of control variables for CEO i in year $t-1$, υ_i and μ_t capture year fixed effects and industry fixed effects, respectively. Robust standard errors in parentheses are clustered at the firm level. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

Panel A: All firms

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔInd-ROA			ΔRet		
VARIABLES	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)
Female CEO	-0.082	1.306*	1.772**	0.002	0.010**	0.000
	(0.341)	(0.702)	(0.733)	(0.004)	(0.004)	(0.006)
Pre-performance controls	YES	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES	YES
CEO Characteristics	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Observations	4,666	4,177	4,169	5,130	4,618	4,456
Adjusted R-squared	0.324	0.295	0.0451	0.538	0.433	0.173

Panel B: Performance in bottom quartile

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔInd-ROA			ΔRet		
VARIABLES	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)
Female CEO	0.309	-0.323	-0.048	0.005	0.007	-0.004
	(0.217)	(0.416)	(0.470)	(0.010)	(0.009)	(0.014)
Pre-performance controls	YES	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES	YES
CEO Characteristics	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Observations	796	703	700	1,499	1,263	1,201
Adjusted R-squared	0.182	0.119	0.0545	0.293	0.222	0.121

Panel C: Performance in second quartile

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔInd-ROA			ΔRet		
VARIABLES	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)
Female CEO	-0.092	0.662	0.783	-0.001	0.015***	0.004
	(0.162)	(0.791)	(0.803)	(0.005)	(0.005)	(0.007)
Pre-performance controls	YES	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES	YES
CEO Characteristics	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Observations	1,590	1,441	1,438	1,729	1,577	1,542
Adjusted R-squared	0.0630	0.0419	0.0193	0.598	0.427	0.216

Panel D: Performance in third and top quartile

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔInd-ROA			ΔRet		
VARIABLES	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)	(t+1)-(t-1)	(t+2)-(t-1)	(t+2)-(t-2)
Female CEO	0.144	2.981*	3.568**	0.002	0.012**	-0.003
	(0.898)	(1.602)	(1.693)	(0.005)	(0.006)	(0.008)
Pre-performance controls	YES	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES	YES
CEO Characteristics	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Observations	2,252	2,009	2,007	2,245	2,104	2,039
Adjusted R-squared	0.385	0.380	0.0909	0.481	0.463	0.264

Table 1.9 Female Directors and the Glass Cliff

Using logit regressions, this table presents results of whether the appointment of female CEOs who potentially face a glass cliff is affected by the female directors on board. Observations are at the CEO-year level over the period 2000 – 2019.

$$P(\textit{Appointment of Female CEOs}_{i,t}) = L(\alpha_1 + \alpha_2 \textit{Ind-ROA}_{i,t-1} + \alpha_3 \textit{Fraction Female Directors}_{i,t-1} + \alpha_4 \textit{Frac Female Directors} \times \textit{Ind-ROA}_{i,t-1} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t)$$

where L is the logistic distribution, and *Appointment of Female CEOs*$_{i,t}$ is a dummy variable that equals 1 if the firm appoints a female CEO, and 0 otherwise. *Ind-ROA*$_{i,t-1}$ represents firm performance measure. *Fraction Female Directors*$_{i,t-1}$ is the ratio of female directors on the board for firm i in year $t-1$. *Frac Female Directors* $\times$ *Ind-ROA*$_{i,t-1}$ is the interaction term between fraction female directors and firm performance for firm i in year $t-1$. $Z_{i,t-1}$ is a vector of control variables for firm i in year $t-1$, $O_{i,t-1}$ is a vector of control variables for CEO i in year $t-1$, υ_i and μ_t capture year-fixed effects and industry-fixed effects, respectively. Robust standard errors in parentheses are clustered at the firm level. The variable definitions are provided in Appendix 1.A.1. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers. *10%, **5%, ***1% significance.

	Appointment of Female CEOs		
	(1)	(2)	(3)
VARIABLES	Full Sample	Monopoly Industries	Competitive Industries
Ind-ROA (t-1)	-0.106*	-0.184**	-0.076
	(0.061)	(0.093)	(0.062)
Fraction Female Directors (t-1)	6.186***	7.451***	5.776***
	(1.262)	(1.244)	(1.480)
Frac Female Dicrectors (t-1) x Ind-adj ROA (t-1)	0.293	-0.211	0.437
	(0.366)	(0.508)	(0.415)
Size (t-1)	-0.055***	-0.186**	0.067
	(0.021)	(0.082)	(0.046)
Leverage (t-1)	-0.973**	-1.455	-0.781
	(0.478)	(1.071)	(0.530)
Sales Growth (t-1)	-0.147	-0.108	-0.471**
	(0.160)	(0.178)	(0.232)
Tangibility (t-1)	0.344	0.333	0.043
	(0.708)	(1.298)	(0.922)
Tobin's Q (t-1)	-0.006	-0.014	0.010
	(0.067)	(0.113)	(0.060)
R&D (t-1)	-0.247	0.497	-0.656
	(0.459)	(2.482)	(0.416)
Network Size (t-1)	-0.013	0.117***	-0.139
	(0.065)	(0.043)	(0.087)
Age (t-1)	-0.255	0.060	-1.123**
	(0.318)	(0.601)	(0.503)
Tenure (t-1)	-0.050	0.038	-0.090
	(0.046)	(0.161)	(0.061)
Non-US (t-1)	-0.520	-0.661	-0.625**
	(0.341)	(0.766)	(0.286)
Constant	-2.393	-3.714	2.338
	(1.726)	(2.811)	(2.021)
Observations	4,134	1,198	2,192
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Pseudo R-squared	0.168	0.193	0.183

1.A Appendix

1.A.1 Variable Definitions

Variable	Definition	Data source
Female CEO	Dummy variable that equals 1 if the CEO is female, and 0 otherwise.	ExecuComp & BoardEx
Appointment of female CEO	Dummy variable that equals 1 if the firm appoints a female CEO, and 0 otherwise.	ExecuComp & BoardEx
Ind-ROA	Income before extraordinary items divided by book assets [ib]/[at], subtracting the industry average (4-digit SIC) of that year.	Compustat Fundamental Annual
Size	Natural logarithm of the book value of total assets. [ln(at)]	Compustat Fundamental Annual
Leverage	Total debt divided by total assets. Total debt is the sum of debt in current liabilities and long-term debt.([dlc]+[dltt])/[at]	Compustat Fundamental Annual
Sales Growth	The growth rate of sales.	Compustat Fundamental Annual
Tobin's Q	The ratio of the firm's market value to its book value of assets. Market value is book assets minus book equity plus market value of equity. ([at]-[ceq]+[csho*prcc])/[at]	Compustat Fundamental Annual
Tangibility	Net property, plant, and equipment divided by total assets. [ppent]/[at]	Compustat Fundamental Annual
R&D	The ratio of research and development expense to its book value of assets. [xrd]/[at] Missing values in research and development expense are set to 0.	Compustat Fundamental Annual
Stock Performance	Average monthly compounded return.	Center for Research in Security Prices (CRSP)
Stock volatility	Standard deviation of excess daily/monthly returns, calculated relative to the value-weighted market index.	Center for Research in Security Prices
HHI	Herfindahl-Hirschman index: Industry concentration	Hoberg-Phillips Data Library
Monopoly Industries	Equals 1 if the firm's industry concentration is above the mean than year-matched peers. 0 otherwise.	Hoberg-Phillips Data Library
Competitive Industries	Equals 1 when a firm's industry concentration is below the mean than year-matched peers. 0 otherwise.	Hoberg-Phillips Data Library
Fraction Female Directors	The ratio of female directors on the board.	BoardEx
Age	Age of the CEO.	ExecuComp & BoardEx
Tenure	Number of years that the CEO has worked in a firm.	ExecuComp & BoardEx
Network Size	Number of overlaps through employment, other activities and education for the CEO.	BoardEx
Non-US CEO	Dummy variable: 1 if the CEO is not American. 0 otherwise.	BoardEx & NNDB

1.A.2 Correlation Coefficient Matrix of Variables

This table presents the Pearson correlation coefficient matrix of the variables. None of the correlations is high enough to cause estimation problems. Observations are at CEO-year level over the period 2000 – 2019. The variable definitions are in Appendix 1.A.1.

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Ind-ROA	1.000											
(2)	Size	-0.053	1.000										
		(0.000)											
(3)	Leverage	-0.043	0.305	1.000									
		(0.000)	(0.000)										
(4)	Sales Growth	0.039	-0.088	-0.027	1.000								
		(0.000)	(0.000)	(0.000)									
(5)	Tangibility	-0.066	0.246	0.275	-0.037	1.000							
		(0.000)	(0.000)	(0.000)	(0.000)								
(6)	Tobin's Q	0.094	-0.180	-0.124	0.198	-0.204	1.000						
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(7)	R&D	0.118	-0.368	-0.155	0.141	-0.304	0.372	1.000					
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(8)	Fraction Female Directors	0.000	0.331	0.086	-0.069	-0.007	0.024	-0.061	1.000				
		(0.976)	(0.000)	(0.000)	(0.000)	(0.147)	(0.000)	(0.000)					
(9)	Age	-0.029	0.066	0.034	-0.082	0.081	-0.110	-0.092	0.030	1.000			
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
(10)	Tenure	0.000	0.173	0.022	-0.087	0.052	-0.055	-0.066	0.083	0.313	1.000		
		(0.962)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
(11)	Network Size	0.043	0.369	0.043	-0.001	-0.078	0.066	0.087	0.232	-0.190	-0.019	1.000	
		(0.000)	(0.000)	(0.000)	(0.777)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
(12)	Non-US CEO	0.040	0.122	0.001	-0.004	0.067	0.000	-0.011	0.060	-0.019	-0.014	0.039	1.000
		(0.000)	(0.000)	(0.909)	(0.450)	(0.000)	(0.992)	(0.016)	(0.000)	(0.000)	(0.004)	(0.000)	

Chapter 2

Corporate Governance and Performance of Australian Family Firms

'Finding a good instrument is like finding a needle in a haystack.'
– Joshua Angrist

ABSTRACT

While the performance of family firms has been extensively studied in international markets, there is limited understanding of their corporate governance structures and impact on firm performance within the Australian context. In this study, we analyse a large sample of Australian firms to assess the performance of family firms from a corporate governance perspective. We first compare key governance mechanisms between family and non-family firms, including board independence, board size, managerial power concentration, and overall governance quality. Our findings reveal a significant substitutive relationship between family control and conventional governance mechanisms, indicating that family firms often rely on internal governance practices rather than external oversight. When examining performance, we find that family firms exhibit higher profitability; however, this advantage diminishes for market-based valuation once governance heterogeneity is considered. Our results remain robust across various tests, including propensity score matching (PSM) and instrumental variable (IV) analyses.

Keywords: Family firms; performance; corporate governance

JEL classification: G3; G32; G34

2.1 Introduction

Family firms represent a significant portion of publicly traded companies worldwide, accounting for substantial shares of equity and assets in both developed and emerging economies (Bennedsen and Nielsen 2010; Anderson and Reeb 2003; Morck et al. 1988). Studies have shown that in the US, family-controlled firms make up over 35% of the S&P 500 and constitute approximately one-third of Fortune 500 companies (Anderson and Reeb 2003; Villalonga and Amit 2006). Family ownership is also pervasive across Europe and East Asia, where more than 40% of publicly traded firms are family-controlled (Claessens et al. 2002; Faccio and Lang 2002).

Family control is the key governance factor distinguishing family firms from non-family firms. The alignment of ownership and control in family firms is often viewed as a double-edged sword. On the one hand, stewardship theory posits that concentration of ownership in the hands of family members reduces agency costs, as family owners are believed to act as stewards of the firm and pursue the firm's long-term value (Davis et al. 1997a). Hence, family control can foster stronger oversight, better decision-making, and ultimately, superior financial performance (Anderson and Reeb 2003; Villalonga and Amit 2006). Conversely, the entrenchment hypothesis argues that family ownership can exacerbate agency problems since controlling families may prioritise personal benefits, such as preserving family control and legacy, over shareholder value (Anderson and Reeb 2003; Morck et al. 1988). For example, family ownership in East Asia and parts of Europe is argued to be associated with lower firm value due to governance risks, where entrenchment is often severe (Claessens et al. 2000; Cronqvist and Nilsson 2003). Therefore, it remains an open question: Do family firms exhibit stronger or weaker corporate governance, and how does this affect their performance?

Prior studies show that family firms frequently adopt weaker governance mechanisms, such as lower board independence and reduced CEO oversight, potentially limiting transparency and external monitoring (Faccio and Lang 2002; Anderson et al. 2004). Anderson et al. (2004), for example, find that US family firms typically have fewer independent directors, raising concerns about effective oversight. However, the alignment of ownership and control in family firms can also mitigate agency conflicts, as family owners are generally more invested in the firm's long-term success (Anderson and Reeb 2003; Meckling and Jensen 1976). While these governance structures may heighten the risk of entrenchment, they can also reduce agency conflicts by aligning ownership and management. This duality raises an important question: Do 'weaker' governance structures in family firms necessarily compromise performance, or can they enhance value by fostering long-term strategic focus?

While corporate governance and firm performance in family firms have been extensively studied in the US and European contexts, far less attention has been given to family firms in Australia. Australia differs from other countries in significant ways in regard to issues relating to family firms. While sharing cultural and institutional characteristics with the US and the UK, Australia has very different industry structures, and Australian firms are, on average, much smaller in size. Its unique geographical environment further determines Australian markets' close ties with those in the Asia and Pacific region, where family firms play a particularly important role. With the distinct corporate governance framework, high investor protection, and concentrated ownership structures (Craswell et al. 1997), Australian firms provide a unique setting to study family firms' performance from the corporate governance perspective. The significance of such a study is highlighted by the lack of evidence on Australian family firms.

This study addresses two interrelated research questions: (1) How do family firms in Australia differ from non-family firms in terms of their corporate governance practices, specifically, in board independence, board size, CEO duality, and corporate governance scores (CGS)? And (2) How do differences in these governance practices translate into superior or inferior financial performance of family firms, as measured by accounting-based metrics (ROA) and market-based metrics (Tobin's Q)?

Our sample comprises all publicly listed companies on the Australian Securities Exchange (ASX) All Ordinary index from 2010 to 2022, providing a comprehensive set of Australian firms over a period covering significant economic events, including the Global Financial Crisis and the COVID-19 pandemic. The sample includes 886 firms, totalling

8,116 firm-year observations, of which 24 percent are from family firms.

We first show that family firms in Australia exhibit governance structures notably different from their non-family counterparts. Specifically, family firms have lower board independence, higher CEO power (measured by duality), and lower overall governance scores, although they have board sizes similar to those of non-family firms. These findings seem consistent with the entrenchment hypothesis, suggesting that family firms, while maintaining strong internal control, are associated with weaker external governance mechanisms. Indeed, in the absence of effective board oversight, powerful CEOs with concentrated control by family members may expose firms to great governance risks. Conversely, in the sense that high insider ownership by founder families helps mitigate the separation of ownership and control, an alternative interpretation of our findings is that there is a substitutive relationship between family control and external governance.

We then examine the performance of family firms by considering the effects of governance heterogeneity. In the absence of governance variables in the test, our results show the superior performance of family firms relative to non-family firms, verifying the findings documented in various existing studies. However, after governance heterogeneity is controlled for, the results become mixed, where the observation that family firms outperform non-family firms is no longer robust. On the one hand, family firms still tend to have higher ROAs than non-family firms; conversely, their values in Tobin's Q are only marginally different from those of non-family firms, depending on how we define family firms (by family members' influence or ownership) and how the governance variables are controlled in the model. It is in this sense, that we view our findings as evidence of the substitutive relationship between family control as an internal governance scheme and external governance mechanisms.

Our study makes two main contributions to the growing literature on family firms. First, we fill a gap in the literature by documenting the first comprehensive evidence on Australian family firms. Some limited prior studies have reported evidence on Australian family firms from small samples or focusing on specific periods. For instance, Aldamen et al. (2020) explore the resilience of family firms during the GFC in Australia, finding that family firms were more sensitive to changes in book value rather than earnings. However, they conclude that family firms did not show superior performance during the GFC. Bartholomeusz and Tanewski (2006) use a sample of only 50 family firms in Australia over two years and determine that family firms often employ governance mechanisms that concentrate control, such as smaller boards and lower board independence. Despite these limited studies, there has been a lack of evidence from a large sample and over a sufficiently long period on the performance of family firms in Australia. Hence, the question remains whether family firms in Australia present an efficient organisation relative to non-family firms. Our research addresses this gap by investigating a large sample of publicly listed firms on the ASX over a 12-year period, thereby providing a more robust examination of the governance-performance relationship in family firms.

Second, we extend the literature on the performance of family firms by comparing external governance between family and non-family firms and incorporating governance heterogeneity into the test for family firms' performance. Our results show that the superior performance of family firms is weakened by the control for corporate governance factors. In particular, the finding of insignificant differences in valuation between family and non-family firms, together with weaker external governance, suggests that family control plays an important role in aligning the interests of management and shareholders as an effective substitute for external governance.

The remainder of our paper is structured as follows. Section 2.2 reviews the related literature, focusing on the corporate governance and performance of family firms. Section 2.3 discusses the data and sample used in this study. Section 2.4 describes the key variables and presents the results of univariate analysis. Section 2.5 presents our regression analysis results for corporate governance and the performance of family firms. Finally, we conclude in Section 2.6.

2.2 Background and Literature Review

2.2.1 Family Firms Around the World

Family firms constitute a significant portion of the global corporate landscape, prevailing across developed and developing economies. Anderson and Reeb (2003) highlight that family-controlled firms account for over 35 percent of S&P 500 companies in the US. Similarly, Villalonga and Amit (2006) find that 37 percent of Fortune 500 firms are family-controlled, with the presence of founders or their descendants in key management or board roles. The global influence of family firms extends to Western Europe, East Asia, and Latin America, where family ownership structures are even more pronounced. Claessens et al. (2000) noted that over two-thirds of firms in East Asia are controlled by a single shareholder, while Faccio and Lang (2002) observed that 44 percent of firms in Western Europe are family-controlled.

These global findings underscore the central role family firms play in shaping corporate governance and performance dynamics. While family firms offer unique advantages, such as reduced principal-agent conflicts between owners and managers, they also raise specific governance challenges. In particular, the tension between family control and effective corporate governance mechanisms has been at the forefront of academic debates.

The governance of family firms has been studied extensively, with mixed results regarding the effectiveness of family control. On the one hand, Anderson and Reeb (2003) and Villalonga and Amit (2006) argued that family involvement, particularly when founders remain in leadership positions, could mitigate traditional agency conflicts by aligning the interests of management and shareholders. As described by Davis et al. (1997a), stewardship theory suggests that family managers act as stewards of the firm, prioritising long-term sustainability and the family's interests over short-term financial gains.

However, this positive outlook is tempered by evidence of governance weaknesses in family firms. Adams et al. (2009a) examined board structures in family firms and found that such firms tend to have fewer independent directors, potentially weakening the oversight mechanisms typically seen in non-family firms. Cronqvist and Nilsson (2003) explored the risks of entrenchment in family-controlled firms, arguing that concentrated control often allows family members to use their influence for private benefits, at the expense of minority shareholders.

2.2.2 Performance of Family Firms

Despite the global prevalence of family firms, empirical research offers mixed findings on their efficiency and value. In the US, studies like Morck et al. (1988) provided early evidence that older family firms may underperform owing to management entrenchment and a reluctance to pursue high-growth strategies. Conversely, McConaughy et al. (1998) found that younger family-controlled firms outperformed older ones in efficiency and value. Anderson and Reeb (2003) provided evidence that family firms in the S&P 500 outperformed non-family firms, with better accounting and market-based performance, particularly when the founder remained actively involved in management or governance. Similarly, Villalonga and Amit (2006) revealed that family firms were highly valued when founders held leadership roles, but this advantage dissipated when control was passed to descendants.

However, the dual nature of agency problems in family firms, as discussed by Villalonga and Amit (2006) and Cronqvist and Nilsson (2003), highlights the complexity of this issue. Family firms may reduce classic agency conflicts between managers and shareholders, but they introduce new agency problems between family and non-family shareholders. The concentration of ownership and control can allow family members to extract private benefits, often at the expense of firm performance.

In Western Europe, Maury (2006) found that family control generally correlates with higher firm value, but only when governance structures remain robust and family involvement does not lead to entrenchment. Similarly, Faccio and Lang (2002) demonstrated that family-controlled firms in countries with stronger investor protections tend to outperform non-family firms. These findings support the view that family ownership can be beneficial under the right governance conditions.

The socioemotional wealth (SEW) perspective, introduced by Gómez-Mejía et al. (2007), provides further insight into family firm behaviour. According to SEW theory, family firms prioritise non-financial goals, such as preserving family control and legacy, which can result in conservative financial strategies. This has been observed in Australian family firms, where Setia-Atmaja et al. (2009) found evidence of lower debt levels and more stable dividend payouts than non-family firms.

2.2.3 Family Firms in Australia

Australia presents a unique landscape for family firm research, with its distinctive corporate governance structures and strong legal protections for investors. The Australian market is characterised by concentrated ownership, with family firms playing a prominent role in various sectors. The conventional separation of ownership and control characteristic of the US and UK corporate governance models might be less pertinent for Australian-listed companies. Such distinctions could result in differing agency issues compared with prominent US corporations (Craswell et al. 1997). While international studies have extensively examined family firm governance and performance, Australian family firms have received less attention in the literature. Fleming (2003) noted a shift in Australian shareholder demographics over time, with family ownership declining, yet remaining influential in large public companies.

Previous Australian studies have predominantly concentrated on short-term outlooks (Aldamen et al. 2020; Bartholomeusz and Tanewski 2006), specifically analysing the dimensions of Australian small- and medium-sized family enterprises (Price et al. 2013; Barbera and Moores 2011; Fleming et al. 2005), with a particular emphasis on facets such as voluntary disclosures, innovation, productivity, business behaviour, capital structure and financial leverage (Louie et al. 2019; Price et al. 2013; Barbera and Moores 2011; Fleming et al. 2005; Setia-Atmaja et al. 2011, 2009). However, evidence on the performance impact of family firms in the Australian context is limited. Aldamen et al. (2020) found that family firms were more vulnerable during the Global Financial Crisis, displaying higher sensitivity to changes in book value rather than earnings. The findings suggest that family firms are no more efficient than other firms during economic downturns, challenging earlier beliefs about family firm resilience. Saleh et al. (2017) showed a positive relationship between ownership concentration and firm performance in the mining sector, but the evidence for other sectors remains inconclusive. These findings indicate that Australian family firms may not exhibit the same resilience as their US or European counterparts. Halili et al. (2015) provide one of the most relevant empirical analyses of family firms in Australia, focusing on long-term operating performance. They find that family ownership is associated with improved performance, particularly when family members are actively involved in management. Their findings support the view that family control may align managerial incentives and reduce agency costs. This study extends that line of research by exploring not only accounting-based profitability but also market-based valuation, and by incorporating external governance indicators such as board independence and corporate governance scores. Integrating both performance and governance dimensions allows for a more holistic understanding of how family ownership structures interact with firm outcomes.

Given these gaps in the literature, our study aims to expand the understanding of family firm governance and performance in Australia by examining both the governance structures and the long – term performance of family firms. This study seeks to fill that gap by examining how family control shapes governance practices and whether these governance structures contribute to firm performance.

Our research specifically addresses how family ownership influences governance mechanisms, such as board independence, CEO duality and corporate governance scores (CGS) and how these factors subsequently affect firm performance. By investigating accounting-based (ROA) and market-based (Tobin's Q) performance measures, we aim to offer a comprehensive understanding of whether family firms in Australia exhibit superior long-term performance relative to non-family firms, and whether this is contingent on governance quality.

2.2.4 Hypothesis Development

Family firms exhibit unique governance and control characteristics that set them apart from widely held corporations. These differences have important implications for both internal governance structures and firm performance outcomes. The theoretical perspectives most commonly applied to family firm research—namely, agency theory and stewardship theory—offer competing predictions about the efficacy of family control.

Agency theory (Meckling and Jensen 1976) suggests that concentrated family ownership may weaken corporate governance, particularly when it reduces transparency or limits the influence of external monitors. Family firms often appoint family members to senior leadership positions, maintain long tenures, and exhibit lower board independence. These governance practices can give rise to entrenchment risks and minority shareholder expropriation, particularly in the absence of strong external governance mechanisms (Shleifer and Vishny 1997). Based on this view, one would expect family firms to exhibit weaker formal governance structures than non-family firms.

Hypothesis 1: Family firms exhibit weaker external corporate governance structures than non-family firms.

However, stewardship theory provides a contrasting view. It argues that family owners are more likely to act as stewards of the firm, placing long-term value creation above short-term personal gains (Davis et al. 1997b). Family control can reduce classic principal-agent conflicts, especially when ownership and management are aligned. These unique dynamics suggest that family firms may not require the same degree of external governance oversight, as internal control and reputational incentives may substitute for formal governance mechanisms (Anderson and Reeb 2003). As such, weaker formal governance does not necessarily imply inferior outcomes.

The implications for firm performance are therefore nuanced. On one hand, the alignment of ownership and management in family firms can reduce agency costs, leading to improved operational efficiency and higher accounting profitability (ROA). On the other hand, the same governance structure may signal rigidity, risk aversion, or limited growth prospects to investors, leading to lower market-based valuations (Tobin's Q). Prior research has shown this divergence in performance metrics to be a persistent pattern (Villalonga and Amit 2006; Chrisman et al. 2004).

Hypothesis 2: Family firms outperform non-family firms in accounting profitability (ROA), but not in market-based valuation (Tobin's Q).

2.3 Data and Sample

Our initial sample includes all publicly listed companies on the Australian Securities Exchange (ASX) All Ordinaries Index from 2010 to 2022. The primary data source for company financials and stock prices is the Compustat Global database. We manually collect firms' annual reports from the DatAnalysis database to obtain detailed information on family firm status, board structure, and governance. Additionally, we retrieve the Corporate Governance Score from the Refinitiv database.

We began the analysis in 2010 to ensure consistency, as the ASX released the Second Edition of Corporate Governance Principles and Recommendations in 2007. These revisions provided clearer guidelines for corporate governance disclosures, including board independence and board diversity. The 2010 start date also helps mitigate the lingering effects of the global financial crisis, which had a substantial impact on firm performance and governance (Attig et al. 2016; D'Aurizio et al. 2015; Lins et al. 2013).

Firms are excluded from the sample if they lack a valid standard industrial classification (SIC) code or belong to the financial sector (SIC codes between 6000 and 6999), due to the unique regulatory environment of financial institutions.

After applying these filters, our final sample consists of 886 Australian firms, yielding 8,116 firm-year observations. Continuous variables are winsorised at the 1st and 99th percentiles to reduce the influence of outliers. Definitions of all variables are provided in Appendix 2.A.1.

The classification of firms as family or non-family presents a challenge due to the absence of a standardised definition of family ownership in academic and practical contexts (Bennedsen and Nielsen 2010). To identify family firms, we manually search each firm's annual report for keywords such as 'found', 'founder', 'founding', and 'establish' to detect family involvement. We also trace each firm's first annual report after its IPO, as founder information is often more clearly disclosed at the time of listing. We supplement our search with external sources such as Google, newspapers and LinkedIn to ensure no relevant information is omitted.

This method of manual identification follows the approach of previous studies on family firms, which emphasise the importance of using a variety of sources for firm classification, given that family involvement is not always consistently reported in annual reports alone (Villalonga and Amit 2006; Maury 2006). By incorporating multiple sources, we aim to enhance the accuracy of our family firm classification.

There is substantial variation in the definitions of family firms used in the literature, and empirical findings often depend on the specific definition adopted (Miller et al. 2007; Maury 2006). To ensure robustness, we use two alternative definitions of family firms, which are consistent with the prior literature:

- Founder family firm (Definition 1): A founder family firm is one in which the founder(s) maintain roles as board members or executive officers and hold at least 5 per cent of the company's shares.

- Ownership-Based family firm (Definition 2): Following the Australian Accounting Standards Board (AASB1024 and AASB128), a firm is defined as a family firm if a family member or a group of related individuals holds 20 per cent or more of the voting shares. This ownership threshold is considered sufficient to exert significant influence over the firm's decision-making processes (Reilly et al. 2006; Fama and Jensen 1983).

2.4 Descriptive Statistics and Univariate Analysis

Consistent with prior literature (e.g., Anderson and Reeb 2003; Maury 2006), our primary performance indicators are return on assets (ROA) and Tobin's Q. ROA is calculated as net income before extraordinary items scaled by the book value of total assets. Tobin's Q is computed by adding the market value of common equity to the book value of total assets, subtracting common equity, and then dividing the result by the book value of total assets. This choice aligns with the efficient market hypothesis argument (Fama 1970), suggesting that market evaluation measures both existing assets and future growth potential, as further explicated by (Bharadwaj et al. 1999). According to (Demsetz and Villalonga 2001), this concept involves the consideration of investor expectations pertaining to future occurrences, including assessing current business strategies.

Following prior literature (Villalonga and Amit 2006; Maury 2006; Anderson and Reeb 2003), several variables are used to control for firm-specific characteristics. Firm size is measured by the logarithm of the book value of total assets, whereas leverage is calculated by total debt divided by the book value of total assets. Firm age is the number of years elapsed since the firm's founding. For asset management, tangibility is the ratio of net property, plant, and equipment to total assets, and the investment intensity of the firm is reflected by the ratio of capital expenditures to total assets. R&D is the ratio of research and development expenses to its book value of assets. Firm risk is determined by the standard deviation of monthly stock returns, and dividend per share is measured by summing all split-adjusted dividends per share during the fiscal year.

Table 2.1 presents the representation of family and non-family firms across industries and years. As shown in Panel A, family firms are present in 84% of the SIC codes represented on the ASX, reflecting the broad industry engagement of family-owned businesses in Australia. However, the distribution of family firms is far from uniform across industries. Certain sectors exhibit a higher concentration of family firms, with family ownership being particularly prevalent in industries such as Transportation Equipment (SIC 37), where family firms account for 64.2% of firms, and Miscellaneous Retail (SIC 59), where

64.6% of firms are family-owned.[1] Automotive Dealers and Gasoline Service Stations (SIC 55) also show a strong presence of family firms, with 66.1% of firms classified as family-owned.

[Insert Table 2.1 about here]

Other notable industries where family firms make up a significant proportion of total firms include Automotive Dealers and Gasoline Service Stations (SIC 55), with 71.4% of firms classified as family-owned, and Transportation Equipment (SIC 37), where family firms account for 75% of firms in the sector. These industries are typically characterised by a high degree of customer interaction and local market knowledge, attributes that align with the strengths of family ownership (Maury 2006).

Family firms are also strongly represented in other sectors such as Business Services (SIC 73), where they account for 52.5% of firms, and Educational Services (SIC 82), where 45.3% of firms are family-owned. These industries are characterised by long-term relationships and personal involvement, attributes that align with family firm characteristics (Villalonga and Amit 2006).

Figure 2.1 provides a visual summary of these concentrations, further highlighting the prominence of family firms in these sectors. These findings are consistent with previous studies, such as Anderson and Reeb (2003), which show that family firms tend to dominate service-oriented and consumer-facing industries, where direct involvement and long-term control are often viewed as advantageous.

Coversely, family firms are entirely absent in several capital-intensive and highly regulated sectors, such as Forestry (SIC 08), Lumber and Wood Products (SIC 24), and Petroleum Refining and Related Industries (SIC 29), where family firms represent 0% of the firms. These sectors often require significant capital investment and face heavy regulation, factors that may discourage family ownership due to the higher operational risks and financial demands (Villalonga and Amit 2006).

[1] This analysis follows the approach outlined by Anderson and Reeb (2003), focusing on industries that consist of five or more firms, and where family firms make up at least 50% of the total firms within that industry.

Given this uneven sectoral distribution, it is crucial to control for industry affiliation in our analyses, as family firms' performance and governance may be influenced by the industry environment in which they operate.

Panel B and Figure 2.2 present the proportion of family firms from 2010 to 2022. Throughout this period, the representation of family firms has remained relatively stable, fluctuating modestly from a high of 25.9% in 2011 to a low of 22.7% in 2014.

Table 2.2 provides summary statistics for the sample and reports the results of mean difference tests between family and non-family firms in Australia. We report key firm characteristics and board characteristics. For each variable, we report details on the number of observations, mean, standard deviation, minimum, maximum, median, and the 25th and 75th percentile values. All continuous variables are winsorised at the 1st and 99th percentiles to mitigate the influence of outliers.

[Insert Table 2.2 about here]

Table 2.2 indicates that family firms constitute 24% of the sample, representing 1,983 family firm-years from 291 distinct firms. This proportion is consistent with findings from other Australian studies during the Global Financial Crisis (GFC). For instance, Aldamen et al. (2020) reported that 19% of Australian firms were family-owned during the GFC, while Saleh et al. (2017) found that 22.45% of Australian firms were family-controlled.

However, this proportion is notably lower than in the US, where Villalonga and Amit (2006) identified 37% of firms in the Fortune 500 as family-owned. Global data suggests that family ownership is often more concentrated outside of Australia. For example, Maury (2006) reported that family firms constitute 63% of firms in a Western European sample, while Claessens et al. (2000) found that in nine East Asian countries, more than two-thirds of firms are controlled by a single shareholder. Similarly, Faccio and Lang (2002) observed that 44% of firms in Western Europe are family-controlled. These comparisons suggest that family ownership in Australia is less concentrated than in both the US and other global economies, where family control is often more prominent.

Firm Characteristics

Firm size, proxied by the natural logarithm of total assets, is significantly smaller for family firms compared with their non-family counterparts, with a mean difference of 0.177, significant at the 1% level. This finding aligns with existing literature, such as Maury (2006), which suggests that family firms often prioritise control over expansion and opt for more conservative growth strategies.

Family firms are also generally younger than non-family firms, with a mean age of 23.35 years versus 29.15 years for non-family firms. The significant difference of 5.80 years at the 1% level is noteworthy, especially when contrasted with findings from studies like Villalonga and Amit (2006), where family firms in other contexts (e.g., the US) often have a longer generational history. The relatively younger profile of family firms in Australia may indicate a recent establishment or a demographic shift within the family firm sector.

Interestingly, the leverage ratio shows only a marginal difference between family and non-family firms, and the difference is not statistically significant. This contrasts with the global literature, which often characterises family firms as more risk-averse and prone to adopting lower leverage to maintain control and preserve family wealth (Anderson and Reeb 2003). However, the findings suggest that family firms in Australia do not significantly differ from their non-family counterparts in terms of their reliance on debt.

R&D investment is higher among family firms than non-family firms, which challenges the traditional view that family firms are conservative in their R&D expenditures. The difference, although small (0.01), is significant at the 1% level, suggesting a strategic shift among Australian family firms toward greater innovation and competitiveness in the market.

Family firms also exhibit lower stock return volatility than non-family firms, with a difference of -0.04, significant at the 1% level. This is consistent with studies like Zhou et al. (2017), which suggest that family firms have more stable governance structures and longer-term strategic horizons, contributing to lower market volatility.

On performance, family firms outperform non-family firms in both ROA and Tobin's

Q, with significant differences at the 1% level. Family firms have an average ROA of -0.07 compared with -0.18 for non-family firms, a difference of 0.11.[2] Similarly, Tobin's Q is significantly higher for family firms (2.79) than for non-family firms (2.32), with a difference of 0.47. These results are consistent with previous findings in the literature, which suggest that family firms often have superior market valuations owing to their long-term focus and effective stewardship (Maury 2006).

Board Characteristics and Governance

In terms of governance, family firms display differences from non-family firms across several board characteristics. Family firms have smaller boards, with an average of 5.28 members compared with 5.44 for non-family firms. The difference is statistically significant at the 1% level, indicating a potential preference for more tightly controlled decision-making processes within family firms.

Board independence is also significantly lower in family firms. Family firms have an average proportion of independent directors of 0.51, while non-family firms have a higher average of 0.58, with a statistically significant difference of -0.07 at the 1% level. This suggests that family firms may be less inclined to rely on external oversight, possibly owing to the stronger internal controls typically present in family-owned businesses.

Duality is measured as a binary variable indicating whether the CEO also serves as the chairperson of the board. In our sample, duality is significantly more common in family firms, with a mean of 0.14 compared with 0.07 for non-family firms. The mean difference of 0.07, significant at the 1% level, suggests that family firms are more likely to consolidate power in the CEO-chairman role. This could be owing to the desire for greater control over governance decisions within family firms, reflecting a higher degree of centralised decision-making.

The Corporate Governance Score (CGS), sourced from the Refinitiv ESG database, is used as a composite measure of a firm's governance attributes. The CGS is a multidi-

[2] The low value of ROA (Net Income) is consistent with a recent Australian study (Daniliuc et al. 2020), which has a ROA of -5.5% in the sample from 2004 to 2018. With a subsample of 2014-2019, our ROA is -7%.

mensional index that assesses various corporate governance indicators, which together evaluate the robustness of a firm's governance infrastructure and its commitment to long-term shareholder value. The CGS serves as a proxy for better governance practices and breaks down into three key aspects: management quality, shareholder equality, and corporate social responsibility (CSR) integration (Refinitiv 2022). These aspects collectively gauge a firm's governance prowess, shareholder fairness, and the incorporation of CSR into strategic decisions.

To quantify corporate governance, the CGS includes over 64 metrics related to management, governance processes, and CSR integration. Firms are given a score ranging from 0 to 100, which provides an in-depth evaluation of their governance quality. In our sample, the average CGS is 47.82.

Family firms score significantly lower on CGS than non-family firms, with a mean of 41.74 for family firms compared with 49.18 for non-family firms, reflecting a significant difference of -7.45, significant at the 1% level. This suggests that family firms may rely more on informal governance mechanisms, such as direct family involvement in management, rather than formal governance structures.

It is important to note that the CGS differs from other well-known governance measures such as the Gompers et al. (2003) index, which focuses on anti-takeover provisions. The Gompers et al. (2003) index measures corporate governance based on the number of provisions in a firm's charter or bylaws that limit shareholder rights, often serving as a proxy for weak corporate governance. In contrast, the CGS emphasises shareholder fairness and management quality, offering a broader assessment of governance beyond just anti-takeover measures.

Appendix 2.A.2 presents the correlation matrix for the key variables in the analysis. As expected, family firm is positively correlated with firm performance (e.g., ROA and Tobin's Q), and negatively correlated with firm size and age.

Of particular interest is the negative correlation between family firm status and board independence, which aligns with prior research showing that family firms typically have fewer independent directors on their boards, potentially owing to a preference for control over external oversight. Similarly, family firms have a weaker CGS. None of the correlations between independent variables exceeds a critical threshold, indicating that multicollinearity is unlikely to pose a problem in the regression analysis.

The descriptive statistics indicate several key differences between family and non-family firms, particularly with respect to firm size, age, and governance practices. These differences raise important questions about the impact of family ownership on governance structures and firm performance. The following sections will address these questions through multivariate regression models.

2.5 Results of Regression Analysis

In this section, we first analyse the corporate governance and performance differentials between family and non-family firms in Section 2.5.1. Next, we discuss the performance outcomes in Section 2.5.2. To address endogeneity concerns, we employ propensity score matching in Section 2.5.3 and the instrumental variable (IV) approach in Section 2.5.4.

2.5.1 Corporate Governance of Family Firms

To examine the relationship between family firm status and key corporate governance variables, we use the following regression specification:

$$\textit{Corporate Governance}_{i,t} = \alpha_1 + \alpha_2 \textit{Family firm}_{i,t} + \beta' Z_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t} \tag{2.1}$$

where $\textit{Corporate Governance}_{i,t}$ represents the variables of our interest – *Board Independence*, *Board Size*, *Duality*, and *CGS*. *Board Independence* represents the proportion of non-executive independent directors on the board. *Board Size* represents the number of directors on the board. *Duality* is a dummy variable that equals 1 when the chairperson is the CEO. *CGS* is the firm's corporate governance score from the Refinitiv. $\textit{Family firm}_{i,t}$ is a dummy variable that equals 1 if a family firm i is present in the sample and 0 otherwise. *Founder family firm* refers to founder-family firm. *Ownership-Based family firm* uses an alternative definition based on ownership. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error.

Table 2.3 presents our regression analysis results for the determinants of key corporate governance variables. The analysis shows that family firms tend to have fewer independent directors, as evidenced by the negative and significant coefficients for board independence (-0.074 and -0.079 for the two family firm definitions, both significant at the 1% level). This finding aligns with previous literature, such as Anderson and Reeb (2003), which highlights family firms' preference for maintaining closer control over governance processes by reducing the presence of external, independent directors. The limited board independence suggests a governance structure in which family owners may prioritise maintaining control over transparency and external oversight, potentially resulting in weaker monitoring mechanisms.

[Insert Table 2.3 about here]

The analysis reveals that board size is primarily driven by firm size, with family firm status exerting no significant effect. The coefficients for firm size (0.552 and 0.549, both significant at the 1% level) indicate that larger firms tend to have bigger boards, a result consistent with Lehn et al. (2009). The absence of a significant relationship between family ownership and board size suggests that, while family firms may limit board independence, they do not substantially differ from non-family firms in terms of the number of directors.

CEO duality, where the CEO also serves as the board chair, is more prevalent in family firms, as indicated by the positive and significant coefficients for both family firm definitions (1.080 and 0.855, significant at the 1% level). This finding supports the work of Villalonga and Amit (2006), who suggest that family firms may favour duality to streamline decision-making and consolidate control. However, the concentration of power in a single individual could raise concerns about governance quality, as it may reduce the board's ability to independently monitor management and create a potential risk of entrenchment.

The analysis also shows that family firms have significantly lower Corporate Governance Scores (CGS) than non-family firms. The coefficients for family firm on CGS are both negative and statistically significant (-5.820 and -4.748, at the 1% level), suggesting weaker formal governance practices in family firms. This is consistent with Maury (2006), who argued that family firms tend to prioritise maintaining control over adopting formal governance mechanisms, such as those that ensure transparency and shareholder rights. The lower CGS reflects the potential trade-off between family control and the adoption of formal governance mechanisms, suggesting that family firms may face higher agency costs in the long term owing to weaker shareholder protections and reduced external oversight.

In summary, the governance structure in family firms is characterised by weaker governance mechanisms – particularly lower board independence and lower CGS – and a greater prevalence of CEO duality. These characteristics suggest that family firms prioritise internal control over external oversight, which may lead to governance practices that favour family interests at the potential expense of broader shareholder accountability. This governance model raises concerns about entrenchment, where the concentration of control in family hands could limit effective board monitoring and reduce the board's capacity to hold executives accountable. The following section will explore CEO turnover as a critical indicator of entrenchment in family firms, exploring whether lower turnover rates reflect entrenched leadership.

Next, we analyse the likelihood of CEO turnover in family firms using the following regression model:

$$\begin{aligned} \textit{CEO turnover}_{i,t} = &\alpha_1 + \alpha_2 \textit{Family firm}_{i,t} + \alpha_3 \textit{Performance}_{i,t-1} \\ &+ \alpha_4 \textit{Family firm} \times \textit{Performance}_{i,t-1} + \beta' Z_{i,t-1} + v_i + \mu_t + \epsilon_{i,t} \end{aligned} \tag{2.2}$$

where *CEO turnover*$_{i,t}$ represents the dummy variable, equal to one if the CEO in the fiscal year t is no longer the CEO by the following year $t+1$. *Founder family firm* and *Ownership-Based family firm* refer to the two alternative definitions of family firms used in the study. *Performance*$_{i,t}$ represents the *Stock return*, which is the average monthly stock return in the previous fiscal year. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error.

Table 2.4 presents the regression results for CEO turnover in family firms, where turnover is defined as a dummy variable indicating whether the CEO in year t is no longer the CEO in year $t+1$. The results explore how family firm influence CEO turnover.

[Insert Table 2.4 about here]

The analysis indicates that family firms have significantly lower CEO turnover rates than non-family firms. For Founder family firm, the coefficient is -0.438 (significant at the 1% level), indicating that family firm CEOs are less likely to be replaced. Similarly, for Ownership-Based family firm, the coefficient is -0.336 (significant at the 1% level). These results suggest that family firms are more likely to retain their CEOs, possibly owing to the alignment of interests between the CEO and family owners. This finding is consistent with stewardship theory, which posits that family executives, motivated by a long-term commitment to the firm, are less likely to be replaced based on short-term performance.

The impact of firm performance, as measured by stock returns, also significantly affects CEO turnover. Across both family firm definitions, the coefficients for stock returns are negative and statistically significant (-1.846 for Founder family firm and -1.912 for Ownership-Based family firm), indicating that better stock performance is associated with lower CEO turnover. This suggests that high-performing family firms are even less likely to experience CEO turnover, further supporting the notion that family firms prioritise stability and long-term leadership. However, the interaction terms between family firm status and stock performance are not statistically significant, indicating that stock performance does not have a different impact on CEO turnover in family firms compared with non-family firms.

These findings highlight the stability of leadership in family firms, which contrasts with findings in some non-family firms where leadership changes are more frequent. The results show that family firms can better manage succession and maintain leadership continuity, which may help reduce agency costs and enhance firm value by ensuring better alignment between the CEO and family objectives. The following section explores how these governance differences manifest in performance differentials between family and non-family firms.

2.5.2 The Performance of Family Firms

Following Anderson and Reeb (2003) and others, we investigate the relationship between family ownership and firm performance using the following regression:

$$\textit{Firm Performance}_{i,t} = \alpha_1 + \alpha_2 \textit{family firm}_{i,t} + \beta' Z_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t} \tag{2.3}$$

where $\textit{Firm Performance}_{i,t}$ represents the dependent variables of our interest – *ROA* and *Tobin's Q*. $\textit{Family firm}_{i,t}$ is a dummy variable that equals 1 if a family firm i at time t is present in the sample, and zero otherwise. Two types of family firms are defined in the text: *Founder family firm* and *Ownership-Based family firm*. A founder family firm is characterised as a firm in which the founder(s) maintain roles as board members or executive officers and hold at least 5 per cent of the company's shares. For *Ownership-Based family firm*, following the Australian Accounting Standards Board (AASB1024 and AASB128), a firm is defined as a family firm if a family member individual or a group of related individuals holds 20 per cent or more of the voting shares. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$, comprising: *Firm size*, *Firm age*, *Leverage*, *Tangibility*, *R&D*, *Stock return volatility*, and *Dividend per share*. υ_i and μ_t capture year-fixed effects and industry-fixed effects, respectively. $\epsilon_{i,t}$ is the random error. For clarity, both *Firm size* and *Firm age* are in natural logarithm. All variable definitions are in Appendix 2.A.1.

Table 2.5 presents the results of the impact of family firms on firm performance over the period from 2010 to 2022, using two different definitions of family firms. Our models incorporate year- and industry-fixed effects to mitigate potential biases stemming from unobservable time-consistent and industry-consistent factors that might be associated with both firm performance and family ownership. Furthermore, we adjust for heteroskedasticity by correcting all standard errors. Consistently across all specifications, standard errors are clustered at the firm level.

[Insert Table 2.5 about here]

Both family firm definitions show positive and statistically significant coefficients for ROA (0.090 for Founder family firm, significant at the 1% level, and 0.083 for Ownership-Based family firm, significant at the 1% level). These results suggest that family firms outperform non-family firms in terms of accounting performance. This finding supports stewardship theory, indicating that family firms may be better positioned to align management interests with long-term firm value, thus improving profitability.

For Tobin's Q, which reflects market-based performance, family firms also exhibit superior performance, with positive and significant coefficients (0.322 for Founder family firm, significant at the 5% level, and 0.362 for Ownership-Based family firm, significant at the 10% level). This indicates that the market views family firms more favourably than non-family firms, possibly because investors expect family firms to be more stable and less prone to agency conflicts.

In terms of control variables, firm size is positively associated with ROA but negatively related to Tobin's Q, which is consistent with the broader literature that larger firms tend to have more stable but lower growth potential (Rajan and Zingales 1995; Anderson and Reeb 2003; Maury 2006). Firm age is positively associated with ROA, implying that older firms have established more efficient operations over time. However, the negative correlation with Tobin's Q reflects a market preference for the potential upside in younger firms owing to their growth prospects (Griffin 2002). Leverage shows a negative association with both ROA and Tobin's Q, in line with the literature that suggests higher debt levels may be perceived as increasing risk and potentially reducing profitability (Myers 1977). Tangibility is positively associated with ROA, which might reflect the efficient utilisation of physical assets in operations but is negatively related to Tobin's Q, indicating that market valuation might favour firms with more intangible assets or growth opportunities (King and Santor 2008). R&D investment shows a negative coefficient for ROA and a highly positive coefficient for Tobin's Q, implying that while R&D expenses may reduce short-term profitability, they are valued by the market, possibly owing to their long-term growth potential (Hall 1993). Stock return volatility is negatively related to ROA, which indicates that more stable firms tend to be more profitable. However, it shows a positive relation with Tobin's Q, suggesting that market participants reward perceived risk-taking associated with growth opportunities (Merton 1987). Dividend per share exhibits a negative relationship with both ROA and Tobin's Q, which could reflect a market preference for reinvestment of earnings over immediate payout (Bhattacharya 1979).

The results show that family firms, tend to perform better both in accounting profitability and market valuation (Anderson and Reeb 2003; Maury 2006). However, these findings do not account for the impact of corporate governance mechanisms, which could play a significant role in explaining the performance differential between family and non-family firms. The following table incorporates these governance characteristics.

Table 2.6 examines how corporate governance factors, such as board independence, board size, duality, and CGS, influence the performance of family firms.

[Insert Table 2.6 about here]

Panel A indicates that family firms under Definition 1 (Founder family firm) consistently outperform non-family firms in terms of both accounting profitability (ROA) and market-based performance (Tobin's Q). Family firms exhibit positive and statistically significant coefficients for ROA across all specifications.[3] These findings suggest family firms exhibit higher profitability, even after controlling for governance mechanisms. This result is consistent with the stewardship theory, which posits that family ownership aligns the interests of management and shareholders, thereby reducing agency costs and improving firm performance. Even after accounting for governance characteristics, the persistence of this performance advantage further supports the notion that family firms can achieve superior profitability through better alignment of incentives.

Although family firms show a positive relationship with Tobin's Q, the magnitude and

[3] The reduced significance in Column 5 is because of reduced sample size caused by missing values for CGS and it would remain to be significant at 1% when CGS is excluded.

significance of these coefficients are markedly reduced compared with ROA. Specifically, in Table 2.6, the coefficients for Tobin's Q are positive but less consistent and less robust across specifications, with diminished statistical significance. The positive relationship between family ownership and Tobin's Q suggests that the market values family firms for their long-term stability and perceived lower agency conflicts. This aligns with previous findings from Villalonga and Amit (2006), who documented that family firms are often valued more highly in the market due to their long-term orientation and control mechanisms. However, the relatively weaker statistical significance for Tobin's Q compared with ROA may reflect the market's more cautious view of family firm governance structures, which often prioritise control over external oversight.

The governance characteristics show mixed effects on firm performance. Board independence, a key element of external governance, has a mixed but insignificant impact on both ROA and Tobin's Q, indicating that the presence of independent directors may not play a substantial role in enhancing performance for family firms. This finding is consistent with previous literature, such as Maury (2006), which suggests that family firms often prioritise internal control and decision-making efficiency over the formalities of independent oversight.

Board size has a negative and statistically significant effect on ROA, indicating that larger boards may hinder decision-making efficiency, particularly in family firms with more centralised decision-making. The negative effect of board size aligns with governance literature that emphasises the trade-off between board size and efficiency, as larger boards can slow down decision-making processes and dilute accountability. These findings align with the theory that smaller boards, particularly in family firms, are more effective in maintaining strategic alignment and ensuring better coordination. In contrast, the positive association between board size and Tobin's Q suggests that while larger boards may hinder internal decision-making efficiency, the market perceives them as a positive governance feature. This could be owing to the view that larger boards bring more diverse expertise and networks, which are beneficial for long-term access to resources and strategic planning. This dual effect is supported by the literature on corporate governance. Yermack (1996) focuses on operational performance and Coles et al. (2008) emphasise the strategic value of larger boards in complex firms.

CEO Duality is negatively associated with Tobin's Q, though this result is not statistically significant. This suggests that while duality may improve operational efficiency, as reflected in ROA, it does not necessarily enhance market valuation. The market might view duality as a potential risk, as it concentrates too much power in the hands of a single individual, potentially limiting effective oversight.

CGS does not show a statistically significant relationship with either ROA or Tobin's Q suggesting that formal governance structures captured by CGS may not be the primary drivers of family firm performance. Instead, family firms may rely on informal governance mechanisms, such as strong family involvement and long-term stewardship, which are not fully captured by traditional governance metrics. This is consistent with literature that suggests the quality of governance in family firms may not be well-reflected in conventional governance indices, as family firms tend to rely more on internal mechanisms of control and trust (e.g., Maury 2006; Anderson and Reeb 2003).

The results in Panel B, which examines family firms under Definition 2 (Ownership-based family firm), are broadly similar. On the one hand, family firms still tend to have higher ROAs than non-family firms; conversely, their values in Tobin's Q are no longer significantly different from those of non-family firms. This may reflect the market's more tempered view of family ownership when it is based primarily on shareholdings rather than direct involvement in management or the board.

Overall, the results in Table 2.6 indicate that family firms achieve higher profitability (ROA), which supports the argument that family ownership can enhance operational performance through aligned incentives and reduced agency conflicts. However, the mixed and less robust results for Tobin's Q suggest that market valuation is more sensitive to governance concerns. It is in this sense that we view our findings as evidence of the substitutive relationship between family control as an internal governance scheme and external governance mechanisms.

Another explanation for the insignificant relationship between family ownership and

Tobin's Q lies in the potential misalignment between controlling shareholders and minority investors. As highlighted in the corporate governance literature, high levels of ownership concentration — typical of family firms — can create agency conflicts between dominant family owners and outside investors (Villalonga and Amit 2006; Maury 2006). These conflicts often manifest in underinvestment, driven by risk aversion or reluctance to dilute control through equity financing, ultimately hindering firm growth (Cronqvist and Nilsson 2003). This interpretation contrasts with the classic view of Tobin's Q as a proxy for market valuation, suggesting instead that it may also reflect growth opportunities and financing flexibility — both of which may be constrained in family-controlled firms.

While Tobin's Q is commonly interpreted as a signal of governance quality or market confidence, it can also reflect investor expectations about a firm's future growth. The lower or weaker Tobin's Q for family firms may not solely be due to concerns over governance inefficiencies, such as entrenchment or lack of external oversight. An alternative explanation relates to the underlying business model of family firms, which often prioritise capital preservation, stability, and long-term control over aggressive expansion. Prior research suggests that family firms invest and innovate less intensively than non-family firms, particularly when control is highly concentrated (Block 2012; Classen et al. 2014). These differences in strategic orientation may lead to structurally lower growth expectations, and thus lower market valuation, even if operational performance remains strong. Hence, the observed Tobin's Q patterns could partly reflect firm-type effects rather than governance deficits.

2.5.3 Propensity Score Matching Analysis

Only 24% of the firms in our sample are classified under family firms (*Founder family firm*), and 13% fall under *Ownership-Based family firm*. To ensure a balanced comparison between family and non-family firms, we employ the propensity score matching (PSM) technique. This allows us to mitigate biases in comparing the performance of family firms against their non-family counterparts. By designating family firms as the 'treated' group and non-family firms as the 'untreated' group, the PSM framework pairs each family firm-year observation with a closely matched non-family firm-year observation based on their propensity scores.

Panel A of Table 2.7 presents the linear probability model estimations of the propensity score for family firms under two definitions. The dependent variable is *Family firms*. We control for firm fundamentals characteristics. The chi-squared test results confirm the statistical significance of the model at the 1% level, indicating that the propensity scores effectively capture the differences between family and non-family firms.

[Insert Table 2.7 about here]

Utilising the predicted propensity scores from Panel A, we match each family firm observation with the non-family firm observation exhibiting the closest propensity score while ensuring that matched observations come from distinct firms and years. This approach yields 3,324 matched observations for Founder family firm and 1,944 for Ownership-Based family firm. To validate the matching process, we conduct several robustness checks. In unreported tables, t-tests confirm that the differences in control variables between matched pairs are statistically insignificant, supporting the notion that the matched groups are comparable in terms of observable characteristics.

Following the matching process, we re-estimate our baseline models on the matched sample. The results are presented in Panel B of Table 2.7 demonstrating that family firms continue to outperform non-family firms in terms of both profitability (ROA) and market valuation (Tobin's Q). The coefficients for family firm status are positive and statistically significant across all specifications, reinforcing the conclusion that family ownership contributes to superior firm performance. Notably, the adjusted R-squared values indicate that the models fit the data better after matching, providing further support for the robustness of our findings.

Panels C and D present the regression results for Founder family firms and Ownership-Based family firms, respectively, using the matched sample with governance controls. The positive relationship between family ownership and ROA remains robust across both panels, although the coefficients are slightly attenuated compared with Panel

B. This suggests that governance mechanisms, such as board independence, board size, and CEO duality, partially mediate the performance advantage but do not eliminate it. Notably, board size consistently shows a negative impact on ROA, indicating that larger boards may hinder decision-making efficiency. For Tobin's Q, the performance premium for family firms becomes less consistent and loses statistical significance in some specifications, reflecting the market's cautious view of governance practices in family firms. These results highlight that while family ownership has higher profitability, the market remains wary of potential governance risks, emphasising the substitutive role of internal governance mechanisms in family firms.

2.5.4 Instrumental Variable Analysis

Assessing the impact of family firms on firm performance and corporate governance is complicated by the potential endogeneity of family firm status. Fixed-effects models, while controlling for unobservable firm-specific characteristics, do not fully address concerns related to time-varying heterogeneity or reverse causality. Specifically, family firm status is not randomly assigned, meaning unobserved factors could influence a firm's likelihood of being family-controlled and its performance outcomes. For instance, families may choose to remain involved in firms that are already successful, or strong firm performance might encourage continued family control. This reverse causality makes it difficult to determine whether family ownership directly drives superior performance, or if families simply retain involvement in firms with brighter future prospects.

To mitigate this concern, we employ instrumental variable (IV) techniques and adopt the Heckman (1979) two-step approach to correct selection bias and ensure a more accurate analysis of the relationship between family ownership and firm performance.

To ensure the validity of our IVs, they must satisfy two key conditions: they must be exogenous in the primary equation of interest, and their coefficients must be nonzero when the endogenous variable is linearly projected onto all explanatory variables. Following Adams et al. (2009a) and Fahlenbrach (2009), we instrument founder family firms using two variables.

The first instrument, 'prior 1960', is an indicator variable set to one if a firm was incorporated before 1960. This serves as a proxy for the 'dead founders' instrument used by Adams et al. (2009a). Firms incorporated before 1960 are assumed to have a lower likelihood of having an active founder still involved in management, making them less likely to be family firms today. This instrument is exogenous because the decision to incorporate before 1960 is unlikely to directly influence firm performance decades later, beyond its effect on family ownership. It is expected to be negatively correlated with the likelihood of having a founder family firm and appears uncorrelated with firm performance beyond the control variables used in the second-stage regression.

Second, the number of founders is an instrument that captures the likelihood of continued family control. Firms with multiple founders are more likely to maintain family control over time, as there are more family members potentially involved in ownership and governance. However, this correlation might be weaker than the 'prior 1960' instrument, as one founder typically assumes a more dominant role. Furthermore, the number of founders is considered exogenous, as it is unlikely to directly influence firm performance years after its inception. While it is possible that different industries may require varying numbers of founders, our analysis found no systematic variation across industries, and all regressions include industry dummies to control for these effects.

The first-stage regression results, shown in Column 1 of Table 2.8, confirm the relevance of the chosen instruments. The 'prior 1960' variable is significantly negatively correlated with family firm status, with a coefficient of -1.034 (significant at the 5% level). This indicates that firms incorporated before 1960 are less likely to remain family-controlled, consistent with the assumption that founders are more likely to be deceased. The number of founders positively correlates with family firm status, with a coefficient of 3.075 (significant at the 1% level), suggesting that firms with more founders are more likely to continue as family-controlled entities. These findings confirm that the instruments are strong predictors of family firm status. The fitted values from this regression are subsequently used as explanatory variables in the second-stage analysis, shown in Columns 2 and 3.

[Insert Table 2.8 about here]

In the second stage of the 2SLS analysis, shown in Columns 2 and 3 of Table 2.8, the results reinforce the earlier findings that family firms outperform non-family firms. The coefficient on family firm status for ROA is 0.095 for ROA and 0.485 for Tobin's Q, both statistically significant. These findings are consistent with those from the fixed effects model, further supporting the conclusion that family firms outperform non-family firms.

Columns 4-8 of Table 2.8 explore the relationship between family ownership and corporate governance outcomes. The results show that family firms exhibit weaker governance structures than non-family firms, consistent with those from the fixed effects model.

2.5.5 Lagged Family Firm Status

One of the primary concerns in assessing the relationship between family ownership and firm performance is the potential for simultaneity bias, where firm performance and family ownership may influence each other simultaneously. To address this issue, we introduce lagged terms in our regressions. By lagging the family firm variable, we allow for the possibility that ownership structure in period t affects performance and governance in subsequent periods $t + 1$ and $t + 2$, thereby reducing the risk of reverse causality.

In Table 2.9, we present the results of regressions that include one-year and two-year lagged family ownership variables. The findings remain consistent with our baseline results, indicating that family firms continue to outperform non-family firms in return on assets (ROA), even after controlling for lagged effects. Specifically, as shown in Panel A (lagged one year), the coefficient on *Founder family firm (t-1)* is positive and significant (0.051 for ROA, significant at the 1% level). At the same time, Tobin's Q remains insignificant, suggesting that family ownership influences profitability more directly than market valuations. Similar patterns are observed in Panel B (lagged two years), where the coefficient on *Founder family firm (t-2)* remains positive and statistically significant for ROA (0.058, significant at the 1% level).

[Insert Table 2.9 about here]

2.5.6 Alternative Definitions of Family Firms

Given the diverse definitions of family firms in the literature, we test the robustness of our results using alternative definitions of family ownership drawn from prior studies. In Table 2.10, we apply two widely-used definitions of family firms: Faccio and Lang (2002) (*Family firm FL*), and Anderson and Reeb (2003) (*Family firm AR*). These definitions capture different aspects of family involvement through voting rights (Faccio and Lang 2002).

Table 2.10 shows that the performance advantages of family firms persist across all alternative definitions. For instance, under the Faccio and Lang (2002) definition, the coefficient on family firm status remains positive and significant for ROA (0.068, significant at the 1% level). Likewise, using the Anderson and Reeb (2003) definition, family firms exhibit strong performance in ROA (0.048, significant at the 1% level). These findings are generally consistent with the main results.

[Insert Table 2.10 about here]

2.5.7 Alternative Performance Measures

Finally, we examine the robustness of our results by using alternative measures of firm performance. In Panel B of Table 2.10, we replace our primary performance metrics (ROA and Tobin's Q) with Return on Equity (ROE), Sales Growth, and Buy-and-Hold Returns (BHReturns). The results remain consistent with our main findings, indicating that family firms exhibit superior performance across various metrics. For instance, under the Founder family firm definition, the coefficient on family firm status is 0.107 for ROE (significant at the 1% level), 0.057 for Sales Growth (significant at the 5% level), and 0.107 for BHReturns (significant at the 1% level). These results reinforce the conclusion that family firms deliver higher performance.

2.6 Conclusion

This study provides new evidence on the corporate governance structures and performance of publicly listed family firms in Australia. Our analysis reveals that Australian family firms adopt governance mechanisms that differ significantly from non-family firms, characterized by lower board independence, higher CEO power concentration (as indicated by CEO duality), and lower overall corporate governance scores (CGS). These governance differences underscore a substitutive relationship between family control and conventional governance mechanisms, with family firms relying more heavily on internal governance practices rather than external oversight.

When examining performance, we find that family firms consistently demonstrate a profitability advantage over non-family firms, supporting the notion that family ownership effectively aligns managerial incentives and enhances operational efficiency. However, this performance advantage diminishes for market-based valuation metrics, such as Tobin's Q, once governance heterogeneity is considered. This suggests that while family control fosters profitability, market participants remain cautious about governance risks associated with concentrated control and weaker external oversight.

The governance structures of family firms reflect a concentration of control that facilitates long-term strategic decision-making, potentially mitigating some of the risks associated with weaker formal governance mechanisms. In the Australian context, where strong investor protection and concentrated ownership structures create a unique regulatory environment, family firms appear to balance the advantages of tight control with superior financial outcomes. These findings challenge the conventional view that robust external governance is always a prerequisite for superior performance, demonstrating instead that family control can act as an effective governance mechanism under the right institutional conditions.

2.7 Figures

Figure 2.1: Family and Non-family firms representation by industry

This figure illustrates family and non-family firms representation from 2010 – 2022.

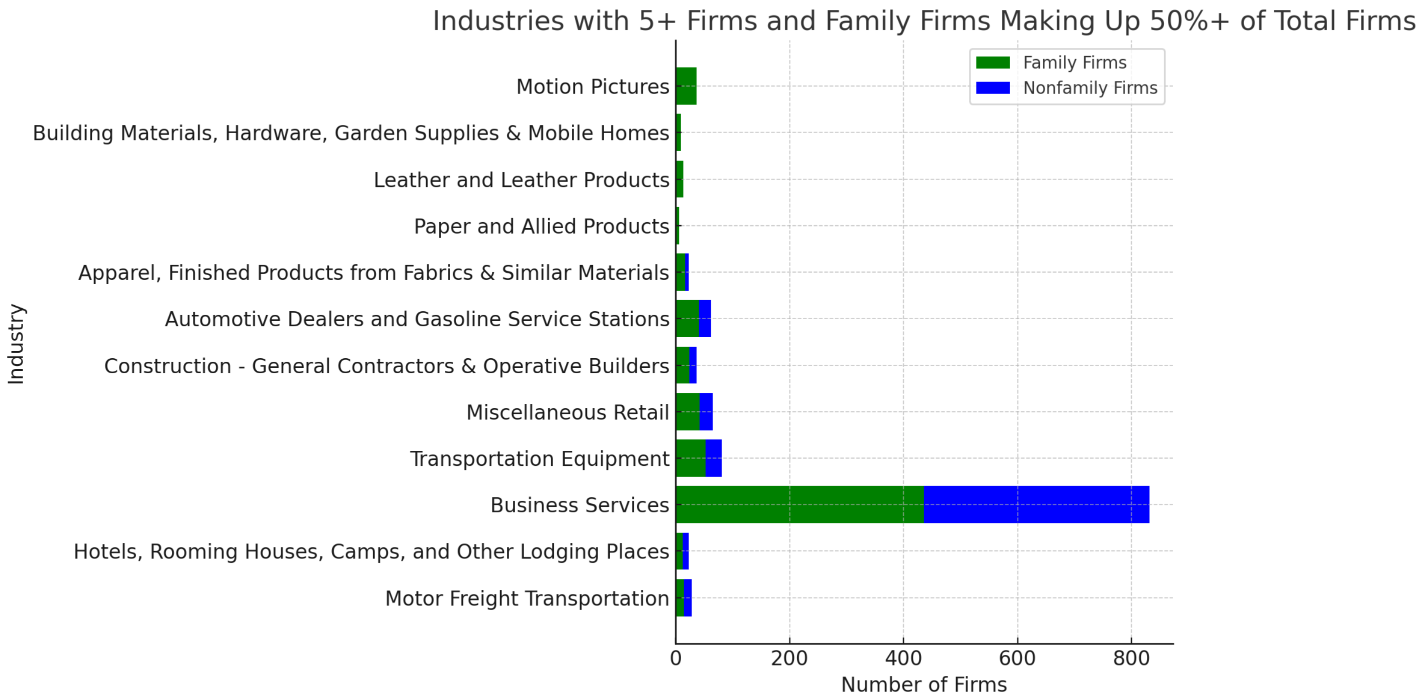
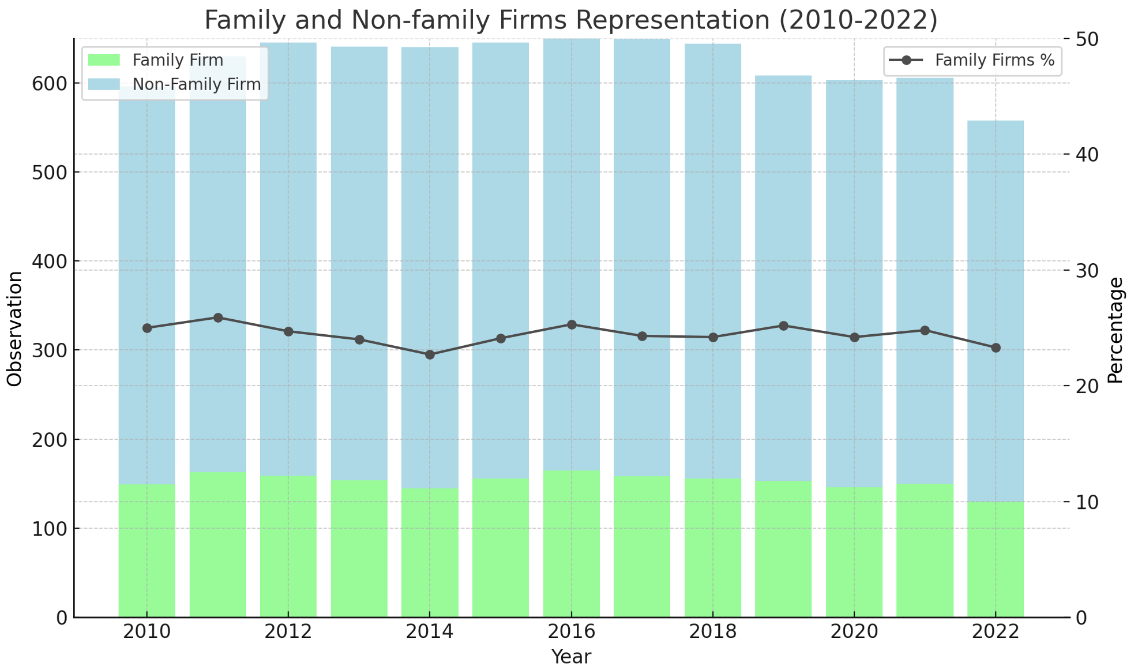


Figure 2.2: Family and Non-family firms representation in each year

This figure illustrates family and non-family firms representation from 2010 – 2022.



2.8 Tables

Table 2.1 Family and Non-family Firms Representation by Industry and Year

Panel A: Family and Non-family firms representation in each industry

SIC	Industry Description	Non-family Firm Obs	Family Firm Obs	Family Firm Percent (%)
08	Forestry	13	0	0.00
24	Lumber and Wood Products, Except Furniture	8	0	0.00
29	Petroleum Refining and Related Industries	35	0	0.00
33	Primary Metal Industries	73	0	0.00
40	Railroad Transportation	12	0	0.00
41	Local & Suburban Transit & Interurban Highway Transportation	22	0	0.00
44	Water Transportation	15	0	0.00
46	Pipelines, Except Natural Gas	6	0	0.00
54	Food Stores	29	0	0.00
75	Automotive Repair, Services and Parking	8	0	0.00
12	Coal Mining	177	14	7.33
32	Stone, Clay, Glass, and Concrete Products	51	5	8.93
13	Oil and Gas Extraction	570	61	9.67
10	Metal Mining	2164	267	10.98
99	Nonclassifiable Establishments	15	2	11.76
14	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	105	19	15.32
51	Wholesale Trade - Nondurable Goods	48	9	15.79
20	Food and Kindred Products	184	38	17.12
28	Chemicals and Allied Products	542	121	18.25
27	Printing, Publishing and Allied Industries	38	10	20.83
49	Electric, Gas and Sanitary Services	170	48	22.02
17	Construction - Special Trade Contractors	47	14	22.95
53	General Merchandise Stores	43	13	23.21
39	Miscellaneous Manufacturing Industries	23	8	25.81
56	Apparel and Accessory Stores	45	16	26.23
36	Electronic & Other Electrical Equipment & Components	70	25	26.32
07	Agricultural Services	17	7	29.17
87	Engineering, Accounting, Research, and Management Services	164	72	30.51
58	Eating and Drinking Places	25	11	30.56
48	Communications	113	51	31.10
35	Industrial and Commercial Machinery and Computer Equipment	92	44	32.35
38	Measuring, Photographic, Medical, & Optical Goods, & Clocks	132	65	32.99
79	Amusement and Recreation Services	73	38	34.23
16	Heamy Construction, Except Building Construction, Contractor	44	23	34.33
45	Transportation by Air	40	21	34.43
47	Transportation Services	80	43	34.96
34	Fabricated Metal Products	42	23	35.38
01	Agricultural Production - Crops	24	14	36.84
72	Personal Services	12	7	36.84
80	Health Services	87	56	39.16
30	Rubber and Miscellaneous Plastic Products	13	9	40.91
02	Agricultural Production - Livestock and Animal Specialties	4	3	42.86
50	Wholesale Trade - Durable Goods	66	50	43.10
82	Educational Services	29	24	45.28
81	Legal Services	12	10	45.45
57	Home Furniture, Furnishings and Equipment Stores	38	33	46.48
42	Motor Freight Transportation	14	14	50.00
70	Hotels, Rooming Houses, Camps, and Other Lodging Places	11	12	52.17
73	Business Services	395	436	52.47
37	Transportation Equipment	29	52	64.20
59	Miscellaneous Retail	23	42	64.62
15	Construction - General Contractors & Operative Builders	13	24	64.86
55	Automotive Dealers and Gasoline Service Stations	21	41	66.13
23	Apparel, Finished Products from Fabrics & Similar Materials	6	17	73.91
25	Furniture and Fixtures	0	4	100.00
26	Paper and Allied Products	0	6	100.00
31	Leather and Leather Products	0	13	100.00
52	Building Materials, Hardware, Garden Supplies & Mobile Homes	0	9	100.00
76	Miscellaneous Repair Services	0	3	100.00
78	Motion Pictures	0	37	100.00

Panel B: Family and Non-family firms representation in each year

	Non-family Firms	Family Firms	Family Firms
	No.	No.	%
Year			
2010	447	149	25.0
2011	467	163	25.9
2012	486	159	24.7
2013	487	154	24.0
2014	495	145	22.7
2015	489	156	24.1
2016	486	165	25.3
2017	491	158	24.3
2018	488	156	24.2
2019	455	153	25.2
2020	457	146	24.2
2021	456	150	24.8
2022	428	130	23.3

Table 2.2 Summary Statistics

This table reports summary statistics for the selected variables in our sample and the results of mean difference tests between family and non-family firms. Our sample consists of 886 Australian All Ordinaries index firms and 8,116 firm-year observations over the period 2010–2022. We report the number of observations (Obs), mean, standard deviation (Std.Dev), minimum (Min), maximum (Max), and observation values at the 25th and 75th percentiles (P25, P75) for each variable. Mean differences between family and non-family firms are reported with statistical significance levels. All variable definitions are in Appendix 2.A.1. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Firm characteristics									Mean of the variables			
	Obs	Mean	Std.Dev.	Min	Max	P25	P50	P75	Family	Non-family	Diff.	Std. Error
Founder family firm	8116	0.24	0.43	0.00	1.00	0.00	0.00	0.00				
ROA	8114	-0.15	0.42	-2.42	0.31	-0.18	-0.02	0.06	-0.07	-0.18	0.11***	0.01
Tobin's Q	8114	2.43	2.87	0.32	18.61	0.98	1.46	2.54	2.79	2.32	0.47***	0.08
Ln(Total assets)	8116	4.96	2.09	0.69	10.08	3.48	4.86	6.32	4.83	5.00	-0.17***	0.05
Firm age	8116	27.73	27.64	0.00	197.00	11.00	19.00	32.00	23.35	29.15	-5.80***	0.55
Leverage	8114	0.14	0.16	0.00	0.65	0.00	0.07	0.24	0.14	0.13	0.01	0.00
Tangibility	8114	0.35	0.31	0.00	0.97	0.06	0.28	0.62	0.25	0.38	-0.13***	0.01
R&D	8116	0.02	0.07	0.00	0.45	0.00	0.00	0.00	0.03	0.02	0.01***	0.00
Stock return volatility	8091	0.19	0.11	0.04	0.67	0.11	0.17	0.24	0.16	0.20	-0.04***	0.00
Dividend per share	8116	0.08	0.21	0.00	1.39	0.00	0.00	0.06	0.08	0.08	-0.00	0.01
Board characteristics												
Board size	6746	5.40	1.75	1.00	13.00	4.00	5.00	6.00	5.28	5.44	-0.16***	0.05
Duality	6746	0.09	0.28	0.00	1.00	0.00	0.00	0.00	0.14	0.07	0.07***	0.01
Board Independence	6746	0.56	0.24	0.00	1.00	0.40	0.60	0.75	0.51	0.58	-0.07***	0.01
CGS	3478	47.82	21.87	2.40	98.54	30.24	46.81	64.32	41.74	49.18	-7.45***	0.87

Table 2.3 Corporate Governance and Family Firm

This table presents regression analyses of the corporate governance of the family firms. Observations are at the firm-year level over the period 2010 – 2022.

$$\textit{Corporate Governance}_{i,t} = \alpha_1 + \alpha_2 \textit{Family firm}_{i,t} + \beta' Z_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

where *Corporate Governance*$_{i,t}$ represents the variables of our interest - *Board Independence*, *Board Size*, *Duality*, and *CGS*. *Board Independence* represents the proportion of non-executive independent directors on the board. *Board Size* represents the number of directors on the board. *Duality* is a dummy variable that equals 1 when the chairperson is the CEO. *CGS* is the firm's corporate governance score from the Refinitiv. *Family firm*$_{i,t}$ is a dummy variable that equals 1 if a family firm i is present in the sample and 0 otherwise. *Founder family firm* refers to founder-family firm. *Ownership-Based family firm* uses an alternative definition based on ownership. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	Board Independence		Board Size		Duality		CGS	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Founder family firm	-0.074***		0.049		1.080***		-5.820***	
	(0.014)		(0.088)		(0.233)		(1.922)	
Ownership-Based family firm		-0.079***		-0.049		0.855***		-4.748**
		(0.020)		(0.121)		(0.275)		(2.274)
Ln(Total assets)	0.046***	0.046***	0.552***	0.549***	-0.275***	-0.286***	6.109***	6.098***
	(0.004)	(0.004)	(0.025)	(0.025)	(0.080)	(0.078)	(0.608)	(0.621)
Ln(Firm age)	0.008	0.016*	0.045	0.042	0.300**	0.158	3.461***	3.759***
	(0.008)	(0.008)	(0.050)	(0.051)	(0.146)	(0.139)	(0.998)	(0.996)
Leverage	-0.070**	-0.056	0.052	0.048	1.087*	0.911	-9.605**	-8.837**
	(0.034)	(0.034)	(0.208)	(0.208)	(0.560)	(0.570)	(4.321)	(4.450)
Tangibility	-0.065***	-0.067***	-0.158	-0.155	1.087***	1.113***	1.962	2.333
	(0.025)	(0.025)	(0.141)	(0.141)	(0.356)	(0.364)	(3.250)	(3.425)
R&D	0.097	0.090	1.191***	1.178***	2.049	2.097	7.410	7.445
	(0.088)	(0.086)	(0.456)	(0.455)	(1.539)	(1.568)	(9.682)	(10.085)
Stock return volatility	-0.195***	-0.181***	-0.217	-0.253	1.272	0.908	-30.528***	-30.841***
	(0.057)	(0.056)	(0.306)	(0.303)	(0.792)	(0.805)	(9.656)	(9.970)
Dividend per share	-0.003	-0.010	0.712***	0.708***	-0.577	-0.451	-2.322	-2.401
	(0.026)	(0.025)	(0.194)	(0.194)	(0.677)	(0.638)	(2.900)	(2.919)
Constant	0.319***	0.288***	2.423***	2.462***	-3.024***	-2.399***	1.721	0.467
	(0.037)	(0.037)	(0.201)	(0.198)	(0.549)	(0.516)	(5.665)	(5.716)
Observations	6,741	6,741	6,741	6,741	6,126	6,126	3,474	3,474
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.268	0.265	0.533	0.533			0.386	0.381
Pseudo R-squared					0.102	0.0912		

Table 2.4 CEO Turnover of Family Firms

This table presents regression analyses of the CEO turnover in family firms. Observations are at the firm-year level over the period 2010 – 2022.

$$\textit{CEO turnover}_{i,t} = \alpha_1 + \alpha_2 \textit{Family firm}_{i,t} + \alpha_3 \textit{Performance}_{i,t-1} + \alpha_4 \textit{Family firm} \times \textit{Performance}_{i,t-1} + \beta' Z_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

where *CEO turnover*$_{i,t}$ represents the dummy variable, equal to one if the CEO in the fiscal year t is no longer the CEO by the following year $t+1$. *Founder family firm* and *Ownership-Based family firm* refer to the two alternative definitions of family firms used in the study. *Performance*$_{i,t}$ represents the *Stock return*, which is the average monthly stock return in the previous fiscal year. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	CEO turnover			
VARIABLES	(1)	(2)	(3)	(4)
Founder family firm	-0.438***	-0.445***		
	(0.117)	(0.123)		
Ownership-Based family firm			-0.336***	-0.332***
			(0.128)	(0.128)
Ln(Total assets)	-0.004	-0.004	0.007	0.007
	(0.024)	(0.024)	(0.025)	(0.025)
Leverage	-0.210	-0.210	-0.126	-0.129
	(0.277)	(0.277)	(0.286)	(0.287)
Stock return volatility	0.722	0.722	0.853*	0.843*
	(0.463)	(0.463)	(0.440)	(0.442)
Stock return	-1.846**	-1.912**	-1.900**	-1.729**
	(0.789)	(0.887)	(0.760)	(0.838)
Founder family firm x Stock return		0.411		
		(2.004)		
Ownership-Based family firm x Stock return				-0.911
				(1.683)
Constant	-1.865***	-1.864***	-1.979***	-1.973***
	(0.252)	(0.251)	(0.234)	(0.234)
Observations	5,670	5,670	5,670	5,670
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Pseudo R-squared	0.0198	0.0198	0.0174	0.0175

Table 2.5 The Performance of Family Firms

This table presents regression analyses of the performance of family firms. Observations are at the firm-year level over the period 2010 – 2022.

$$\textit{Firm Performance}_{i,t} = \alpha_1 + \alpha_2 \textit{Family firm}_{i,t} + \beta' Z_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

where *Firm Performance*$_{i,t}$ represents the dependent variables of our interest - *ROA* and *Tobin's Q*. *Family firm*$_{i,t}$ is a dummy variable that equals 1 if a family firm i is present in the sample and 0 otherwise. Two types of family firms are defined in the text. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	ROA		Tobin's Q	
VARIABLES	(1)	(2)	(3)	(4)
Founder family firm	0.090***		0.322**	
	(0.016)		(0.155)	
Ownership-Based family firm		0.083***		0.362*
		(0.019)		(0.210)
Ln(Total assets)	0.098***	0.097***	-0.331***	-0.330***
	(0.006)	(0.006)	(0.042)	(0.041)
Ln(Firm age)	0.027***	0.019**	-0.173**	-0.203***
	(0.010)	(0.010)	(0.068)	(0.068)
Leverage	-0.350***	-0.360***	0.033	-0.008
	(0.040)	(0.041)	(0.305)	(0.300)
Tangibility	0.187***	0.186***	-1.792***	-1.799***
	(0.033)	(0.033)	(0.248)	(0.249)
R&D	-0.912***	-0.900***	6.057***	6.106***
	(0.163)	(0.167)	(1.608)	(1.608)
Stock return volatility	-0.271***	-0.292***	3.143***	3.084***
	(0.078)	(0.079)	(0.715)	(0.707)
Dividend per share	-0.134***	-0.128***	2.116***	2.142***
	(0.032)	(0.032)	(0.257)	(0.253)
Constant	-0.684***	-0.649***	4.066***	4.179***
	(0.060)	(0.059)	(0.454)	(0.440)
Observations	8,089	8,089	8,089	8,089
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Adjusted R-squared	0.329	0.326	0.238	0.238

Table 2.6 Corporate Governance and Performance of Family Firms

This table presents regression analyses of the performance of family firms. Observations are at the firm-year level over the period 2010 – 2022. Panel A presents results using 'Founder family firm' definition. Panel A presents results using 'Ownership-Based family firm' definition.

$$\textit{Performance}_{i,t} = \alpha_1 + \alpha_2 \textit{Family Firm}_{i,t} + \alpha_3 CG_{i,t} + \beta' Z_{i,t-1} + \nu_i + \mu_t + \epsilon_{i,t}$$

where *Firm Performance*$_{i,t}$ represents the dependent variables of our interest - *ROA* and *Tobin's Q*. *Family firm*$_{i,t}$ is a dummy variable that equals 1 if a family firm i is present in the sample and 0 otherwise. Two types of family firms are defined in the text. $CG_{i,t}$ is a corporate governance indicator such as *Board independence*, *Board size*, *Duality* or *CGS* in the previous test. $Z_{i,t-1}$ is a vector of control variables for a firm i in year $t-1$. υ_i, and μ_t capture industry-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the random error. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Panel A Founder family firm

	ROA					Tobin's Q				
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Founder family firm	0.066***	0.072***	0.065***	0.032**	0.021	0.266	0.253	0.269*	0.397*	0.301
	(0.016)	(0.016)	(0.016)	(0.014)	(0.015)	(0.166)	(0.165)	(0.161)	(0.231)	(0.253)
Independent directors	-0.039				-0.048*	0.037				0.011
	(0.030)				(0.028)	(0.248)				(0.474)
Board size		-0.043***			-0.020***		0.192***			0.169***
		(0.006)			(0.005)		(0.041)			(0.057)
Duality			0.044**		0.023			-0.072		-0.088
			(0.021)		(0.023)			(0.217)		(0.254)
CGS				-0.005	0.006				-0.118	-0.131
				(0.011)	(0.013)				(0.125)	(0.155)
Observations	6,741	6,741	6,741	3,474	3,148	6,741	6,741	6,741	3,474	3,148
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.335	0.353	0.336	0.270	0.253	0.280	0.286	0.280	0.285	0.326

Panel B Ownership-Based family firm

	ROA					Tobin's Q				
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ownership-Based family firm	0.072***	0.073***	0.072***	0.029	0.037*	0.288	0.295	0.290	0.143	-0.000
	(0.020)	(0.018)	(0.020)	(0.020)	(0.019)	(0.212)	(0.213)	(0.209)	(0.364)	(0.388)
Independent directors	-0.043				-0.049*	0.023				-0.096
	(0.030)				(0.028)	(0.243)				(0.471)
Board size		-0.043***			-0.021***		0.195***			0.171***
		(0.006)			(0.005)		(0.041)			(0.057)
Duality			0.048**		0.024			-0.057		-0.040
			(0.022)		(0.023)			(0.216)		(0.251)
CGS				-0.007	0.005				-0.147	-0.140
				(0.011)	(0.013)				(0.120)	(0.156)
Observations	6,741	6,741	6,741	3,474	3,148	6,741	6,741	6,741	3,474	3,148
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.334	0.352	0.335	0.269	0.254	0.280	0.286	0.280	0.282	0.324

Table 2.7 Propensity Score Matching

This table presents the results of propensity score matching and the subsequent regression analysis. Using propensity scores estimated with a set of firm characteristics, we match each family firm to a similar non-family firm. Within this framework, family firms are designated as the 'treated' group, whereas non-family firms are classified as the 'untreated' group. We then estimate the relationship between the family firm and the firm performance. Panel A reports the pre-match propensity score regressions for both family firm definitions, where the dependent variable is the family firm status under both definitions. Utilising the predicted propensity scores from Panel A, we pair each family firm-year observation with its corresponding non-family firm-year observation. Our criteria mandate that the matched pairs possess the most minimal variance in predicted propensity scores. Additionally, we ensure that the pairs stem from distinct firms to preclude pairing observations from the same firm across different years. Panels B-D present the performance regressions for the matched sample, using ROA and Tobin's Q as dependent variables. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Panel A: Pre-match propensity score regression

	Founder family firm	Ownership-Based family firm
VARIABLES	(1)	(2)
Ln(Total assets)	-0.203***	-0.243***
	(0.064)	(0.072)
Ln(Firm age)	-0.506***	0.194
	(0.112)	(0.153)
Leverage	-0.354	0.506
	(0.468)	(0.500)
Tangibility	-0.016	0.232
	(0.364)	(0.360)
R&D	-0.120	-1.324
	(1.004)	(1.450)
Stock return volatility	-3.831***	-3.099***
	(0.858)	(1.058)
Dividend per share	-0.215	-1.243
	(0.539)	(0.901)
Constant	1.083**	-1.485***
	(0.456)	(0.506)
Observations	7,813	7,773
Year FE	YES	YES
Industry FE	YES	YES
Pseudo R-squared	0.167	0.125

Panel B: Multivariate regression using the matched sample

	ROA		Tobin's Q	
VARIABLES	(1)	(2)	(3)	(4)
Founder family firm	0.090***		0.283***	
	(0.011)		(0.091)	
Ownership-Based family firm		0.079***		0.281**
		(0.015)		(0.122)
Observations	3,324	1,944	3,324	1,944
Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Adjusted R-squared	0.364	0.327	0.257	0.271

Panel C Founder family firm using the matched sample with governance controls

	ROA					Tobin's Q				
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Founder family firm	0.073***	0.071***	0.068***	0.026*	0.019	0.284	0.293*	0.295*	0.442*	0.299
	(0.017)	(0.017)	(0.017)	(0.015)	(0.015)	(0.174)	(0.168)	(0.168)	(0.264)	(0.300)
Independent directors	0.040				-0.036	-0.292				-1.043
	(0.046)				(0.043)	(0.353)				(0.677)
Board size		-0.029***			-0.004		0.251***			0.231***
		(0.007)			(0.005)		(0.058)			(0.078)
Duality			0.017		0.030			0.138		-0.479
			(0.030)		(0.028)			(0.285)		(0.397)
Ln(CGS)				-0.021	-0.020				-0.193	-0.119
				(0.014)	(0.016)				(0.241)	(0.293)
Constant	-0.376***	-0.304***	-0.360***	0.142	0.250***	3.630***	3.023***	3.540***	7.637***	8.300***
	(0.086)	(0.081)	(0.083)	(0.094)	(0.089)	(0.677)	(0.634)	(0.645)	(1.252)	(1.304)
Observations	2,770	2,770	2,770	1,307	1,187	2,770	2,770	2,770	1,307	1,187
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.370	0.379	0.370	0.303	0.278	0.284	0.293	0.284	0.299	0.339

Panel D Ownership-Based family firm using the matched sample with governance controls

	ROA					Tobin's Q				
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ownership-Based family firm	0.066***	0.072***	0.072***	0.015	0.017	0.110	0.120	0.084	-0.033	-0.195
	(0.023)	(0.021)	(0.022)	(0.020)	(0.021)	(0.210)	(0.212)	(0.214)	(0.343)	(0.397)
Independent directors	-0.062				-0.064	-0.157				0.542
	(0.061)				(0.048)	(0.441)				(0.854)
Board size		-0.050***			-0.003		0.218***			0.289**
		(0.010)			(0.007)		(0.080)			(0.114)
Duality			-0.007		-0.021			0.394		-0.029
			(0.037)		(0.044)			(0.377)		(0.785)
Ln(CGS)				-0.037*	-0.024				-0.733*	-0.735
				(0.022)	(0.024)				(0.403)	(0.454)
Constant	-0.395***	-0.329***	-0.418***	0.090	0.184*	4.587***	4.143***	4.506***	7.820***	7.783***
	(0.132)	(0.124)	(0.131)	(0.106)	(0.110)	(1.197)	(1.133)	(1.150)	(1.677)	(1.857)
Observations	1,615	1,615	1,615	655	595	1,615	1,615	1,615	655	595
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.323	0.349	0.321	0.237	0.220	0.325	0.331	0.326	0.249	0.305

Table 2.8 2SLS Instrumental Variable Estimation of Performance and Governance on Family Firm

This table reports the results of a Heckman two-stage least squares (2SLS) instrumental variable (IV) regression model examining the performance and governance of founder family firms (family firm definition 1) over the period 2010–2022. In Column 1 (the first stage), a logit regression of family firm status is run on the instruments Prior 1960 and Number of Founders, and control variables. In Columns 2 and 3 (the second stage), ordinary least squares (OLS) regressions of ROA and Tobin's Q are run on family firm status, governance control and the control variables. CGS is excluded due to large sample size reduction from missing values. Columns 4 through 8 present the effects of family firm status on governance outcomes. Family firm status is instrumented with an indicator variable that is equal to 1 if the firm was incorporated prior to 1960 ('Prior 1960'). Number of founders is the total number of founders for each firm. Details on the construction of the instruments are provided in the text. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	IV-2SLS			IV-2SLS				
	Family Firm	ROA	Tobin's Q	Family Firm	Board Ind.	Board Size	Duality	CEO Turnover
	(1)	(2)	(3)	(1)	(2)	(3)	(4)	(5)
Prior1960	-1.034**			-0.934*				
	(0.47)			(0.50)				
Number of Founders	3.075***			3.082***				
	(0.28)			(0.28)				
Family Firm		0.095***	0.485*		-0.084***	0.023	1.010***	-0.429***
		(0.03)	(0.25)		(0.03)	(0.02)	(0.36)	(0.14)
Observations	6,741	6,741	6,741	6,416	6,416	6,416	6,416	6,416
Corporate Governance	Yes	Yes	Yes					
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared		0.353	0.287		0.271	0.499		
Log Likelihood	-1,810.09			-1,791.85			-1,726.15	-2,644.91
Akaike Inf. Crit.	3,780.18			3,735.70			3,610.29	5,447.81

Table 2.9 Robustness: Lagged term

This table presents regression analyses of the performance and governance of family firms with lagged family firm variables. Panel A uses one-year lagged family firm variables, while Panel B uses two-year lagged family firm variables. Observations are at the firm-year level over the period 2010 – 2022. All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Panel A: Lagged one year

	ROA	Tobin's Q	Board Independence	Board Size	Duality	CEO Turnover
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Founder Family Firm (t-1)	0.051***	0.196	-0.081***	0.016	1.120***	-0.277**
	(0.20)	(0.18)	(0.02)	(0.02)	(0.28)	(0.11)
Observations	6,442	6,442	5,943	5,943	5,943	5,687
Corporate Governance	YES	YES				
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.237	0.264	0.279	0.500		
Log Likelihood					-1,495.10	-2,408.11
Akaike Inf. Crit.					3,146.20	4,970.22

Panel B: Lagged two year

	ROA	Tobin's Q	Board Independence	Board Size	Duality	CEO Turnover
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Founder Family Firm (t-2)	0.058***	0.077	-0.073***	0.013	1.206***	-0.268**
	(0.08)	(0.19)	(0.01)	(0.02)	(0.27)	(0.12)
Observations	5,713	5,713	5,140	5,140	5,140	4,914
Coporate Governance	YES	YES				
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.197	0.254	0.276	0.481		
Log Likelihood					-1,268.42	-2,107.20
Akaike Inf. Crit.					2,690.83	4,366.41

Table 2.10 Robustness: Alternative Measures of Family Firm and Firm Performance

This table shows robustness checks using alternative definitions of family firms from other studies such as Faccio and Lang (2002) and Anderson and Reeb (2003). It also presents results with alternative firm performance measures: ROE, Sales Growth, and Buy-and-Hold Returns (BHReturns). All variable definitions are in Appendix 2.A.1. Robust standard errors in parentheses are clustered at the firm level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	Alternative Measures of Family Firm				Alternative Measures of Firm Performance		
	ROA		Tobin's Q		ROE	Sale Growth	BHReturn
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Family Firm_FL	0.068***		0.296				
	(0.02)		(0.21)				
Family Firm_AR		0.048***		0.192			
		(0.02)		(0.14)			
Founder Family Firm					0.107***	0.057**	0.107***
					(0.03)	(0.03)	(0.03)
Observations	6,741	6,741	6,741	6,741	6,741	5,731	6,741
Corporate Governance	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.337	0.337	0.242	0.243	0.266	0.044	0.13

2.A Appendix

2.A.1 Variable Definitions

Variable	Definition
Family firm	A dummy variable that equals one if the sample firm is a family firm.
ROA	Return on assets, measured by income before extraordinary item (IB) scaled by total assets.
Tobin's Q	The market value plus total assets minus common equity (CEQ) scaled by total assets.
Ln(Total assets)	Natural logarithm of total assets (AT).
Firm age	The firm's age, measured by the difference between the fiscal year and founding year.
Leverage	The firm's leverage ratio, measured by debt in current liabilities (DLC) plus long-term debt (DLTT) scaled by total assets.
Tangibility	Property, plant and equipment (PPE), scaled by total assets.
R&D	The ratio of research and development expense (XRD) to its book value of assets (AT).
	Missing values in research and development expense are set to zero.
Stock return volatility	Standrad deviation of monthly return over past five years.
Stock return	Average monthly stock return in a fiscal year.
Dividend per share	Dividend per share, measured by summing all split-adjusted dividends per share during the fiscal year (DIVD/AJEXID).
Board size	Number of directors on the board.
Duality	A dummy variable equals one when the chairperson is the CEO.
Board independence	Proportion of non-executive independent directors on the board.
CGS	The firm's corporate governance score from the Refinitiv.
	Refinitiv uses 56 key performance indicators of corporate governance to measure firms' CGS scores and provides a percentage score between 0 and 100.
CEO Turnover	Dummy = 1 if CEO turnover occurs in year t, 0 otherwise.
ROE	Return on equity, calculated as net income / shareholder's equity.
Sales Growth	Year-on-year percentage change in sales.
BHReturn	Buy-and-Hold Return: cumulative stock return over one year.

2.A.2 Correlation Coefficient Matrix of Variables

This table presents the Pearson correlation coefficient matrix of the variables. None of the correlations is high enough to cause estimation problems. Observations are at firm-year level over the period 2010 – 2022. The variable definitions are in Appendix 2.A.1.

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	Founder family firm	1.000													
(2)	ROA	0.114	1.000												
		(0.000)													
(3)	Tobin's Q	0.071	-0.330	1.000											
		(0.000)	(0.000)												
(4)	Ln(Total Assets)	-0.031	0.512	-0.320	1.000										
		(0.006)	(0.000)	(0.000)											
(5)	Firm Age	-0.090	0.199	-0.126	0.414	1.000									
		(0.000)	(0.000)	(0.000)	(0.000)										
(6)	Leverage	0.014	0.175	-0.171	0.483	0.213	1.000								
		(0.200)	(0.000)	(0.000)	(0.000)	(0.000)									
(7)	Tangibility	-0.183	0.055	-0.241	0.087	-0.054	0.105	1.000							
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
(8)	R&D	0.032	-0.221	0.294	-0.215	-0.073	-0.127	-0.271	1.000						
		(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(9)	Stock Return Volatility	-0.153	-0.350	0.213	-0.543	-0.306	-0.290	0.150	0.111	1.000					
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(10)	Dividend Per Share	-0.001	0.200	-0.025	0.462	0.351	0.215	-0.081	-0.064	-0.333	1.000				
		(0.944)	(0.000)	(0.023)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
(11)	Board Size	-0.041	0.238	-0.158	0.698	0.343	0.335	0.004	-0.103	-0.396	0.397	1.000			
		(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.773)	(0.000)	(0.000)	(0.000)				
(12)	Duality	0.104	-0.031	0.026	-0.127	-0.061	-0.015	0.060	0.037	0.093	-0.070	-0.144	1.000		
		(0.000)	(0.011)	(0.035)	(0.000)	(0.000)	(0.230)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)			
(13)	Board Independence	-0.132	0.177	-0.085	0.415	0.214	0.166	-0.099	0.017	-0.287	0.220	0.299	-0.195	1.000	
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.172)	(0.000)	(0.000)	(0.000)	(0.000)		
(14)	CGS	-0.132	0.199	-0.167	0.545	0.306	0.189	0.021	-0.113	-0.384	0.280	0.390	-0.207	0.465	1.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.217)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Chapter 3

Bank CEOs' Financial Distress Experience and Risk Inertia in Risk-Taking

'Finance is more art than science. It requires judgment, experience, and instinct, which no textbook can provide.'
– Merton Miller

ABSTRACT

This study investigates the relationship between banks' risk-taking behaviour and bank CEOs' experience of financial distress under regular market conditions. We document strong evidence showing the relationship to be positive: banks of high-risk levels are associated with CEOs with distress experiences. This finding contrasts previous studies that report a negative influence of CEOs' experiences in crises or early-career disasters. Our results remain robust through propensity score matching (PSM) and are further validated with placebo tests. To understand the mechanisms behind the positive relationship, we compare risk levels before and after the appointment of distress-experienced CEOs. Our results show that bank risk-taking does not significantly change following the appointment, suggesting that these CEOs do not actively escalate risk. Instead, the evidence suggests a role of matching in top-management appointments, whereby risk-prone banks strategically choose CEOs with distress experience to align with their existing risk culture.

Keywords: CEO distress experience; bank risk-taking; risk culture

JEL classification: G21; G30; G32

3.1 Introduction

The role of bank chief executive officers (CEOs) in shaping banks' risk-taking behaviours has attracted increasing attention in the literature. Previous studies have shown that CEOs significantly influence banks' investment decisions and overall bank performance, particularly in periods of financial instability or crisis (see Hambrick and Mason 1984; Malmendier and Tate 2005; Fahlenbrach and Stulz 2011; Ho et al. 2016). The existing literature has focused on CEOs' roles through CEO incentives, educational backgrounds, and personal characteristics, such as overconfidence and risk tolerance (e.g., Malmendier and Tate 2005; King et al. 2016; Ho et al. 2016). Less attention has been given to how bank CEOs' professional experiences shape their strategic decision-making and influence corporate outcomes (Dittmar and Duchin 2015).

Regarding the role of managerial experiences, Hambrick and Mason (1984) propose the Upper Echelons theory that a firm's strategic decisions reflect its top executives' personal characteristics and experiences. As firms' key decision-makers, CEOs, carry their cognitive biases, shaped by past experiences, into the boardroom and may leave a lasting impact on their risk preferences and decision-making styles (Custódio et al. 2013; Huang 2014). The role of CEOs' experiences involving financial distress or crisis is particularly notable in the banking sector where risk management is crucially important.

Distress experiences, often referred to as managing a firm through periods of financial instability or significant adversity, represent high-risk, high-stress episodes that could profoundly influence future decision-making and performance. While some studies have explored the impact of crisis experiences on bank risk-taking strategies, their findings remain inconclusive. Fahlenbrach et al. (2012) report that CEOs who managed banks during early financial crises tend to maintain similar risk strategies in subsequent crises, reflecting a persistent risk-taking culture rather than a shift towards conservatism. Conversely, Yu (2023) documents that early-career exposure to the 1980s savings and loan (S&L) crisis led to more cautious and conservative behaviour, with banks managed by these CEOs taking on less risk.

Departing from these studies, we ask whether and how bank CEOs' distress experiences during non-crisis periods affect banks' risk-taking behaviour. In contrast to crisis experiences, distress experiences under more routine or regular market conditions are common and, being relatively short-term oriented, could be more relevant to banks' decisions. Behavioural finance literature suggests that recent professional distress experiences may influence decision-making more strongly than distant experiences, a phenomenon known as the 'recency effect' (Tversky and Kahneman 1974). More specifically, we identify bank CEOs' financial distress experiences by banks' abnormally poor performance or high risk status in immediately previous years and investigate whether and how banks' risk-taking decisions change in sequent years.

We start with the two competing hypotheses about the influence of CEOs' distress experiences on banks' risk-taking behaviour and decision-making. The first hypothesis is based on loss aversion and the hot stove effects, which predict that CEOs who have experienced financial distress will adopt conservative risk-taking behaviours. This hypothesis is consistent with the 'once bitten, twice shy' notion of Kahneman and Tversky (1984) and Denrell and March (2001) and in line with the finding of Yu (2023). In this view, CEOs, having faced significant financial setbacks in the past, will prioritise stability over risk and seek to avoid future distress by taking fewer risks (Yu 2023; Lonare et al. 2024).

The second hypothesis is based on the reinforcement learning theory of Skinner (2019), which posits that managers who successfully navigate distress may develop greater confidence and ability to manage risk. This theory predicts that distress-experienced managers will engage more in strategic risk-taking, leveraging their crisis management expertise to pursue more risky and high-reward opportunities. Fahlenbrach et al. (2012) and Bernile et al. (2017) further note such CEOs' increased risk tolerance and willingness to take on new challenges. Therefore, with this hypothesis, we expect banks with distress-experienced CEOs to exhibit higher levels of risk-taking.

We use a sample of US banks from ExecuComp and Compustat Bank from 1994 to 2016, with 2,513 CEO-year observations for 427 CEOs from 254 unique banks. To identify CEOs' financial distress experience, we define 'distress' as an indicator variable equal to one if the CEO worked at another bank in previous 5-year employment that experienced the lowest (highest) decile of performance (risk) and zero otherwise. To analyse such CEOs' subsequent banks' risk-taking behaviour, we examine three bank risk measures: the Z-score as a measure of financial stability, the expected default frequency (EDF) as a proxy for insolvency risk, and stock volatility as a market-based risk measure. We employ a range of control variables for bank characteristics and CEO demographic traits and include time-invariant bank and CEO fixed effects. Our results show that banks led by distress-experienced CEOs are associated with higher risk-taking behaviours, evidenced by lower Z-scores, higher EDF values, and greater stock volatility. This finding supports the reinforcement hypothesis but is inconsistent with the 'once bitten, twice shy' hypothesis. This finding is robust to a PSM analysis and further verified by our placebo tests with random assignments of CEOs.

To explore possible mechanisms behind our findings, we compare banks' risk levels before and after appointing distress-experienced CEOs. Our comparison shows that such banks' high levels of risk do not owe to increased risk after appointing distress-experienced CEOs but have exhibited time persistence, which is high from the pre-appointment period. This finding suggests a matching mechanism at play in CEO appointment, where high-risk banks are more likely to appoint distress-experienced CEOs. In other words, distress-experienced CEOs are not randomly appointed, but strategically placed in banks that pursue aggressive risk strategies.

Our study contributes to the literature by documenting new evidence on the influence of CEOs' professional experience on banks' risk-taking. Our results are consistent with the 'reinforcement learning' argument that predicts a positive influence of CEOs' crisis experiences on risk-taking (see Skinner 2019; Fahlenbrach et al. 2012; Bernile et al. 2017). Conversely, our results differ from the 'career lesson' argument that suggests a negative impact of bank CEOs' crisis experience on banks' risk-taking decisions (see Yu 2023). We note one important difference in empirical strategy between our study and previous studies. In the commonly used approach, Fahlenbrach et al. (2012), Bernile et al. (2017) and Yu (2023) focus on CEOs' experiences in financial market crises or drastic events such as early-life disasters. This approach has the advantage of highlighting influences of extraordinary events; it could also suffer from weakening effects or even changing effects owing to typically long time spans from an early year event to CEOs' subsequent decisions. In contrast, in this study, we focus on CEOs' financial distress experiences under non-drastic time, which allows us to identify influences from CEOs' more recent but less drastic experiences. The lack of studies on such CEO experiences suggests a gap in the existing literature. Indeed, our results show significant differences in the impacts of CEOs' distress experiences between crisis periods and non-crisis periods, which merit further investigation and explanation.

We also document evidence of the possible mechanism behind the link between CEOs' distress experience and banks' risk-taking. In contrast to the existing literature's dominating attention to CEO influence, our results suggest a selection mechanism that matches banks with CEOs by risk-taking preferences: High risk-taking banks are more likely to appoint CEOs with financial distress experiences. Indeed, our results show that banks that hire distress-experienced CEOs are associated with high risk and their risk-taking strategy does not change after CEO appointment. This finding of risk-taking persistency of banks is in support of the matching mechanism instead of CEO influence.

The remainder of this chapter is organised as follows. Section 3.2 reviews the literature and the main hypotheses. Section 3.3 describes the data and summary statistics, including the measures of the CEO distress experience. Section 3.4 presents the regression analysis results and Section 3.5 discusses robustness tests. Section 3.6 concludes.

3.2 Literature Review and Hypotheses Development

3.2.1 CEO Experience and Upper Echelons Theory

The Upper Echelons Theory developed by Hambrick and Mason (1984) posits that the characteristics and experiences of top executives significantly shape their strategic decision-making and, by extension, corporate outcomes. According to this theory, a firm's strategic decisions reflect the cognitive frames of its leaders, shaped by personal values and experiences. CEOs, as key decision-makers, bring their unique backgrounds and past experiences into the decision-making process, influencing how they perceive and manage risks.

While general CEO characteristics such as education, overconfidence, or demographic traits have been widely studied in relation to corporate outcomes (Bertrand and Schoar 2003; Hu and Liu 2015; Huang 2014) and bank risk profiles (Ho et al. 2016; King et al. 2016), there is growing recognition that a CEO's experiences play a crucial role in shaping their approach to decision making. For instance, Bernile et al. (2017) demonstrate that early-life experiences, such as surviving natural disasters, can leave lasting effects on CEOs' risk preferences.

Recent studies on professional experience have emerged in response to explain corporate decision-making (Custódio and Metzger 2013; Huang 2014; Hu and Liu 2015). Custódio and Metzger (2013) find that managerial skills based on past work experiences are an important determinant of CEO pay and that CEOs with general managerial skills are paid at a premium. Huang (2014) outlines that CEOs' industry experiences matter for divestiture decisions and finds that CEOs are more likely to divest divisions in industries where they have less experience. Hu and Liu (2015) find that CEOs with more diverse career experiences are less likely to be constrained by insufficient internal capital.

In contrast to personal experiences or general professional backgrounds, professional distress experience involves navigating firms through periods of crisis or financial instability. The effects of this type of experience may be different from broader managerial expertise because distress experiences are inherently high-risk and high-stress, potentially leaving a more pronounced mark on a CEO's future decision-making. Therefore, understanding how distress experiences shape CEO risk-taking behaviour is crucial, particularly in the banking sector, where risk management is central to a firm's survival and profitability.

3.2.2 'Once Bitten, Twice Shy'

Psychological theories such as loss aversion and the hot stove effect provide a framework for understanding why distress-experienced CEOs may become more risk-averse. Kahneman and Tversky (1984) prospect theory highlights that individuals are disproportionately sensitive to losses compared with gains, leading them to avoid risky situations that could result in negative outcomes. In the corporate context, this suggests that CEOs who have led firms through financial distress may be especially cautious about future risk-taking, prioritising stability over aggressive growth.

The hot stove effect (Denrell and March 2001) further explains this behaviour by proposing that individuals generalise from past negative experiences, making them more likely to avoid behaviours that previously led to failure. Having once faced the consequences of risky decision-making, distress-experienced CEOs are more inclined to adopt conservative strategies to avoid a recurrence. In this way, CEOs who have navigated companies through distress will likely prioritise risk mitigation and corporate stability in subsequent roles.

Empirical research supports the idea that CEOs who have been 'burned' by past crises tend to become more cautious. In their study of non-financial firms, Dittmar and Duchin (2015) find that CEOs who have previously navigated distress tend to adopt more conservative financial policies, such as reducing leverage and avoiding high-risk investments. Similarly, Bernile et al. (2017) show that CEOs who experienced extreme early-life disasters tend to be more cautious in later life, avoiding risky decisions that could expose their firms to instability. This caution often manifests in more conservative corporate policies and risk management strategies. Yu (2023) expands on this concept in the banking sector, finding that CEOs who experienced state-level crises early in their careers adopt risk-averse strategies to avoid similar pitfalls. Lonare et al. (2024) found that distress-experienced CEOs in the insurance sector prioritised reducing firm risks to safeguard against future financial crises.

The phrase 'once bitten, twice shy' captures the essence of this hypothesis. Just as individuals quickly learn to avoid risks after a negative experience, CEOs who have led firms through distress are likely to adopt more conservative risk-taking behaviours to avoid repeating past mistakes. This pattern suggests that, rather than seeking high-reward strategies, these CEOs focus on stability and risk mitigation.

Hypothesis 1: Banks with distress-experienced CEOs are prone to conservative risk-taking.

3.2.3 Reinforcement Learning and Confidence-Building

In contrast to the risk-averse narrative, reinforcement learning theory (Skinner 2019) suggests that individuals who have successfully navigated challenging situations become more confident in their ability to handle similar scenarios in the future. CEOs who have led firms through distress and emerged successfully may view these experiences as validation of their risk management abilities, leading to risk acclimatisation. This theory posits that past success in managing risk reinforces a CEO's confidence in their ability to take on and control risk, potentially increasing their willingness to engage in high-risk, high-reward strategies.

Bernile et al. (2017) provide empirical support for this theory, showing that CEOs who experienced mild or manageable early-life disasters are more likely to engage in risk-taking behaviours later in life. Their study suggests that the successful resolution of risky situations increases an individual's tolerance for risk, as they become confident in their ability to control future risks. Similarly, Malmendier and Tate (2005) argue that CEOs who have navigated past crises successfully may develop overconfidence, believing they can manage risk more effectively than they actually can. This overconfidence may lead to increased risk-taking, as CEOs feel emboldened by their past success.

In the banking sector, the role of institutional risk culture further amplifies this effect. Banks with strong, ingrained risk-taking cultures may deliberately select CEOs with a history of managing distress, not to curb risk-taking but to align with the institution's ongoing risk strategies. Fahlenbrach et al. (2012) find that banks with strong risk-taking cultures tend to maintain their risk levels across crises, driven by deep institutional norms. In such cases, CEOs who have successfully navigated distress may be appointed not to reduce risk, but to align with and reinforce the bank's existing risk-taking strategies. These CEOs, having built confidence in their ability to manage risk, may escalate risk-taking behaviours in banks with aggressive risk cultures.

In this view, distress-experienced CEOs are not seen as risk mitigators, but rather as leaders who can leverage their past success to manage – and potentially increase – risk in high-reward scenarios.

Hypothesis 2: Banks with distress-experienced CEOs are more likely to reinforce or escalate risk-taking behaviours.

3.3 Data and Summary Statistics

In this section, we outline the data sources, sample construction process, and the criteria used to select the banks in our study. We also present descriptive statistics and conduct univariate comparisons of key variables, comparing banks led by CEOs with distress experience to those without such experience.

3.3.1 Data and Sample

Our study draws a comprehensive dataset of banks and financial institutions identified by Standard Industrial Classification (SIC) codes ranging from 6000 to 6300, obtained from the S&P Compustat Bank and ExecuComp databases. The initial sample covers the period from 1992 to 2016, designed to capture the long-term effects of CEO distress experiences on bank risk-taking behaviour.

Depository institutions (savings institutions and commercial banks SIC 6000-6099), non-depository credit institutions (SIC 6100-6199), and investment banks (SIC 6200-6299) are included in the sample. Following prior studies (Fahlenbrach and Stulz 2011; Fahlenbrach et al. 2012; Ho et al. 2016), we opt to exclude firms that do not exist in the traditional banking industry, such as payment processors, investment advisers (SIC 6282) and online brokerages, since these are not in the lending business.

Given data availability constraints from ExecuComp, our effective sample period starts in 1993, with results calculated from 1994 onwards to allow for lagged variable analyses. We further restrict the sample to institutions with a minimum of two consecutive years of data, which is necessary for calculating year-over-year changes in our key variables and limiting the sample to data up to 2016 to avoid confounding our analysis with the effects of the full Basel III [1] implementation, which significantly alters the landscape of banking risk management. This approach aligns with recent studies, such as Yu (2023), which examined CEO early-crisis exposure using data up to 2015, and Lonare et al. (2024), which analysed CEO distress in the insurance sector with a sample ending in 2018.

By adhering to these timeframes, our study ensures comparability with existing research while focusing on the period most relevant to understanding the long-term effects of CEO distress experience.[2]

After obtaining an initial sample of bank CEO data, we apply additional screening criteria. Following prior literature (Francis et al. 2008; Ho et al. 2016; Dittmar and Duchin 2015), our default assumption is that the CEO is the highest-ranking executive in the bank. Consequently, when a CEO is formally appointed, we exclude other executives holding roles such as president, chief operating officer (COO), or chair of the board, unless these positions are simultaneously held by the CEO. This ensures that our sample focuses on individuals with the most direct influence over strategic decision-making.

For cases where multiple individuals held the CEO role within a single fiscal year, we use ExecuComp's CEOANN indicator to identify the executive who held the position for most of the year. This approach provides consistency in our data by ensuring that our analysis accurately reflects the leadership with the most significant impact on the bank's operations during the given period.

[1] Basel III introduced stricter capital requirements, leverage ratios, and liquidity standards, which fundamentally reshaped banks' risk-taking incentives by requiring higher capital buffers to absorb potential losses. This regulatory shift aimed to enhance the resilience of banks following the 2008 financial crisis, and its full implementation continued to phase in globally until 2019.

[2] We conclude the data collection in 2016 was partly driven by data availability at the time this project commenced. At that point, extending the dataset to include more recent years was not feasible owing to limitations in the data and potential biases introduced by unexamined post-2016 events. This carefully selected timeframe allows us to present a robust analysis of long-term CEO distress experience impacts while maintaining methodological consistency and relevance to the broader academic discourse.

We collect detailed career histories for each CEO from ExecuComp and BoardEx, including information on prior employers and employment dates. We specifically match these prior employers to banks that have experienced financial distress, enabling us to measure each CEO's career exposure to distressed institutions. Following Dittmar and Duchin (2015), our focus is on recent professional experiences, as these are more likely to exert a stronger influence on decision-making than more distant experiences.

The financial and accounting data were primarily drawn from Compustat Bank, which provided detailed information on depository institutions, and Compustat for data on investment banks. Stock returns data were sourced from the Center for Research in Security Prices (CRSP). We calculated the EDF using a method developed by Bharath and Shumway (2008), combining data from both CRSP and Compustat to derive measures of bank risk.

Our final sample consists of 2,513 CEO-year observations from 254 unique banks, covering 427 individual CEOs over a period spanning from 1994 to 2016. The number of observations varies across different regression models owing to the specific measures of financial distress employed, issues related to multicollinearity and the perfect prediction of certain dependent variables. Detailed variable definitions and further statistical descriptions are available in Appendix 3.A.1. To mitigate the influence of outliers on our results, we winsorise continuous variables at the 1st and 99th percentiles in all the analyses.

3.3.2 Measure of CEO Distress Experience

To measure a CEO's distress experience, we track their employment history using data from ExecuComp and BoardEx to identify whether they previously worked at a distressed firm. Our focus is specifically on previous 5-year employment at other banks to ensure that the effects observed can be attributed to the CEO's influence rather than the specific bank's characteristics.[3] To construct these measures, we follow prior literature on bank risk-taking

[3] We do not limit this definition to executive roles; instead, we adopt a broader approach that captures any prior employment during the distress period. This design reflects the behavioural premise that organisational crises can shape perceptions and decision-making processes even among non-executive personnel. As noted by Kahneman (2011), individuals exposed to institutional failure environments may internalise

or CEO experience and employ six indicators of distress as outlined by previous studies (Lonare et al. 2024; Dittmar and Duchin 2015; Ho et al. 2016; Khan et al. 2017; Adams and Ragunathan 2015; Fahlenbrach and Stulz 2011; Houston et al. 2010; Laeven and Levine 2009).

Our emphasis on recent distress experiences is supported by behavioural psychology literature, particularly the 'recency effect' described by Miller and Campbell (1959), which suggests that recent professional challenges exert a stronger influence on decision-making than older experiences. This effect implies that distress-experienced CEOs are more likely to base their current risk strategies on the most immediate lessons they have learned. As noted by Kahneman (2011), recent experiences trigger intuitive and rapid responses in decision-making, indicating that these CEOs are drawing on their latest knowledge to navigate risk. Moreover, Shefrin (2010) highlights that recent financial distress has a more significant impact on shaping managerial risk perceptions and actions, reinforcing the relevance of focusing on recent experiences to understand adaptive management techniques. By emphasising these experiences, our approach offers a different view of how distress-experienced CEOs actively shape bank risk strategies, distinguishing our analysis from studies like Yu (2023), which assume a uniform effect of distress across the CEO's career.

Our identification strategy further differs from Yu (2023), who focuses on CEOs' risk experiences during rare but drastic financial crises, we examine their experiences during more frequent, firm-level financial distress.

To address concerns over potential entanglement between CEO characteristics and firm-level risk preferences, we incorporate bank fixed effects, year fixed effects, and a range of CEO-level controls including tenure, education, age, and prior appointments. These adjustments help isolate within-bank variation attributable specifically to the CEO's prior distress experience. We further assess the robustness of this identification strategy in the

intuitive risk heuristics, while Shefrin (2010) argues that proximity to distress can influence managerial behaviour through emotional learning. Our approach allows for a more inclusive measure of crisis exposure, recognising that meaningful professional learning can occur without formal authority. The five-year window balances recency and relevance, drawing on evidence from the behavioural sciences that recent experiences have a more persistent influence on future decisions (Miller and Campbell 1959).

robustness section, using placebo tests and CEO fixed effects.

Bank Performance-Based Measures of Distress

The first three indicators of distress experience focus on bank performance metrics. Following the method of Ho et al. (2016), we use return on equity (ROE) and cumulative stock return as proxies for bank performance. Specifically, ROE is calculated as net income divided by total equity, reflecting the bank's operating performance, while the Stock return measures the total annual return on the bank's stock. To ensure that these measures accurately reflect distress, we adopt the approach of Dittmar and Duchin (2015) by classifying firms as distressed only if they exhibit negative stock returns.

The third measure of bank performance is Tobin's Q, which represents the ratio of a firm's market value to its book value of assets, calculated as book assets minus book equity plus the market value of equity (Adams and Ragunathan 2015). This measure provides insight into the market's valuation of the bank's future growth opportunities relative to its existing assets.

Risk-Based Measures of Distress

The fourth measure focuses on the overall stability of banks, captured by the Z-score. A higher Z-score indicates greater bank stability and is calculated as the sum of the return on assets (ROA) and the capital-to-asset ratio, divided by the standard deviation of asset returns. This measure assesses how many standard deviations the bank's profits would need to fall to wipe out its equity capital, providing a direct indication of the distance from insolvency (Khan et al. 2017; Houston et al. 2010; Laeven and Levine 2009). The formula for the Z-score is expressed as:

$$Z\text{-}score = \frac{Return\ on\ Asset + (Equity/Asset)}{Standard\ Deviation\ of\ Return\ on\ Asset} \tag{3.1}$$

We use a two-year rolling window to calculate the standard deviation of asset returns.[4] In

[4] We also employ 3-year and 5-year rolling windows for calculating the standard deviation of asset returns for the Z-score, and the results do not differ significantly across these windows.

models incorporating the Z-score as a risk measure, we exclude ROA as a control variable to avoid collinearity issues, given that the Z-score is a function of ROA.

The fifth measure is based on the default risk of banks. Researchers might directly analyse bankruptcy events (Fahlenbrach et al. 2012), but because bankruptcies are relatively rare,[5] especially for bank holding companies, estimating approaches can be challenging.[6] We opted for the EDF over direct measures of insolvency owing to its robust out-of-sample forecasting ability Bharath and Shumway (2008). The EDF is grounded in the Merton distance-to-default model, offering a simplified approach to estimating the probability of default. It effectively captures the cross-sectional and time-varying likelihood of a bank's insolvency, making it a robust indicator of financial distress. EDF is the percentile ranking of a firm's default risk based on its distance to default, constructed by Bharath and Shumway (2008). See Appendix 3.A.2 for details.

Market Measure of Bank Risk

The final measure of distress is based on stock return volatility, which serves as a market-based proxy for bank risk. Following the approaches of Khan et al. (2017) and Konishi and Yasuda (2004), we calculate stock volatility as the standard deviation of excess monthly returns relative to a value-weighted market index. This measure provides a direct indication of the uncertainty and risk inherent in the bank's stock performance.

Categorisation of CEOs with Distress Experience

To categorise CEOs as having relevant professional distress experience, we analyse whether they were employed by a bank ranked in the lowest decile of performance based on the six distress measures during their tenure. We follow the framework established by Dittmar and Duchin (2015) and further validated by Lonare et al. (2024), ensuring that our categorisation is consistent with established methodologies in the literature. Banks are sorted annually into deciles for each metric, with those in the lowest decile for ROE,

[5] Only 18 banks were classified as failing during the financial crisis from FDIC.

[6] Yu (2023) noted that roughly 4% of CEOs have experienced firm-level bankruptcy. The variation in the firm bankruptcy indicator is insufficient for identification purposes, and the estimated coefficients are too noisy for drawing any reliable inference.

Stock return, Tobin's Q, and Z-score being identified as distressed. In contrast, those in the highest decile for EDF and Stock volatility are similarly classified. We also create a composite index that is equal to one if any of the above distress experience measures is equal to one. Detailed definitions are provided in Appendix 3.A.1.

Our approach to measuring CEO distress experience builds on and extends the frameworks used in previous studies such as those conducted by Dittmar and Duchin (2015) and Lonare et al. (2024). While they only use firm performance metrics to categorise distress, our study expands this by incorporating a combination of both performance-based and risk-based measures of distress. This allows us to capture a broader spectrum of distress scenarios, thereby improving the validity and robustness of our findings.

Lonare et al. (2024) focus specifically on the insurance sector and apply performance distress measures to assess CEO behaviour in that industry. In contrast, our study's emphasis on banking institutions introduces unique complexities, such as regulatory impacts and liquidity considerations, which require a set of risk indicators like the EDF and Z-score.

Unlike Yu (2023), who primarily examines CEO learning behaviours during crisis events, we focus on the CEOs' career-driven experiences at distressed banks, regardless of the broader economic environment. This approach allows us to isolate the influence of individual distress experiences on subsequent decision-making without overshadowing the confounding effects of broader market crises. By focusing on detailed measures such as the EDF and stock return volatility, we capture both the probabilistic risk of default and the volatility that signals market perception of risk, thereby presenting a comprehensive view less sensitive to short-term economic fluctuations.

3.3.3 Control Variables

The control variables in this study are selected to account for both bank-specific characteristics and CEO attributes that might influence risk-taking behaviour. These variables are measured for each bank i in the year $t-1$ and are widely recognised in the literature as standard controls in studies of bank risk-taking (Ho et al. 2016; Adams and Ragunathan 2015; Fahlenbrach et al. 2012). The definitions of all variables are detailed in Appendix 3.A.1.

Bank characteristics are included to capture each institution's financial profile and risk structure. The natural logarithm of the book value of total assets is used as a measure of bank size, as larger banks tend to have different risk profiles and market behaviours, influencing their risk-taking tendencies. Studies like Demsetz (1997) and Stiroh and Rumble (2006) suggest that larger institutions often engage in more diversified activities, affecting their risk-taking.

We also control for Book Leverage, defined as the ratio of total assets to the book value of equity, which serves as a proxy for a bank's capital structure. Higher leverage ratios may incentivise banks to undertake riskier activities to enhance returns, a relationship explored extensively in the context of banking risk (Fahlenbrach and Stulz 2011; Laeven and Levine 2009). The Tier 1 Capital Ratio is included as a measure of the bank's core equity capital relative to its risk-weighted assets, consistent with the Basel Accord's guidelines. This ratio is critical for assessing a bank's ability to absorb financial shocks and maintain stability, aligning with findings from studies like Hanson et al. (2011) on the impact of capital adequacy on risk-taking behaviour.

The study also incorporates ROA, calculated as net income divided by book assets, to evaluate bank profitability and operational efficiency. Higher ROA values typically correlate with lower risk-taking, as more profitable banks have a greater capacity to absorb losses without resorting to risky strategies (Houston et al. 2010). The Loan-to-Deposit Ratio (Loan/Deposit) is another key variable, reflecting the proportion of a bank's deposits allocated to loans. A higher loan-to-deposit ratio indicates a more aggressive lending approach, which is directly tied to the bank's risk exposure, as discussed in studies by Berger et al. (2017) and Acharya et al. (2013).

In addition to bank characteristics, we control for several CEO-specific attributes to distinguish the effect of career experience on risk-taking from other individual factors. CEO age is included as a control variable, as older CEOs will likely encounter diverse operating environments throughout their careers, potentially shaping their risk preferences. Research by Bertrand and Schoar (2003) suggests that older CEOs may be more conservative in their strategic choices, often resulting in lower investment levels and risk aversion.

Second, we control for CEO tenure using the number of years that a CEO has worked in the bank. Prior literature shows an inconclusive result between CEO tenure and firm risk-taking, with some studies indicating a positive relationship. For example, Chen and Zheng (2014) and Serfling (2014) argue that longer-tenured CEOs may be more willing to engage in risk-taking owing to their familiarity and confidence in managing the firm's operations. Conversely, other studies, such as Berger et al. (1997) and Coles et al. (2006), find that longer-tenured CEOs tend to be more risk-averse, possibly owing to entrenchment and a desire to safeguard their positions.

The educational background of the CEO is another important control variable. We include an indicator for MBA education, as it has been shown to influence risk-taking through the development of human and social capital. Bertrand and Schoar (2003) argue that MBA-educated CEOs are generally more aggressive in their strategic choices, including capital expenditure and leverage decisions. Studies by King et al. (2016) and Frydman (2019) further suggest that MBA holders demonstrate superior decision-making capabilities, which could affect their approach to risk management. We also control for CEOs with a PhD degree, based on findings from Berger et al. (2014), which indicate that advanced academic training can play a significant role in shaping conservative risk management practices, although its effect on bank-specific risk-taking remains inconclusive.

Finally, the study accounts for the CEO's gender, given the extensive evidence indicating that gender differences can influence financial decision-making and risk tolerance. Research by Barber and Odean (2001) and Weber et al. (2002) has consistently found that women are more risk-averse than men in their financial and strategic choices. This control is further supported by Byrnes et al. (1999) and Eckel and Grossman (2008), demonstrating that gender plays a significant role in shaping risk-taking behaviour across different contexts.

3.3.4 Summary Statistics

Panel A of Table 3.1 summarises the bank characteristics, CEO characteristics, and distress measures for our sample, which includes 2,513 firm-year observations spanning from 1993 to 2016. We report the number of observations, mean, standard deviation, minimum, maximum, median, and values at the 10th and 90th percentiles for each variable. All continuous variables are winsorised at the 1st and 99th percentiles to mitigate the influence of outliers.

[Insert Table 3.1 about here]

As shown in Panel A, the average bank in our sample has a size of 9.64, suggesting that we are primarily analysing medium to large-sized institutions. The mean book leverage ratio of 11.8 indicates that these banks operate with a relatively high degree of leverage, a characteristic often associated with increased risk-taking in line with findings by Laeven and Levine (2009) and Houston et al. (2010). The average Tier 1 regulatory capital ratio is 11.01%, which suggests adequate capital buffers to absorb financial shocks, consistent with regulatory standards emphasised in Basel III guidelines (Hanson et al. 2011).

The average ROA is 0.91%, while the mean ROE is 9.97%, indicative of modest profitability levels in comparison to the banking industry average. The loan-to-deposit ratio of 0.88 highlights that the banks in our sample maintain a balanced approach to lending relative to their deposits, aligning with prior research by Berger et al. (2017), which suggests that this ratio is a critical determinant of liquidity risk and stability. Notably, the average Z-score of 4.91 indicates a reasonable level of financial stability, aligning with the findings of Delis et al. (2014) on the use of Z-scores as predictors of insolvency risk.

Panel A also reveals that the EDF has a mean of 0.10, but the skewed distribution with a median of zero and a maximum of nearly 100% highlights the variability in default risk across banks. Stock volatility and Stock return exhibit mean values of 0.26 and 0.12, respectively, suggesting moderate levels of market risk and return, which are broadly consistent with observations from Brogaard et al. (2017) in the context of financial institutions.

Panel B of Table 3.1 provides summary statistics on CEO characteristics within the sample. The average age of CEOs is 57.03 years, and their average tenure at the bank is approximately 10.46 years, indicating a relatively experienced and entrenched leadership cohort compared to broader industry norms. For instance, Dittmar and Duchin (2015) report an average CEO age of 52.8 years and tenure of 7.3 years in non-financial firms, highlighting that CEOs in the banking sector tend to have longer tenures, which could influence their risk preferences and decision-making stability.

The data also shows that 19% of CEOs in our sample possess an MBA degree, while only 2% hold a PhD This educational composition aligns with previous findings by King et al. (2016) and Frydman (2019), who noted that MBA education often correlates with more aggressive risk-taking behaviour owing to formal training in financial strategy and decision-making. Furthermore, the low representation of female CEOs (only 2%) is consistent with existing literature on gender disparities in executive roles, such as the study by Barber and Odean (2001), which finds that women in leadership positions tend to adopt more risk-averse strategies compared to their male counterparts.

Panel C of Table 3.1 presents the summary statistics for the six distress measures that categorise CEO distress experience based on the lowest or highest annual deciles. For example, banks in the lowest decile of ROE have an average return on equity of -27%, indicating severe underperformance. The minimum stock return in the lowest decile is consistently below zero, aligning with our definition of distress that requires negative stock returns to ensure the identification of financial difficulties, as supported by Dittmar and Duchin (2015).

The average values of Tobin's Q and the Z-score for banks in the lowest deciles are 0.96 and 1.92, respectively, underscoring the significantly lower market valuation and stability of distressed institutions compared with their peers. In contrast, banks in the highest decile for EDF and stock volatility have mean values of 0.49 and 0.61, respectively, suggesting elevated levels of insolvency risk and market instability. These findings are consistent with the use of EDF as a forward-looking measure of default risk in studies like Bharath and Shumway (2008), which emphasise its ability to capture cross-sectional variations in financial distress.

Panel D of Table 3.1 outlines the frequency with which CEOs in the sample experienced distress according to the specified measures. The data indicates that 13.1% of CEOs encountered distress as measured by ROE, while 29.7% experienced distress according to stock return. Additionally, 15.6%, 18.4%, and 18.5% of CEOs faced distress based on Z-score, EDF, and stock volatility measures, respectively.

Table 3.2 presents the correlation analysis for the variables used in our study, divided into three panels that highlight different aspects of the relationships between bank risks, performance measures, and CEO distress indicators. Panel A of Table 3.2 displays the pairwise correlation coefficients between key bank risk and performance measures. The results indicate that as expected, the return on equity (ROE), Stock return, Tobin's Q, and Z-score are positively correlated with each other. These positive correlations suggest that higher values of these measures generally reflect better bank performance and greater financial stability. For instance, Tobin's Q, which measures market valuation relative to a firm's assets, is positively correlated with ROE and Stock return, indicating that banks with higher profitability also tend to have higher market valuations, consistent with findings in studies by Fahlenbrach et al. (2012) and Ho et al. (2016).

[Insert Table 3.2 about here]

Conversely, EDF and stock volatility show a negative correlation with the stability measures (such as Z-score and Tobin's Q) and a positive correlation with each other. This aligns with the literature that uses EDF and stock volatility as proxies for financial distress, where higher values indicate increased risk and lower stability (Bharath and Shumway 2008). The strong positive correlation between EDF and stock volatility (0.655) reinforces their role as complementary indicators of market-based risk perception. These findings are consistent with prior work by Houston et al. (2010), which highlighted the link between market volatility and credit risk measures.

The absolute values of the correlations between risk and performance measures range from 0.18 to 0.65, with stock volatility and returns having the lowest correlation and stock volatility and EDF having the highest. This variability suggests that while these measures are interrelated, they still capture distinct aspects of bank distress.

Panel B of Table 3.2 reports the tetrachoric correlations among the different indicators of CEOs' distress experience. As expected, the results show that all the CEO distress measures are positively correlated, with values ranging from 0.3 to 0.8. The strongest correlation is observed between the Z-score and ROE distress indicators, indicating that these two measures often signal distress together. This finding aligns with the study by Lonare et al. (2024), which also found a high correlation between accounting-based measures of distress in CEOs' previous employment.

Lower correlations, such as those between Stock return and stock volatility, suggest that these indicators may represent different dimensions of a CEO's experience with financial distress. This diversity in correlations supports the argument that using multiple distress measures provides a more nuanced understanding of a CEO's past financial challenges, capturing both market-based and accounting-based signals of distress.

Panel C of Table 3.2 presents the comprehensive correlation matrix for all variables used in this study. Importantly, the matrix does not show high correlations between the explanatory and the dependent variables, indicating that multicollinearity is unlikely to pose significant issues in the regression analyses. The highest correlations observed are moderate, such as the correlation between EDF and stock volatility, reinforcing their close association in capturing bank risk without redundancy.

The significant positive correlation between EDF, stock volatility, and the six measures of CEO distress experience suggests that banks with CEOs who have previously faced distress tend to exhibit higher risk profiles. This finding is consistent with studies by Ho et al. (2016) and Adams and Ragunathan (2015), which also highlighted the relationship between executive distress experiences and subsequent risk-taking behaviour. Conversely, the consistently negative correlation coefficients between the natural logarithm of the Z-score and the CEO distress measures underscore the association between distress experiences and reduced financial stability.

The correlation between CEO age and tenure (0.23) indicates a modest but positive relationship, suggesting that older CEOs tend to have longer tenures within the same institution. This relationship aligns with prior findings by Serfling (2014), who argued that longer-tenured CEOs may accumulate greater decision-making power and potentially influence the firm's risk-taking strategy more significantly.

3.3.5 Comparison of Bank and CEO Characteristics by Distress Experience

Table 3.3 compares bank and CEO characteristics for banks led by CEOs with and without distress experience. The results in Panel A highlight significant differences in risk-taking behaviour between banks led by distress-experienced CEOs and those without such experience, as defined by the composite measure.[7] The composite measure captures whether a CEO has been exposed to financial distress according to at least one of several individual distress metrics, including Distress(ROE), Distress(Stock return), Distress(Tobin's Q), Distress(Z-score), Distress(EDF), and Distress(Stock volatility). This approach ensures a comprehensive assessment of a CEO's past exposure to various dimensions of distress and is consistent with previous studies, such as Lonare et al. (2024), which highlight the importance of integrating multiple distress signals to account for the varied nature of financial adversity and its implications on subsequent managerial decision-making.

[Insert Table 3.3 about here]

Banks with distress-experienced CEOs demonstrate a higher level of risk-taking, as indicated by book leverage of 12.46, which is 1.2 points higher than that of banks led by non-distress-experienced CEOs, with the difference being statistically significant. Similarly, the loan-to-deposit ratio is 0.89 for distress-experienced banks, which is 0.02 higher compared with their counterparts, suggesting a more aggressive lending strategy in line

[7] The composite measure of CEO distress experience is constructed as an indicator equal to one if a CEO has experienced distress according to at least one of the six individual distress metrics: Distress(ROE), Distress(Stock return), Distress(Tobin's Q), Distress(Z-score), Distress(EDF), and Distress(Stock volatility). This multidimensional approach captures both accounting-based and market-based indicators of distress, providing a more holistic view of the CEO's past financial challenges.

with findings from Ho et al. (2016) and Fahlenbrach et al. (2012), who also noted that increased leverage and lending ratios are characteristic of risk-prone financial institutions.

When comparing bank performance, distress-experienced banks exhibit significantly lower profitability measures. The return on equity (ROE) for these banks is 7.36%, which is 4.72 percentage points lower than for non-distress-experienced banks. Tobin's Q, a proxy for the market valuation of assets, is also lower for distress-experienced banks by 0.02 points, indicating a less favourable market perception of these banks. These results align with the study by Adams and Ragunathan (2015), which observed that distress-experienced executives tend to manage firms with lower market valuations and weaker profitability owing to more conservative or risk-averse strategies following past failures.

Regarding non-performing loans (NPL/Loan), distress-experienced banks have a higher ratio by about 0.01, statistically significant at the 1% level. This elevated NPL ratio suggests that distress-experienced CEOs might manage institutions with poorer loan performance, reflecting a legacy of prior risk-taking or more lenient credit policies. Consistent with Ellul and Yerramilli (2013), who found a link between executive background and loan quality, these findings suggest that prior distress experience might influence more cautious lending practices, although not always successfully mitigating loan default risk.

Panel A also reveals that banks run by CEOs with distress experience have a Z-score of 4.46, which is 0.82 lower than non-distress-experienced banks, indicating significantly reduced financial stability. The higher EDF and stock volatility for these banks further confirm their higher risk profile, with both measures being statistically significant at the 1% level. This evidence strongly supports the contention that banks led by distress-experienced CEOs are more prone to instability, default risks, and market fluctuations, aligning with findings from Bharath and Shumway (2008), who emphasised the predictive power of EDF in assessing bank risk.

The heightened stock volatility of distress-experienced banks is consistent with Brogaard et al. (2017), who documented that institutions with risk-prone management tend to exhibit more volatile stock performance, reflecting greater uncertainty in their strategic direction and market valuation. These results suggest that the experience of distress does not necessarily lead to a conservative approach to managing risks but may also drive calculated risk-taking behaviour that increases market volatility.

Panel B of Table 3.3 reinforces the findings observed in Panel A by detailing results for each individual distress measure. Across all six measures, banks managed by CEOs with distress experience consistently exhibit higher risk-taking behaviour, lower profitability, and greater market risk compared with their non-distress-experienced counterparts. For example, the comparison based on Distress(ROE) indicates that banks with distress-experienced CEOs have a significantly lower ROE and higher leverage, consistent with prior studies like Aebi et al. (2012), which highlight the trade-off between profitability and stability in risk-taking institutions.

The consistent pattern across all measures suggests a robust relationship between CEO distress experience and subsequent risk-taking. Even when using the different distress proxies, the pattern remains similar, suggesting that the composite measure comprehensively captures the underlying risk-taking tendencies associated with distress experience. This consistency supports the multidimensional approach employed in previous studies such as Lonare et al. (2024), who also advocated for a holistic view of distress indicators to better understand executive decision-making and its impact on firm outcomes.

The analysis of CEO characteristics in both panels highlights that distress-experienced CEOs tend to be slightly older, have longer tenures, and are less likely to hold an MBA or PhD than their counterparts. The lower prevalence of MBA degrees among distress-experienced CEOs suggests that formal business training may influence the strategic orientation towards risk. Frydman (2019) observed that MBA-educated CEOs are often linked to more structured decision-making processes, which could mitigate aggressive risk-taking behaviour. The longer tenure of distress-experienced CEOs, as noted in Serfling (2014), might imply greater entrenchment and risk tolerance built up over years of institutional familiarity.

3.4 Results

In this section, we discuss the results. Sections 3.4.1 discuss the findings on bank stability, insolvency risk, and market-based risk. We apply propensity score matching (PSM) in Section 3.4.2 to address potential selection bias. In Section 3.4.3, we explore potential endogeneity issues using a difference-in-differences (DiD) approach. Finally, Section 3.4.4 examines the persistence of risk cultures in CEO appointments, highlighting how high-risk banks tend to select leaders whose distress experience aligns with their existing risk profiles.

3.4.1 CEO Distress Experience and Bank Risk-Taking

To examine the impact of recent professional distress-experienced CEOs on bank risk, we estimate the following specification:

$$BankRisks_{i,t} = \alpha_1 + \alpha_2 Distress_{i,t} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t} \tag{3.2}$$

where $BankRisks_{i,t}$ represents the dependent variables of interest – Z-score, EDF, and – which measure overall bank stability, insolvency risk, and market-based risk, respectively. $Distress_{i,t}$ is a dummy variable that equals one if the CEO of bank i experienced distress in the past five years at other banks based on six distress measures: Distress(ROE), Distress(Cumulative return), Distress(Tobin's Q), Distress(Z-score), Distress(EDF), and Distress(Stock volatility). $Z_{i,t-1}$ is a vector of control variables for bank i in year $t-1$, and has five bank characteristics: Assets, Book leverage, ROA(%), Tier 1 and Loan/Deposit. $O_{i,t-1}$ is a vector of CEO characteristics including: Age, Tenure, MBA, PhD, and Female. υ_i and μ_t capture bank-specific effects and year-fixed effects, respectively. $\epsilon_{i,t}$ is the error term. In all specifications, we cluster the standard errors at the bank level, consistent with prior literature (Khan et al. 2017; Ho et al. 2016).

A distinguishing feature of our study is its emphasis on recent, non-drastic professional distress experiences, enabling us to isolate the unique influence of CEOs from broader, systemic bank-level factors. In contrast, prior research, including Fahlenbrach et al. (2012), Bernile et al. (2017), and Yu (2023), has predominantly focused on CEO experiences shaped by significant financial market crises or extraordinary life events, such as early-life disasters. While these studies adeptly highlight the influence of extreme, high-impact experiences, they also risk capturing attenuated or modified effects owing to the considerable time elapsed between those events and CEOs' subsequent strategic decisions. By narrowing our focus to more recent and moderate financial distress episodes, our analysis offers a fresh perspective on how contemporary professional experiences affect bank risk-taking.

CEO Distress Experience and Bank Stability – Z-Score

Table 3.4 provides the regression results for the impact of CEO distress experience on bank stability, as measured by the natural logarithm of the Z-score. A higher Z-score indicates greater stability, while a lower score implies higher risk. It should be stressed that in the model specifications using the Z-score, ROA(%) should not be considered a control variable because the Z-score is a function of this variable and would lead to spurious results. To control for unobservable bank characteristics and market-wide effects that may be correlated with the CEOs' distress experience and the bank risks, the regressions also include year and firm fixed effects.

[Insert Table 3.4 about here]

The findings indicate a consistently negative and statistically significant relationship between CEO distress experience and the Z-score across all distress measures. Distress(ROE), Distress(Cumulative return), Distress(Tobin's Q), Distress(Z-score), Distress(EDF), and Distress(Stock volatility) all exhibit coefficients ranging from -0.512 to -1.565 and are statistically significant. This suggests that banks led by CEOs with recent distress experiences tend to have lower Z-scores, indicating reduced financial stability.

These findings provide evidence that CEOs with recent distress experiences are more inclined to lead banks with higher risk profiles. This contrasts with the argument that distress-experienced executives typically become more risk-averse, as Yu (2023) discussed.

Instead, our findings indicate that recent distress exposure may incentivise CEOs to engage in calculated risk-taking, leveraging their recent distress experience to manage risk dynamically, as seen in sectors such as banking where high-risk strategies can offer high rewards (Fahlenbrach et al. 2012).

The control variables provide additional insight into the factors influencing bank stability. Larger banks, as captured by the natural logarithm of total assets, generally exhibit lower Z-scores, indicating higher risk. This result is consistent with previous studies, such as Bertay et al. (2013), which found that bank size does not necessarily equate to lower risk owing to the complexities and risk exposures of larger institutions. Book leverage also shows a negative relationship with the Z-score, suggesting that higher leverage leads to increased instability.

CEO tenure positively influences the Z-score, suggesting that longer-serving CEOs contribute to greater bank stability, possibly owing to their deeper understanding of the institution's risk profile. Educational factors like MBA and PhD degrees do not significantly affect stability, which aligns with Berger et al. (2014), indicating that practical experience might be more crucial than formal education in influencing bank risk decisions.

CEO Distress Experience and Bank Insolvency Risk – EDF

Table 3.5 explores the relationship between CEO distress experience and EDF, a forward-looking measure of the likelihood of bank insolvency. The positive and statistically significant coefficients observed across all distress measures indicate that distress-experienced CEOs are associated with higher EDF values, suggesting a greater risk of bank default. The magnitudes of these effects are substantial, with coefficients ranging from 0.037 to 0.124, implying that distress-experienced CEOs increase the probability of default by up to 12.4 percentage points. This confirms that such CEOs are associated with higher default risks, possibly owing to their willingness to embrace riskier strategies to pursue greater returns, rather than risk-aversion. This aligns with the notion that leadership in distressed situations, particularly in volatile sectors like banking, may foster risk-seeking behaviour as a strategic response to uncertainty (Brogaard et al. 2017).

[Insert Table 3.5 about here]

The control variables in the EDF analysis largely mirror those from the Z-score results. Bank size and leverage are positively associated with EDF, highlighting the heightened insolvency risk for larger, more leveraged banks. ROA remains negatively correlated with EDF, indicating that more profitable banks are less prone to default. The patterns observed in CEO characteristics also align with the Z-score analysis, emphasising the consistency of these variables in influencing bank risk across different dimensions.

CEO Distress Experience and Market Risk – Stock Volatility Analysis

Table 3.6 focuses on the market-based risk measure of stock return volatility. Our analysis indicates a strong positive correlation between CEO distress experience and stock volatility, signifying increased market risk under their leadership. This finding underscores the tendency of distress-experienced CEOs to embrace riskier strategies that amplify stock price fluctuations.

[Insert Table 3.6 about here]

The coefficients range from 0.034 to 0.089, indicating that the presence of a distress-experienced CEO increase stock volatility by up to 8.9 percentage points. This finding suggests that these CEOs may not shy away from market risk but instead pursue aggressive strategies to enhance returns, even if it results in greater price fluctuations. The observed increase in volatility aligns with the view that these CEOs are likely leveraging their crisis management skills to navigate uncertain environments more dynamically, as discussed by Brogaard et al. (2017).

The control variables for stock volatility exhibit trends similar to those observed in the Z-score and EDF analyses. Bank size is positively associated with stock volatility, suggesting that larger banks experience greater market fluctuations owing to their complex operations. Book leverage similarly contributes to higher volatility, consistent with the notion that leveraged institutions are more sensitive to market changes. The negative association between ROA and stock volatility reinforces the stabilising influence of profitability on market risk.

CEO characteristics, including tenure and educational background, show mixed effects on stock volatility. While tenure appears to contribute to lower market volatility, indicating that experienced CEOs might stabilise stock performance, the impact of MBA and PhD qualifications remains statistically insignificant, highlighting the limited role of formal education in mitigating market-based risk in the banking sector.

These results provide compelling evidence that banks led by distress-experienced CEOs are generally associated with higher risk-taking behaviours, characterised by lower Z-scores, higher EDF values, and increased stock volatility. These findings challenge the risk-averse narrative suggested by Yu (2023) and partially contrast with Lonare et al. (2024)'s observations in the insurance sector. Specifically, Lonare et al. (2024) found that distress-experienced CEOs in the insurance sector prioritised reducing firm risks to safeguard against future financial crises. In contrast, our results suggest that distress-experienced CEOs in banks might engage in strategic risk-taking that elevates default probabilities, aiming to exploit high-risk, high-reward opportunities. This behaviour highlights a key difference between sectors: while insurance firms may emphasise stability and risk mitigation, banks often pursue riskier positions to capitalise on potentially lucrative returns, as noted by Bharath and Shumway (2008).

Our findings are closely supported by Fahlenbrach et al. (2012), who demonstrated that banks' risk-taking behaviours tend to persist across different financial crises and could be largely driven by the leadership style of their CEOs. Their study shows that banks led by CEOs with a track record of risk-taking followed similar strategies during subsequent crises, suggesting a continuity in the risk culture shaped by their leadership. This seems in line with our findings that distress-experienced CEOs in banks may actively leverage their recent experiences to engage in calculated risk-taking.

3.4.2 Propensity Score Matching

In our study, only a relatively small proportion of banks are led by CEOs with distress experiences across different measures, as shown in Panel D of Table 3.1. For instance, 13.2% of CEOs have distress experience based on ROE, while only 6.5% do so based on Tobin's Q. This imbalance raises significant challenges in directly comparing banks with distress-experienced CEOs and those without. Specifically, banks that hire CEOs with past distress experience might inherently differ in their underlying characteristics or financial strategies, leading to potential self-selection bias in our analysis.

We employ PSM to mitigate selection bias to address these potential biases and ensure a more balanced comparison. PSM helps create a matched sample that simulates a randomised experimental design by ensuring that treated banks (those with distress-experienced CEOs) and control banks (those without distress-experienced CEOs) are comparable in terms of observable characteristics. This approach reduces the risk that our findings are driven by underlying differences in bank characteristics.

We employ nearest-neighbour matching with replacement, using a calliper of 5%, to pair each treated observation (bank with a distress-experienced CEO) with the most similar non-treated observation based on propensity scores. These scores are estimated using a logistic regression model that accounts for pre-treatment bank and CEO characteristics, including firm size, leverage, tenure, age, and educational background, ensuring that the matched firms are comparable across key variables that influence the likelihood of hiring a distress-experienced CEO.

Panel A of Table 3.7 presents the pre-match propensity score regression results, revealing that variables such as assets, book leverage, and tenure significantly influence the probability of a bank hiring a distress-experienced CEO. These results confirm that certain bank and CEO characteristics indeed play a crucial role in the decision to select CEOs with distress backgrounds, highlighting the need for a rigorous matching procedure.

[Insert Table 3.7 about here]

To validate the matching process, we conducted t-tests (unreported for brevity) on the control variables, confirming that there are no statistically significant differences between the matched pairs. This suggests that the PSM method effectively balances the observable characteristics.

Following the matching process, we re-estimate our baseline models using the matched sample. The results in Panels B-D indicate that the association between CEO distress experience and increased bank risk-taking remains statistically significant across all measures. This suggests that the effect of CEO distress experience on risk-taking is not simply a product of inherent differences in the observable bank and CEO characteristics.

3.4.3 CEO Selection and Bank Risk-Taking – DiD

Although previous PSM addresses observable differences between treated (banks with distress-experienced CEOs) and control groups (banks without distress-experienced CEOs), it does not fully eliminate endogeneity concerns. The key challenge remains the presence of unobservable factors that could simultaneously influence CEO selection and the bank's risk-taking behaviour. For example, unobservable managerial traits or hidden aspects of bank culture might still bias the results.

To address these concerns, we implemented a Difference-in-Differences (DiD) approach. The DiD method compares the changes in risk-taking behaviours before and after the appointment of distress-experienced CEOs relative to a control group of banks led by non-distress-experienced CEOs. This approach helps control for time-invariant unobservable factors that confound the results.

A critical assumption of the DiD method is the parallel trends assumption, which posits that, in the absence of treatment, the treated and control groups would have followed similar paths over time. To validate this, we examined pre-turnover trends in Z-score, EDF, and stock volatility, finding that both groups exhibited comparable trajectories before the CEO turnover event.

We use a composite index of distress experience for brevity, assigning a value of one if any of the previous six distress experience measures are present.[8] However, the results are similar across all six measures of distress experience. This composite measure allows us to provide a broader representation of CEO distress experience. Our results across individual measures of distress experience are consistent.

Table 3.8 presents the results of our DiD analysis, showing changes in bank risk around CEO turnover events for both treated and control groups. We focus on the risk measures Z-score, EDF, and stock volatility across three panels representing one-year (Panel A), two-year (Panel B), and three-year (Panel C) time horizons around the CEO turnover.

[Insert Table 3.8 about here]

The Z-score was significantly lower at 1% for the treatment group before the turnover (difference of 0.598) than the control group, indicating a higher inherent risk among banks led by distress-experienced CEOs. After the turnover, both groups experienced a slight increase in their Z-scores, yet the difference remained significant at 1% (0.609). The difference suggests that distress-experienced CEOs are associated with consistently lower bank stability before and after their appointment. However, the DiD difference of 0.011 is not statistically significant, suggesting that while distress-experienced CEOs maintain lower bank stability, they do not significantly alter the trajectory of bank stability in the immediate post-turnover period. In other words, despite the lower Z-scores associated with these CEOs, their appointment does not substantially affect the bank's stability in the short term.

For the EDF, banks with distress-experienced CEOs exhibited a higher default probability both before and after the turnover. Before the turnover, the treated group exhibited significantly higher EDF values than the control group, with a difference of -0.076 (significant at 1%). This pattern continues after the turnover, with a difference of -0.078, suggesting persistently higher insolvency risk in banks led by distress-experienced CEOs. However, the DiD difference (-0.002) is not statistically significant, implying that the ap-

[8] A bank run by a CEO who experienced any of the six distress measures that we use in this study cannot be part of the control groups.

pointment of distress-experienced CEOs does not meaningfully affect the bank's default risk in the short term. Although distress-experienced CEOs are associated with higher insolvency risk, their leadership does not significantly change the bank's risk of default immediately following their appointment.

The stock volatility analysis revealed a significantly higher level for the treatment group before the turnover. However, the DiD difference (0.041) is not statistically significant. This suggests that while distress-experienced CEOs are linked to greater market-based risk, their appointment does not significantly change the bank's stock volatility in the short term. Although the gap in volatility between the treated and control groups narrowed slightly, the treatment group's volatility remained consistently higher. This persistent difference suggests that the market continues to perceive higher risk in banks led by distress-experienced CEOs, reflecting entrenched risk culture as noted by Fahlenbrach et al. (2012).

The two-year and three-year horizons (Panels B and C) present a more extended view of the effects of distress-experienced CEOs on bank risk. Over the two-year period, the gap in Z-scores between the treated and control groups narrows to 0.337 (significant at 10%), but the DiD difference becomes negative and insignificant (-0.104). This suggests some convergence in bank stability between the two groups over time, indicating that distress-experienced CEOs may not have a long-lasting impact on stability. Similarly, the EDF difference narrows to -0.044 after two years and becomes insignificant, indicating a potential convergence in insolvency risk between the two groups. However, stock volatility remains significantly higher for banks led by distress-experienced CEOs, with a difference of -0.068 (significant at 1%). However, the DiD difference remains insignificant (0.026), suggesting that market-based risk persists. By the three-year mark, the differences in Z-score and EDF are statistically insignificant, suggesting further convergence in bank stability and insolvency risk over the long term. Stock volatility, however, continues to show a significant difference between the two groups (-0.042, significant at 10%), with no significant DiD effect, indicating that market perceptions of higher risk in banks led by distress-experienced CEOs persist even after three years.

These findings could imply that the appointment of distress-experienced CEOs does not significantly alter the risk trajectory of the banks they lead, at least in the short term. These CEOs appear to maintain, rather than drastically change, the pre-existing risk profiles of their banks.

Over longer horizons, the differences in Z-scores and EDF between the two groups tend to diminish, indicating a degree of convergence in bank stability and insolvency risk. However, the persistent difference in stock volatility suggests that market perceptions of higher risk in banks led by distress-experienced CEOs continue over time. These findings suggest that distress-experienced CEOs may reinforce, rather than mitigate, the bank's pre-existing risk culture. In this sense, their appointment is more of a continuation of the bank's risk-taking behaviour rather than a significant shift in strategy. This reinforces the idea that the risk culture of the bank plays a dominant role in shaping risk-taking behaviour, and that leadership changes alone are unlikely to alter the institution's risk profile. This aligns with the arguments of Fahlenbrach et al. (2012), who observed that the risk-taking culture in banks is difficult to alter.

3.4.4 Are Banks with Higher Risk More Likely to Appoint CEOs with Distress Experience?

The DiD analysis suggested persistence in the bank's risk profile even after the turnover. This lack of significant change in risk around turnover indicates that the existing risk culture in these banks is deeply ingrained and persistent, irrespective of changes in leadership. Such persistence in risk behaviour aligns with theories of cultural entrenchment in financial institutions (Fahlenbrach et al. 2012).

If the risk culture persists despite a change in leadership, it raises the question of whether banks intentionally select CEOs whose past experiences align with their existing risk strategies. This perspective suggests a matching mechanism where banks, particularly those with higher risk profiles, might strategically choose CEOs with distress-handling capabilities to navigate their aggressive risk-taking approach. To explore this hypothesis, we examine the likelihood of appointing distress-experienced CEOs based on different measures of bank risk.

We conduct a logistic regression where the dependent variable is the appointment of a CEO with distress experience. The model specification is structured as follows:

$$P(\textit{Appoint. of CEO}_{i,t}) = L(\alpha_1 + \alpha_2 \textit{Bank risk}_{i,t-1} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t) \quad (3.3)$$

where L is the logistic distribution. *Appoint. of CEOs*$_{i,t}$ is a dummy variable that equals 1 if the firm appoints a CEO with distress experience and 0 otherwise. The independent variable of interest is $BankRisks_{i,t-1}$ measured by Z-score, EDF, and stock volatility. We control for a set of bank-specific characteristics denoted by $Z_{i,t-1}$. υ_i and μ_t capture bank fixed effects and year fixed effects, respectively. $\epsilon_{i,t}$ is the random error.

Panel A of Table 3.9 presents the regression results for the Z-score. The negative and significant coefficients across all columns confirm that banks with lower Z-scores (indicating higher financial distress) are more likely to select distress-experienced CEOs. This finding is consistent across models, indicating the strategic need for these banks to appoint leaders adept at navigating financial instability.

[Insert Table 3.9 about here]

Similarly, Panel B shows a consistently positive association between higher EDF levels and the appointment of distress-experienced CEOs. The significant positive coefficients suggest that banks with a higher probability of default are more likely to hire CEOs with a background in managing distress scenarios. This pattern reinforces the argument that banks in precarious financial positions prioritise hiring leaders with distress-handling skills, reflecting an alignment between the bank's risk profile and the CEO's ability to navigate such environments. This also aligns with the strategic leadership framework proposed by Bernile et al. (2017), who argued that leaders shaped by challenging environments develop a greater tolerance for risk, which can be crucial for navigating high-risk, high-reward opportunities in financial distress.

The positive and statistically significant coefficients in Panel C suggest that banks experiencing greater market uncertainty are significantly more likely to opt for leaders who have previously managed volatile environments.

These findings support theories of strategic alignment in corporate governance, where the selection of a CEO is influenced by a firm's intent to align leadership skills with its risk-taking strategy. The consistent results across different risk measures suggest that distress-experienced CEOs are not merely hired to mitigate risk but are chosen to manage and potentially enhance the bank's risk-taking behaviour.

This perspective aligns with the broader literature on CEO characteristics and firm behaviour. (Fahlenbrach et al. 2012) highlighted that banks with high-risk profiles tend to persist in their risk-taking strategies, often driven by a leadership style. Similarly, Bernile et al. (2017) found that CEOs shaped by early-life crises develop a greater tolerance for risk, which subsequently influences their strategic decision making. Our study extends these insights by demonstrating that distress-experienced CEOs are selected not only for their crisis management skills but also for their compatibility with the strategic goals of risk-prone banks.

Our results indicate that banks with higher inherent risk do not simply hire distress-experienced CEOs to reduce risk; rather, they strategically align their leadership to reinforce and manage their risk-taking behaviour.

3.5 Robustness

3.5.1 Placebo Test

Our earlier DiD analysis revealed little change in bank risk following the appointment of distress-experienced CEOs, suggesting that the risk profile of these banks remains stable, likely owing to entrenched risk cultures. This indicates that the relationship between CEO distress experience and bank risk is not a direct consequence of the CEOs' strategic decisions but a matching in top-management appointments. Banks with higher risk profiles are more likely to appoint distress-experienced CEOs who align with their existing risk culture, as discussed in the previous section.

Given this potential matching mechanism, it is essential to evaluate whether the observed relationship between CEO distress experience and bank risk-taking is indeed owing to this alignment of experience and risk profile or if it could be a product of external norms, random factors, or broader industry-wide conditions. Market-wide pressures, regulatory changes, or other external factors might impose similar risk-taking behaviours on banks, diluting the influence of individual CEOs' distress experience on bank outcomes. We conduct a placebo test to ensure that the observed relationship is not simply the result of chance.

The placebo test, following similar approaches used by Lonare et al. (2024) and Bernile et al. (2017), randomly assigns distress experience to CEOs, maintaining the observed distress experience probabilities from our sample (e.g., 13.2% for Distress(ROE)). Doing so creates a scenario where distress experience is not systematically linked to the bank's risk-taking behaviour. We repeated this random assignment process 100 times and ran OLS regressions for each iteration to generate a distribution of coefficients that reflects what would happen if there were no systematic relationship between CEO distress experience and bank risk.

Table 3.10 provides evidence that the observed associations in our main analysis are not a result of random variation. Specifically, the mean and median placebo coefficients are close to 0. This confirms that, under random assignment, there is no consistent relationship between distress experience and bank risk. Furthermore, the distribution of placebo coefficients shows that only a small proportion of the coefficients are statistically significant at 1%, which is aligns with what would be expected under random variation. These findings reinforce the notion that the patterns observed in our main analysis are not a result of random variation.

[Insert Table 3.10 about here]

3.5.2 CEO Fixed Effects

Our previous findings suggest that high-risk banks are more likely to appoint distress-experienced CEOs, indicating a matching in top-management appointments where they select leaders who align with their existing risk-taking culture. However, the persistence of high risk-taking levels in these banks, even after leadership changes, raises the question of whether the association between CEO distress experience and bank risk is driven by the CEO's individual decision-making or the bank's deeply ingrained risk culture. To explore this further, we implement a CEO fixed effects model to isolate the impact of CEO distress experience from unobserved CEO-specific traits that could influence both their selection and the bank's risk behaviour.

Including CEO fixed effects allows us to control for unobservable characteristics – such as inherent risk tolerance or managerial style – that might be common among distress-experienced CEOs and could otherwise confound our results. By controlling for these CEO-specific traits, we aim to disentangle whether the risk behaviour observed is owing to the CEO's distress experience or simply reflects the bank's inherent risk culture.

Table 3.11 presents the CEO fixed effects regression results across different risk measures, including the Z-score, EDF, and stock volatility. The coefficients on the Distress CEO variable remain significant mostly, even after accounting for unobserved CEO-specific traits through fixed effects.

[Insert Table 3.11 about here]

Specifically, banks with distress-experienced CEOs are consistently associated with higher financial risk, reflected by lower Z-scores, higher EDF, and greater stock volatility. The CEO fixed effects model provides strong evidence that the observed association between CEO distress experience and bank risk-taking is not driven by unobservable CEO-specific traits. Instead, it reinforces the conclusion that high-risk banks select distress-experienced CEOs to manage and sustain their risk-taking behaviour. This is consistent with theories of strategic matching, where firms align their leadership choices with their broader strategic objectives and risk culture, as highlighted by Bernile et al. (2017) and Fahlenbrach et al. (2012).

These findings further support the argument that distress-experienced CEOs are not simply risk-averse individuals seeking to mitigate risk following past distress but are instead selected because of their ability to operate within the risk-taking culture of high-risk banks. The fact that the relationship between CEO distress experience and higher risk persists even after accounting for CEO fixed effects underscores the intentional nature of this matching mechanism. This alignment between leadership and the bank's strategic risk preferences helps explain why distress-experienced CEOs continue to manage banks with elevated risk profiles, and why leadership changes do not necessarily result in shifts in the bank's risk-taking behaviour.

3.5.3 GFC and Non-GFC Periods

As an additional robustness check, we re-estimate the main models after excluding observations where CEO distress experience may have occurred during the Global Financial Crisis (2008–2009). This ensures that the observed effects are not driven by atypical macroeconomic conditions associated with the GFC. The results remain directionally consistent and statistically significant, suggesting that the CEO distress effect holds even outside of systemic crisis periods. These findings reinforce the argument that the behavioural effects of distress experience are not confined to crisis-era dynamics.

3.6 Conclusion

This study examines the relationship between bank risk-taking behaviour and the professional distress experience of bank CEOs under regular market conditions. Our findings reveal a positive association between a CEO's pre-appointment distress experience and the bank's risk-taking. Contrary to traditional views, which suggest that distress-experienced CEOs tend to adopt more conservative strategies, we find evidence that high-risk banks seek out these CEOs to align with their existing risk behaviours.

Importantly, we find that appointing distress-experienced CEOs does not significantly alter a bank's risk. This suggests that the risk-taking behaviour of banks is not primarily shaped by the active decisions of these CEOs but rather reflects a deeply embedded risk culture that persists across leadership changes. This persistence indicates that bank risk profiles are largely governed by institutional norms and strategic objectives, aligning with the 'risk inertia' concept observed in financial institutions. This finding complements the broader literature on risk persistence in financial institutions (Fahlenbrach et al. 2012), which emphasises that bank risk behaviours are deeply rooted in organisational culture.

Despite these contributions, the study has limitations. Our use of propensity score matching (PSM) and placebo tests enhances the robustness of our findings, concerns around endogeneity and unobserved variables remain. Additionally, similar to the limitations noted in Fahlenbrach et al. (2012), we lack direct measures of a bank's internal risk culture or specific business model elements, which restricts our ability to precisely attribute risk persistence to cultural factors.

Another limitation, similar to Fahlenbrach et al. (2012), is the absence of direct, quantifiable measures of a bank's risk culture or business model. While we observe a persistence in risk-taking, we are unable to fully capture the internal bank mechanisms or cultural norms that may drive this persistence. The lack of data on bank-specific risk cultures limits our ability to definitively isolate the source of risk inertia.

In conclusion, our research offers a fresh perspective on the role of CEO distress experience in bank risk-taking, challenging the conventional view of risk aversion. Instead, we highlight a strategic matching mechanism, where high-risk banks select CEOs with a history of managing financial distress to align with their established risk-taking preferences.

3.7 Tables

Table 3.1 Sample Summary Statistics

This table reports summary statistics for our sample, which includes 2,513 firm-year observations spanning from 1993 to 2016. Panels A and B display summary statistics for both bank-level variables and CEO characteristics, respectively. Panel C provides statistics for the six distress measures identified in the lowest or highest annual deciles, which serve as proxies for CEO distress experience. Panel D reports the frequency of CEO distress experience according to each measure. We present the number of observations, mean, standard deviation, minimum, maximum, and values at the 10th and 90th percentile of each variable. The variable definitions are in Appendix 3.A.1. All continuous variables are winsorised at the 1st and 99th percentile values to lessen the influence of outliers.

Variable	Obs	Mean	Std.Dev.	Min	Max	P10	P50	P90
Panel A: Bank characteristics								
Assets	2513	9.64	1.36	6.65	13.40	8.07	9.39	11.60
Book leverage	2513	11.80	4.20	3.63	43.55	7.66	11.21	16.29
Tier 1	2423	11.01	3.26	5.04	26.65	7.39	10.61	15.04
ROA(%)	2513	0.91	0.83	-4.04	2.35	0.29	1.03	1.58
Loan/Deposit	2513	0.88	0.21	0.35	1.46	0.61	0.88	1.13
ROE(%)	2513	9.97	12.76	-82.72	29.20	3.24	11.62	18.84
NPL/Loan	2459	0.02	0.02	0.00	0.65	0.00	0.01	0.04
Z-score	2478	4.91	1.68	-0.74	9.01	2.76	4.98	6.91
Tobin's Q'	2479	1.07	0.07	0.93	1.26	0.99	1.06	1.17
EDF	2337	0.10	0.21	0.00	0.99	0.00	0.00	0.37
Asset volatility	2337	0.41	0.25	0.13	1.67	0.20	0.35	0.67
Stock volatility	1705	0.26	0.16	0.08	1.03	0.12	0.21	0.44
Cumulative return	1708	0.12	0.32	-0.72	1.47	-0.24	0.09	0.53
Panel B: CEO characteristics								
Age	2507	57.03	6.82	32	79	49	57	65
Tenure	2513	10.46	7.76	1	31	3	8	22
MBA	2513	0.19	0.39	0	1	0	0	1
PhD	2513	0.02	0.15	0	1	0	0	0
Female	2513	0.02	0.14	0	1	0	0	0
Panel C: Distress measures in the lowest/highest decile								
Lowest decile of ROE	118	-0.27	0.33	-0.83	0.04	-0.83	-0.07	0.03
Lowest decile of Stock return	149	-0.31	0.23	-0.72	0	-0.72	-0.22	-0.06
Lowest decile of Tobin's Q	54	0.96	0.02	0.93	1.02	0.93	0.96	0.98
Lowest decile of Z-score	158	1.92	1.24	-0.74	3.73	-0.36	2.17	3.39
Highest decile of EDF	178	0.49	0.28	0.02	0.99	0.18	0.4	0.97
Highest decile of Stock volatility	117	0.61	0.27	0.25	1.03	0.31	0.51	1.03
Highest decile of Asset volatility	149	1.03	0.37	0.54	1.67	0.66	0.89	1.67

Panel D: Frequency of CEO distress experience

	Obs	Mean	Std.Dev.
Distress(ROE)	2513	0.132	0.338
Distress(Cumulative return)	1714	0.297	0.457
Distress(Tobin's Q)	2482	0.065	0.247
Distress(Z-score)	2480	0.156	0.363
Distress(EDF)	2350	0.184	0.388
Distress(Stock volatility)	1716	0.185	0.388
Distress(Asset volatility)	2355	0.204	0.403

Table 3.2 Pairwise Pearson and Tetrachoric Correlation Coefficients

This table reports the sample-wide correlations. Panel A reports pair-wise correlation coefficients between bank risks and performance measures. Panel B provides tetrachoric correlations between the indicators of CEOs' distress experience. Panel C reports the correlation coefficients of control variables used in this study. None of the correlations is high enough to cause estimation problems. Observations are at CEO-year level over the period 1993 – 2016. The variable definitions are in Appendix 3.A.1.

Panel A: bank risks and performance pair-wise correlation

Variable	ROE(%)	Stock return	Tobin's Q	Z-score	EDF	Stock volatility
ROE(%)	1.000					
Stock return	0.350	1.000				
Tobin's Q	0.426	0.344	1.000			
Z-score	0.478	0.259	0.464	1.000		
EDF	-0.570	-0.410	-0.401	-0.492	1.000	
Stock volatility	-0.531	-0.184	-0.216	-0.481	0.655	1.000

Penel B: CEO distress indicator tetrachoric correlation

	Distress(ROE)	Distress(Stock return)	Distress(Tobin's Q)	Distress(Z-score)	Distress(EDF)	Distress(Stock volatility)
Distress(ROE)	1.000					
Distress(Stock return)	0.420	1.000				
Distress(Tobin's Q)	0.626	0.427	1.000			
Distress(Z-score)	0.842	0.449	0.645	1.000		
Distress(EDF)	0.631	0.576	0.493	0.659	1.000	
Distress(Stock volatility)	0.614	0.337	0.427	0.523	0.437	1.000

Panel C: Correlation coefficient matrix of variables

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1)	Distress(ROE)	1.000																				
(2)	Distress(SR)	0.224	1.000																			
(3)	Distress(TQ)	0.273	0.177	1.000																		
(4)	Distress(Z-score)	0.579	0.249	0.272	1.000																	
(5)	Distress(EDF)	0.324	0.343	0.185	0.375	1.000																
(6)	Distress(StockV)	0.362	0.196	0.192	0.307	0.244	1.000															
(7)	Z-score	-0.375	-0.204	-0.254	-0.366	-0.216	-0.268	1.000														
(8)	EDF	0.281	0.209	0.229	0.248	0.385	0.268	-0.492	1.000													
(9)	Stock volatility	0.240	0.140	0.184	0.215	0.220	0.410	-0.481	0.655	1.000												
(10)	Tobin's Q	-0.225	-0.076	-0.280	-0.203	-0.179	-0.098	0.464	-0.401	-0.216	1.000											
(11)	Assets	-0.043	0.029	-0.014	-0.029	0.087	-0.093	0.007	0.004	-0.101	-0.065	1.000										
(12)	Book leverage	0.158	0.167	-0.033	0.220	0.318	0.229	-0.212	0.315	0.390	-0.041	0.078	1.000									
(13)	ROA(%)	-0.389	-0.143	-0.240	-0.246	-0.212	-0.198	0.527	-0.632	-0.551	0.508	0.030	-0.301	1.000								
(14)	Tier 1	-0.027	-0.034	0.044	-0.070	-0.117	0.063	0.019	-0.032	-0.004	-0.035	-0.247	-0.375	0.071	1.000							
(15)	ROE(%)	-0.401	-0.152	-0.262	-0.239	-0.174	-0.209	0.478	-0.570	-0.531	0.426	0.079	-0.240	0.884	-0.015	1.000						
(16)	Loan/Deposit	0.051	-0.017	0.036	0.048	0.041	0.024	-0.043	0.058	0.026	-0.100	-0.045	-0.047	-0.040	-0.358	-0.054	1.000					
(17)	Tenure	-0.065	0.044	-0.057	-0.033	-0.010	-0.059	0.108	-0.012	-0.079	0.048	0.187	-0.072	0.047	0.025	0.021	-0.026	1.000				
(18)	Age	-0.011	0.033	-0.017	-0.014	-0.010	-0.045	0.018	-0.004	-0.067	-0.081	0.053	-0.106	0.009	0.055	-0.003	0.096	0.230	1.000			
(19)	MBA	0.024	-0.028	-0.005	0.048	-0.019	-0.050	0.000	-0.040	-0.051	-0.014	0.128	-0.031	-0.022	0.003	-0.005	-0.037	0.160	-0.007	1.000		
(20)	PhD	-0.012	0.014	-0.041	-0.021	-0.061	0.032	-0.019	-0.022	-0.015	0.053	-0.005	-0.084	0.044	0.061	0.009	-0.048	-0.045	-0.029	0.016	1.000	
(21)	Female	0.041	-0.001	-0.037	0.044	0.040	0.019	-0.025	0.087	0.059	-0.059	-0.064	0.014	-0.089	0.022	-0.109	0.051	0.002	-0.038	0.001	-0.022	1.000

Table 3.3 Comparison of Bank and CEO Characteristics by Distress Experience

This table compares the bank and CEO characteristics by distress experience over 1993–2016. Panel A groups the firm-year observations using the composite measure, Distress(Composite), while Panel B shows the firm-year observations by each of the six distress measures: Distress(ROE), Distress(Stock return), Distress(Tobin's Q), Distress(Z-score), Distress(EDF), and Distress(Stock volatility). The variable definitions are in Appendix 3.A.1. All continuous variables are winsorised at the 1st and 99th percentile values to reduce the influence of outliers. *10%, **5%, ***1% significance.

Panel A: Bank and CEO characteristics by distress experience (composite)

	No. of observations		Mean of the variables			
	Non-distress	Distress	Non-distress	Distress	Diff.	Std. error
Firm characteristics						
Assets	1385	1128	9.67	9.60	0.06	0.05
Book leverage	1385	1128	11.26	12.46	-1.20***	0.18
Tier 1	1328	1095	11.06	10.94	0.12	0.14
ROA(%)	1385	1128	1.06	0.73	0.34***	0.03
Loan/Deposit	1385	1128	0.87	0.89	-0.02*	0.01
ROE(%)	1385	1128	12.08	7.36	4.72***	0.54
NPL/Loan	1341	1118	0.01	0.02	-0.01***	0.00
Z-score	1365	1113	5.28	4.46	0.82***	0.07
Tobin's Q	1366	1113	1.08	1.06	0.02***	0.00
EDF	1276	1061	0.06	0.16	-0.10***	0.01
Asset volatility	1276	1061	0.38	0.45	-0.07***	0.01
Stock volatility	871	834	0.22	0.29	-0.07***	0.01
Stock return	874	834	0.14	0.11	0.03**	0.02
CEO characteristics						
Age	1379	1128	56.95	57.13	-0.19	0.27
Tenure	1385	1128	10.16	10.83	-0.67**	0.31
MBA	1385	1128	0.18	0.20	-0.02	0.02
PhD	1385	1128	0.03	0.02	0.01*	0.01
Female	1385	1128	0.02	0.02	-0.01	0.01

Panel B: Bank and CEO characteristics by each distress experience

	Distress(ROE)			Distress(Stock return)			Distress(Tobin's Q)		
	Non-distress	Distress	Diff.	Non-distress	Distress	Diff.	Non-distress	Distress	Diff.
Firm characteristics									
Assets	9.66	9.49	0.17**	9.48	9.56	-0.08	9.64	9.56	0.08
Book leverage	11.54	13.51	-1.96***	10.75	12.23	-1.47***	11.84	11.28	0.56
Tier 1	11.04	10.78	0.27	11.65	11.41	0.24	10.95	11.52	-0.58
ROA(%)	1.04	0.09	0.95***	0.97	0.70	0.27***	0.97	0.17	0.80***
Loan/Deposit	0.87	0.91	-0.03***	0.87	0.86	0.01	0.88	0.91	-0.03*
ROE(%)	11.96	-3.18	15.14***	10.40	5.94	4.45***	10.91	-2.55	13.46***
NPL/Loan	0.01	0.03	-0.02***	0.01	0.02	-0.01***	0.01	0.03	-0.02***
Z-score	5.15	3.27	1.88***	5.17	4.40	0.76***	5.02	3.28	1.74***
Tobin's Q	1.08	1.03	0.05***	1.07	1.06	0.01***	1.08	0.99	0.08***
EDF	0.08	0.25	-0.17***	0.08	0.17	-0.10***	0.09	0.29	-0.20***
Asset volatility	0.39	0.54	-0.15***	0.40	0.47	-0.07***	0.40	0.56	-0.15***
Stock volatility	0.24	0.36	-0.12***	0.24	0.29	-0.05***	0.25	0.37	-0.12***
Stock return	0.13	0.07	0.06*	0.15	0.06	0.09***	0.13	0.02	0.11***
CEO characteristics									
Age	57.06	56.84	0.22	56.98	57.47	-0.50	57.10	56.62	0.47
Tenure	10.66	9.16	1.49***	11.32	12.08	-0.76*	10.68	8.88	1.80***
MBA	0.18	0.21	-0.03	0.21	0.19	0.02	0.19	0.18	0.01
PhD	0.02	0.02	0.01	0.03	0.03	-0.01	0.02	0.00	0.02***
Female	0.02	0.04	-0.02	0.02	0.02	0.00	0.02	0.00	0.02***

	Distress(Z-score)			Distress(EDF)			Distress(Stock volatility)		
	Non-distress	Distress	Diff.	Non-distress	Distress	Diff.	Non-distress	Distress	Diff.
Firm characteristics									
Assets	9.65	9.54	0.11	9.57	9.86	-0.30***	9.55	9.24	0.32***
Book leverage	11.42	13.92	-2.51***	11.24	14.65	-3.41***	10.76	13.13	-2.38***
Tier 1	11.07	10.45	0.62***	11.21	10.25	0.96***	11.50	12.04	-0.53**
ROA(%)	1.01	0.45	0.56***	1.00	0.55	0.45***	0.98	0.54	0.44***
Loan/Deposit	0.87	0.90	-0.03**	0.87	0.89	-0.02*	0.86	0.87	-0.01
ROE(%)	11.34	2.96	8.38***	11.06	5.32	5.74***	10.42	3.22	7.20***
NPL/Loan	0.01	0.03	-0.02***	0.01	0.03	-0.01***	0.01	0.03	-0.02***
Z-score	5.17	3.48	1.70***	5.09	4.16	0.93***	5.15	3.97	1.18***
Tobin's Q	1.08	1.04	0.04***	1.08	1.04	0.03***	1.07	1.05	0.02***
EDF	0.08	0.22	-0.14***	0.07	0.27	-0.21***	0.08	0.23	-0.15***
Asset volatility	0.40	0.49	-0.09***	0.39	0.50	-0.11***	0.38	0.58	-0.20***
Stock volatility	0.24	0.34	-0.10***	0.24	0.34	-0.10***	0.23	0.40	-0.18***
Stock return	0.13	0.08	0.05*	0.13	0.07	0.06**	0.12	0.12	-0.00
CEO characteristics									
Age	57.12	56.85	0.27	56.99	56.82	0.17	57.27	56.46	0.81*
Tenure	10.68	9.96	0.71*	10.71	10.51	0.20	11.74	10.56	1.18**
MBA	0.18	0.23	-0.05**	0.19	0.17	0.02	0.22	0.16	0.05**
PhD	0.02	0.02	0.01	0.03	0.00	0.02***	0.03	0.04	-0.01
Female	0.02	0.03	-0.02*	0.02	0.03	-0.01	0.02	0.03	-0.01

Table 3.4 CEO Distress Experience and Bank Stability – Z-score

This table presents the regression estimates for the impact of CEO distress experience on bank stability, measured by the Z-score.

$$Z - score_{i,t} = \alpha_1 + \alpha_2 Distress_{i,t} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

The dependent variable is the natural logarithm of the Z-score. The primary independent variable of interest is a dummy variable indicating whether the CEO has recent distress experience based on six distinct distress measures. Control variables include key bank characteristics (e.g., Assets, Book leverage, ROA) and CEO characteristics (e.g., Age, Tenure, MBA, PhD). All regressions include bank-specific and year-fixed effects to account for unobservable heterogeneity. All variable definitions are in Appendix 3.A.1. Robust standard errors in parentheses are clustered at the bank level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	Z-score					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	-1.565***					
	(0.154)					
Distress(Stock return)		-0.743***				
		(0.135)				
Distress(Tobin's Q)			-0.868***			
			(0.198)			
Distress(Z-score)				-1.154***		
				(0.152)		
Distress(EDF)					-0.553***	
					(0.161)	
Distress(Stock volatility)						-0.512**
						(0.213)
Assets	-0.214	-0.021	-0.166	-0.229	-0.256	-0.124
	(0.142)	(0.201)	(0.158)	(0.150)	(0.173)	(0.218)
Book leverage	0.007	-0.007	-0.005	-0.000	0.002	-0.008
	(0.018)	(0.023)	(0.022)	(0.021)	(0.024)	(0.025)
Tier 1	-0.005	-0.020	-0.011	-0.011	-0.015	-0.011
	(0.021)	(0.023)	(0.022)	(0.022)	(0.025)	(0.026)
Loan/Deposit	0.369	0.033	0.303	0.126	0.324	0.000
	(0.359)	(0.439)	(0.368)	(0.396)	(0.431)	(0.459)
Tenure	0.026**	0.025	0.029**	0.028**	0.026*	0.021
	(0.011)	(0.015)	(0.013)	(0.011)	(0.014)	(0.018)
Age	-0.005	-0.007	-0.008	-0.002	-0.001	-0.008
	(0.008)	(0.011)	(0.009)	(0.008)	(0.009)	(0.012)
MBA	-0.072	0.044	0.093	0.018	0.070	0.075
	(0.167)	(0.176)	(0.185)	(0.175)	(0.175)	(0.190)
PhD	-0.017	-0.203*	-0.319*	-0.128	-0.430**	-0.281
	(0.169)	(0.121)	(0.173)	(0.192)	(0.194)	(0.195)
Female	0.478	0.835**	0.619	0.350	0.776	0.842*
	(0.372)	(0.406)	(0.463)	(0.509)	(0.482)	(0.457)
Constant	6.942***	6.750***	5.377***	6.933***	6.387***	7.648***
	(1.679)	(2.393)	(1.776)	(1.748)	(1.898)	(2.657)
Observations	2,137	1,539	2,137	2,137	2,036	1,537
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.458	0.450	0.413	0.435	0.404	0.427

Table 3.5 CEO Distress Experience and Bank Insolvency Risk – EDF

This table reports the regression results for the effect of CEO distress experience on Expected Default Frequency (EDF), a measure of the likelihood of bank insolvency.

$$EDF_{i,t} = \alpha_1 + \alpha_2 Distress_{i,t} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

The independent variable, CEO distress experience, is constructed similarly to Table 3.4 using six distress indicators. Control variables include standard bank-specific metrics and CEO attributes. All specifications control for both time-fixed effects and bank-specific effects to mitigate biases from unobserved heterogeneity. All variable definitions are in Appendix 3.A.1. Robust standard errors in parentheses are clustered at the bank level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	EDF					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	0.071***					
	(0.023)					
Distress(Stock return)		0.083***				
		(0.014)				
Distress(Tobin's Q)			0.102***			
			(0.031)			
Distress(Z-score)				0.037*		
				(0.019)		
Distress(EDF)					0.124***	
					(0.017)	
Distress(Stock volatility)						0.044*
						(0.023)
Assets	0.061***	0.073***	0.056***	0.061***	0.064***	0.086***
	(0.016)	(0.017)	(0.014)	(0.016)	(0.016)	(0.019)
Book leverage	0.003	0.003	0.004	0.003	0.003	0.003
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
ROA(%)	-0.046***	-0.048***	-0.052***	-0.053***	-0.047***	-0.057***
	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)
Tier 1	-0.005**	-0.007**	-0.005*	-0.005*	-0.004	-0.007**
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Loan/Deposit	0.133***	0.138***	0.139**	0.142***	0.133***	0.149***
	(0.050)	(0.049)	(0.054)	(0.048)	(0.042)	(0.051)
Tenure	-0.001	-0.002*	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.002**	0.002*	0.003**	0.002**	0.002**	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MBA	-0.010	0.005	-0.019	-0.014	-0.011	0.001
	(0.019)	(0.016)	(0.018)	(0.018)	(0.017)	(0.018)
PhD	-0.006	-0.008	0.009	0.002	0.027	0.003
	(0.035)	(0.021)	(0.034)	(0.035)	(0.031)	(0.031)
Female	0.038	0.041	0.045	0.046	0.037	0.045
	(0.040)	(0.052)	(0.046)	(0.049)	(0.041)	(0.056)
Constant	-0.658***	-1.067***	-0.567***	-0.623***	-0.694***	-1.164***
	(0.206)	(0.219)	(0.182)	(0.203)	(0.201)	(0.247)
Observations	2,024	1,498	2,024	2,024	2,024	1,496
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.557	0.595	0.559	0.553	0.578	0.579

Table 3.6 CEO Distress Experience and Market Risk – Stock Volatility

This table presents regression estimates for the influence of CEO distress experience on stock return volatility, a market-based measure of bank risk.

$$\textit{Stock volatility}_{i,t} = \alpha_1 + \alpha_2 Distress_{i,t} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t + \epsilon_{i,t}$$

The dependent variable is the standard deviation of stock returns, capturing the bank's exposure to market fluctuations. The CEO distress experience is assessed using the same six indicators as in the previous tables. Control variables include standard bank-specific metrics and CEO attributes. All specifications control for both time-fixed effects and bank-specific effects to mitigate biases from unobserved heterogeneity. All variable definitions are in Appendix 3.A.1. Robust standard errors in parentheses are clustered at the bank level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

	Stock volatility					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	0.049***					
	(0.015)					
Distress(Stock return)		0.038***				
		(0.010)				
Distress(Tobin's Q)			0.067***			
			(0.020)			
Distress(Z-score)				0.034**		
				(0.013)		
Distress(EDF)					0.048***	
					(0.013)	
Distress(Stock volatility)						0.089***
						(0.013)
Assets	0.019	0.007	0.012	0.015	0.016	0.010
	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)	(0.015)
Book leverage	0.009***	0.009***	0.009***	0.009***	0.008***	0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
ROA(%)	-0.044***	-0.045***	-0.048***	-0.049***	-0.050***	-0.045***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Tier 1	-0.001	-0.001	-0.001	-0.001	-0.000	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Loan/Deposit	0.028	0.031	0.032	0.038	0.050	0.018
	(0.039)	(0.040)	(0.041)	(0.040)	(0.039)	(0.041)
Tenure	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MBA	0.017	0.015	0.013	0.014	0.014	0.014
	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
PhD	-0.019	-0.015	-0.009	-0.015	0.000	-0.016
	(0.034)	(0.031)	(0.034)	(0.034)	(0.034)	(0.034)
Female	0.010	0.005	0.008	0.016	0.003	0.015
	(0.036)	(0.036)	(0.032)	(0.039)	(0.040)	(0.035)
Constant	-0.052	0.047	0.001	-0.020	-0.038	0.043
	(0.156)	(0.144)	(0.142)	(0.149)	(0.154)	(0.156)
Observations	1,530	1,530	1,530	1,530	1,498	1,530
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.676	0.678	0.677	0.674	0.684	0.693

Table 3.7 Propensity Score Matching

This table presents the results of propensity score matching and the subsequent regression analysis. Using propensity scores estimated with a set of bank and CEO characteristics, we match each distress CEO to a similar non-distress CEO. Panel A presents the pre-match propensity score regression results, where the dependent variable is the likelihood of a bank hiring a distress-experienced CEO. Nearest-neighbor matching with replacement was used with a caliper width of 5% to pair each treated bank with a control bank that has a similar propensity score. Panel B – D present the regressions for the matched sample. All variable definitions are in Appendix 3.A.1. Robust standard errors in parentheses are clustered at the bank level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Panel A: Pre-match propensity score regression

	Distress CEO					
VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Assets	0.374	1.116**	1.033	-0.425	-0.396	0.620
	(0.839)	(0.522)	(1.221)	(0.690)	(0.532)	(0.763)
Book leverage	0.073*	0.028	-0.058	0.025	0.127**	0.033
	(0.041)	(0.035)	(0.068)	(0.038)	(0.051)	(0.042)
Tier 1	0.070	0.006	0.062	0.027	-0.017	0.257**
	(0.103)	(0.060)	(0.107)	(0.076)	(0.089)	(0.110)
Loan/Deposit	-0.680	1.305	-1.662	-2.437*	0.047	3.265*
	(1.617)	(1.137)	(3.286)	(1.335)	(1.485)	(1.713)
Tenure	0.011	0.027	-0.008	-0.030	-0.009	-0.031
	(0.062)	(0.036)	(0.086)	(0.052)	(0.039)	(0.062)
Age	-0.008	0.026	-0.168**	0.044	0.048	0.002
	(0.039)	(0.034)	(0.084)	(0.051)	(0.044)	(0.053)
MBA	-0.285	-0.307	2.580**	-0.299	-0.723	0.272
	(0.877)	(0.530)	(1.174)	(0.716)	(0.572)	(0.721)
PhD	4.339***	0.944		1.385	-2.222**	1.251
	(1.421)	(0.924)		(1.774)	(0.881)	(0.891)
Female	-0.884	-0.692		-2.388**	-0.228	-1.617*
	(1.328)	(0.554)		(1.085)	(0.919)	(0.911)
Constant	-7.646	-7.477**	-1.556	0.249	-4.878	-10.321
	(6.311)	(3.642)	(8.552)	(5.708)	(3.921)	(6.990)
Observations	775	1,083	359	765	863	622
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.310	0.205	0.353	0.252	0.244	0.279

Panel B: Z-score

	Z-score					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	-1.154***					
	(0.205)					
Distress(Stock return)		-0.733***				
		(0.154)				
Distress(Tobin's Q)			-0.555*			
			(0.322)			
Distress(Z-score)				-1.453***		
				(0.252)		
Distress(EDF)					-0.655***	
					(0.218)	
Distress(Stock volatility)						-0.374
						(0.314)
Observations	216	645	147	263	284	320
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.447	0.497	0.445	0.520	0.464	0.486

Panel C: EDF

	EDF					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	0.064**					
	(0.026)					
Distress(Stock return)		0.102***				
		(0.019)				
Distress(Tobin's Q)			0.108***			
			(0.037)			
Distress(Z-score)				0.041		
				(0.028)		
Distress(EDF)					0.120***	
					(0.030)	
Distress(Stock volatility)						0.039
						(0.038)
Observations	216	645	147	263	284	320
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.613	0.650	0.685	0.599	0.582	0.652

Panel D: Stock volatility

	Stock volatility					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Distress(ROE)	0.045**					
	(0.020)					
Distress(Stock return)		0.040***				
		(0.014)				
Distress(Tobin's Q)			0.067*			
			(0.033)			
Distress(Z-score)				0.047***		
				(0.014)		
Distress(EDF)					0.051**	
					(0.022)	
Distress(Stock volatility)						0.084***
						(0.018)
Observations	216	645	147	263	284	320
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.692	0.703	0.813	0.762	0.671	0.684

Table 3.8 Difference-in-Differences (DiD) Analysis of the Impact of CEO Distress Experience on Bank Risk Around CEO Turnover

The table presents the Difference-in-Differences analysis of the effect of CEO distress experience on bank risk around CEO turnover. Panel A reports the results for one year, Panel B for two years, and Panel C for three years around the turnover. The treatment group consists of banks run by CEOs with distress experience, defined using a composite index that equals one if any of the previous six distress measures are met. The control group comprises banks led by CEOs without any distress experience. The risk measures analysed include Z-score, Expected Default Frequency (EDF), and stock volatility. All variable definitions are in Appendix 3.A.1. Statistical significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

Panel A: Bank risk 1-year around CEO turnover

Δ Z-score	Non-distress (1)	Distress (2)	Difference (1) - (2) (3)	Std. error (4)
Before turnover $t-1$	5.021	4.422	0.598***	0.191
After turnover $t+1$	5.043	4.433	0.609***	0.192
Difference	0.022	0.01	0.011	0.204
Δ EDF				
Before turnover $t-1$	0.079	0.155	-0.076***	0.025
After turnover $t+1$	0.08	0.158	-0.078***	0.025
Difference	0.001	0.003	-0.002	0.036
Δ Stock volatility				
Before turnover $t-1$	0.228	0.329	-0.100***	0.027
After turnover $t+1$	0.245	0.304	-0.059***	0.022
Difference	0.016	-0.025	0.041	0.033

Panel B: Bank risk 2-year around CEO turnover

Δ Z-score	Non-distress (1)	Distress (2)	Difference (1) - (2) (3)	Std. error (4)
Before turnover $t-2$	4.867	4.426	0.441**	0.203
After turnover $t+2$	4.894	4.557	0.337*	0.183
Difference	0.027	0.131	-0.104	0.254
Δ EDF				
Before turnover $t-2$	0.123	0.268	-0.144**	0.055
After turnover $t+2$	0.125	0.170	-0.044	0.038
Difference	0.001	-0.098	0.099	0.071
Δ Stock volatility				
Before turnover $t-2$	0.221	0.316	-0.095***	0.025
After turnover $t+2$	0.256	0.325	-0.068***	0.027
Difference	0.035	0.009	0.026	0.040

Panel C: Bank risk 3-year around CEO turnover

Δ Z-score	Non-distress (1)	Distress (2)	Difference (1) - (2) (3)	Std. error (4)
Before turnover $t-3$	4.898	4.683	0.215	0.212
After turnover $t+3$	5.063	4.699	0.364*	0.198
Difference	0.164	0.015	0.148	0.273
Δ EDF				
Before turnover $t-3$	0.115	0.155	-0.039	0.028
After turnover $t+3$	0.102	0.121	-0.019	0.025
Difference	-0.013	-0.034	0.02	0.041
Δ Stock volatility				
Before turnover $t-3$	0.232	0.289	-0.056**	0.025
After turnover $t+3$	0.237	0.280	-0.042*	0.023
Difference	0.005	-0.009	0.014	0.037

Table 3.9 Logit Regression of Bank Risk and the Appointment of CEOs with Distress Experience

This table presents the logit regression examining the likelihood of appointing a CEO with distress experience, based on the bank's risk. measures of bank risk. Panel A focuses on the Z-score as the primary risk measure, Panel B analyzes Expected Default Frequency (EDF), and Panel C investigates stock volatility as the risk indicator. The dependent variable is the appointment of a distress-experienced CEO.

$$P(\textit{Appoint. of CEO}_{i,t}) = L(\alpha_1 + \alpha_2 \textit{Bank risk}_{i,t-1} + \beta' Z_{i,t-1} + \gamma' O_{i,t-1} + \upsilon_i + \mu_t)$$

The regressions control for several bank and CEO characteristics, including assets, book leverage, ROA, Tier 1 capital ratio, loan-to-deposit ratios, CEO tenure, age, educational background (MBA, PhD), and gender. Year-fixed effects and bank-fixed effects are included in all models to account for time and bank-specific unobserved factors. The variable definitions are in Appendix 3.A.1. Robust standard errors are clustered at the bank level. Statistical significance is indicated by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

Panel A: Bank risk (Z-score)

	Appointment of CEO with distress experience					
VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Bank risk (Z-score)	-0.692***	-0.334***	-0.440***	-0.492***	-0.258***	-0.274***
	(0.105)	(0.064)	(0.157)	(0.083)	(0.068)	(0.079)
Assets	0.452	1.204***	1.418	-0.552	-0.496*	0.604
	(0.470)	(0.253)	(0.900)	(0.372)	(0.294)	(0.427)
Book leverage	0.017	0.016	-0.094	0.006	0.080**	0.026
	(0.032)	(0.025)	(0.061)	(0.029)	(0.037)	(0.031)
Tier 1	0.102	0.004	0.008	0.018	-0.041	0.248***
	(0.069)	(0.045)	(0.082)	(0.061)	(0.066)	(0.073)
Loan/Deposit	-0.447	2.396***	-3.115**	-2.129**	0.142	3.492***
	(1.014)	(0.782)	(1.534)	(0.880)	(0.755)	(1.087)
Tenure	0.032	0.022	0.018	-0.016	0.016	-0.034
	(0.038)	(0.018)	(0.044)	(0.030)	(0.020)	(0.032)
Age	-0.016	0.032	-0.262***	0.048	0.025	-0.017
	(0.028)	(0.020)	(0.063)	(0.031)	(0.023)	(0.031)
MBA	-0.912	-0.218	3.347***	-0.262	-0.566	-0.072
	(0.625)	(0.335)	(1.125)	(0.431)	(0.363)	(0.437)
PhD	2.945**	0.834		1.372	-1.816**	1.350
	(1.389)	(0.730)		(1.592)	(0.846)	(1.261)
Female	-1.440	-0.201		-2.178**	0.741	-0.946
	(1.233)	(0.673)		(0.877)	(0.682)	(1.259)
Constant	-4.209	-11.251***	6.796	0.230	-1.310	-8.159**
	(4.148)	(2.968)	(7.339)	(3.105)	(2.548)	(3.990)
Observations	735	1,168	402	750	904	656
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.398	0.252	0.442	0.308	0.266	0.261

Panel B: Bank risk (EDF)

	Appointment of CEO with distress experience					
VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Bank risk (EDF)	1.503**	3.134***	0.066	0.968	5.963***	1.459**
	(0.755)	(0.695)	(0.976)	(0.683)	(0.861)	(0.732)
Assets	0.924*	1.270***	2.280**	-0.509	-0.421	0.890**
	(0.531)	(0.262)	(1.039)	(0.380)	(0.317)	(0.415)
Book leverage	-0.005	-0.030	-0.067	0.051	0.051	0.013
	(0.039)	(0.036)	(0.071)	(0.034)	(0.042)	(0.036)
ROA(%)	-1.192***	-0.749***	-0.304	-0.326*	-0.058	-0.316*
	(0.265)	(0.225)	(0.234)	(0.167)	(0.162)	(0.162)
Tier 1	0.228***	0.072	0.054	0.084	0.009	0.320***
	(0.071)	(0.049)	(0.104)	(0.070)	(0.080)	(0.081)
Loan/Deposit	-0.609	2.915***	-3.382**	-2.388***	-0.529	4.065***
	(1.093)	(0.811)	(1.547)	(0.887)	(0.784)	(1.184)
Tenure	-0.013	0.040**	0.047	-0.019	0.013	-0.025
	(0.043)	(0.019)	(0.036)	(0.031)	(0.022)	(0.033)
Age	-0.007	0.013	-0.266***	0.046	0.038	-0.042
	(0.032)	(0.020)	(0.052)	(0.034)	(0.023)	(0.031)
MBA	-0.737	-0.329	3.543***	-0.466	-0.792*	-0.497
	(0.493)	(0.353)	(0.902)	(0.481)	(0.415)	(0.465)
PhD	5.444***	1.651**		1.808	-1.405*	2.070*
	(1.288)	(0.679)		(1.516)	(0.814)	(1.123)
Female	-1.824	0.246		-2.300**	1.296	-0.547
	(1.535)	(0.898)		(0.909)	(0.823)	(1.248)
Constant	-8.211*	-12.185***	-3.408	-3.804	-3.531	-10.818***
	(4.592)	(2.460)	(8.078)	(3.477)	(2.656)	(3.909)
Observations	689	1,134	345	713	882	637
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.407	0.296	0.434	0.273	0.332	0.277

Panel C: Bank risk (Stock volatility)

	Appointment of CEO with distress experience					
VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Bank risk (Stock volatility)	4.127**	4.790***	-0.323	4.790***	4.203***	5.967***
	(1.743)	(1.032)	(1.698)	(1.383)	(1.301)	(1.097)
Assets	-1.198	1.057***	1.221	-1.088**	-0.604	0.803*
	(0.782)	(0.284)	(0.909)	(0.517)	(0.406)	(0.467)
Book leverage	-0.023	-0.077**	0.044	0.054	0.037	-0.043
	(0.049)	(0.032)	(0.075)	(0.043)	(0.050)	(0.043)
ROA(%)	-1.109***	-0.930***	-0.361	-0.000	-0.676***	-0.183
	(0.277)	(0.220)	(0.296)	(0.175)	(0.185)	(0.163)
Tier 1	0.112	0.055	0.136	0.045	0.032	0.240***
	(0.077)	(0.051)	(0.102)	(0.068)	(0.084)	(0.088)
Loan/Deposit	5.676***	2.634***	4.465	0.521	-0.219	3.993***
	(1.827)	(0.831)	(2.777)	(1.283)	(1.057)	(1.259)
Tenure	0.046	0.047**	0.335***	0.061	0.020	-0.036
	(0.075)	(0.022)	(0.122)	(0.042)	(0.029)	(0.042)
Age	0.045	0.026	-0.274***	-0.066*	0.052*	-0.012
	(0.052)	(0.022)	(0.093)	(0.039)	(0.031)	(0.036)
MBA	-0.872	-0.200	3.033***	0.399	-0.729*	-0.437
	(0.689)	(0.353)	(1.163)	(0.556)	(0.418)	(0.499)
PhD	2.738	1.335*		3.938**	-1.626	1.287
	(1.883)	(0.690)		(1.984)	(1.022)	(1.210)
Female	-1.611	0.254		-2.954***	1.408	-0.617
	(1.322)	(0.802)		(0.824)	(0.946)	(1.283)
Constant	1.710	-13.115***	-9.374	10.482**	-0.632	-14.920***
	(8.552)	(3.088)	(11.251)	(5.287)	(4.634)	(5.461)
Observations	448	1,056	178	504	612	588
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Pseudo R-squared	0.445	0.269	0.343	0.325	0.310	0.303

Table 3.10 Placebo Test of CEO Distress Experience and Bank Risk

This table presents the results of a placebo test examining the relationship between CEO distress experience and bank risk (Z-score, EDF, and stock volatility). The placebo test involves 100 random assignments of CEO distress experience based on the mean frequency observed in our sample. For each random sample, we re-estimate the model and report the mean, median, and standard deviation (SD) of the coefficients across the random regressions. The table also reports the percentage of coefficients that are statistically significant at the 1%, 5%, and 10% levels, respectively. All variable definitions are in Appendix 3.A.1.

	DISTRESS coefficient				% of coef. that are statistically significant at		
Dependent var	DISTRESS	Mean	Median	SD	1% level	5% level	10% level
Z-score	Distress(ROE)	-0.0012	0.0000	0.0816	3	6	14
	Distress(Stock return)	-0.0042	0.0000	0.0681	2	7	11
	Distress(Tobin's Q)	-0.0005	0.0000	0.0092	1	6	14
	Distress(Z-score)	-0.0045	0.0000	0.0085	2	6	17
	Distress(EDF)	-0.0035	0.0000	0.0759	2	6	12
	Distress(Stock volatility)	-0.0019	0.0000	0.0739	0	6	16
EDF	Distress(ROE)	0.0009	0.0000	0.0099	2	6	13
	Distress(Stock return)	0.0013	0.0000	0.0087	3	5	16
	Distress(Tobin's Q)	0.0001	0.0000	0.0134	3	8	17
	Distress(Z-score)	-0.0001	0.0000	0.0093	4	5	12
	Distress(EDF)	-0.0008	0.0000	0.0088	4	9	15
	Distress(Stock volatility)	-0.0007	0.0000	0.0101	3	8	18
Stock volatility	Distress(ROE)	0.0001	0.0000	0.0067	1	2	12
	Distress(Stock return)	-0.0006	0.0000	0.0053	3	8	16
	Distress(Tobin's Q)	0.0013	0.0000	0.0114	2	6	16
	Distress(Z-score)	0.0002	0.0000	0.0077	4	9	13
	Distress(EDF)	0.0001	0.0000	0.0065	1	6	15
	Distress(Stock volatility)	0.0004	0.0000	0.0078	3	9	15

Table 3.11 CEO Distress Experience and Bank Risk – CEO Fixed Effect

This table presents the results of fixed effects estimates for the impact of CEO distress experience on bank risk. The dependent variable is the Bank risk variables: natural logarithm of the Z-score, EDF and Stock volatility. The primary independent variable of interest is a dummy variable indicating whether the CEO has recent distress experience based on six distinct distress measures. Control variables include key bank characteristics (e.g., Assets, Book leverage, ROA) and CEO characteristics (e.g., Age, Tenure, MBA, PhD). All specifications control for time-fixed effects, bank-specific effects and CEO-fixed effects to mitigate biases from unobserved heterogeneity. All variable definitions are in Appendix 3.A.1. Robust standard errors in parentheses are clustered at the bank level. All continuous variables are winsorised at the 1st and 99th percentile values. *10%, **5%, ***1% significance.

Panel A: Dependent variable - Z-score

VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Distress CEO	-1.392***	-0.535***	-0.665***	-1.039***	-0.311*	-0.437**
	(0.205)	(0.147)	(0.223)	(0.195)	(0.179)	(0.202)
Observations	2,137	1,539	2,137	2,137	2,036	1,537
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
CEO FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.475	0.474	0.448	0.463	0.436	0.465

Panel B: Dependent variable - EDF

VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Distress CEO	0.064**	0.102***	0.108***	0.041	0.120***	0.039
	(0.026)	(0.019)	(0.037)	(0.028)	(0.030)	(0.038)
Observations	2,024	1,498	2,024	2,024	2,024	1,496
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
CEO FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.561	0.585	0.559	0.552	0.573	0.574

Panel C: Dependent variable - Stock volatility

VARIABLES	D(ROE) (1)	D(SR) (2)	D(TQ) (3)	D(Z-score) (4)	D(EDF) (5)	D(StockV) (6)
Distress CEO	0.045**	0.040***	0.067*	0.047***	0.051**	0.084***
	(0.020)	(0.014)	(0.033)	(0.014)	(0.022)	(0.018)
Observations	1,530	1,530	1,530	1,530	1,498	1,530
Bank Controls	YES	YES	YES	YES	YES	YES
CEO Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
CEO FE	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.680	0.679	0.678	0.676	0.683	0.696

3.A Appendix

3.A.1 Variable Definitions

Variable	Definition	Data source
Assets	Natural logarithm of total assets [ln(at)]	Compustat Bank (CB)
Book leverage	Total assets [at] / book value of equity [ceq]	CB
Tier 1	Tier 1 capital ratio: bank core equity capital to its total risk-weighted assets (capr1)	CB
ROA(%)	Net income [ni] / total asset [at]	CB
Loan/Deposit	Loans [lntal] / deposits [dptc]	CB
ROE(%)	Net income [ni] / total equity [ceq]	CB
NPL/Loan	Non performing loan [npat]/ total loan [lntal]	CB
Z-score	Log(ROA+(Equity/Asset)/Standard Deviation of ROA), standard deviation of ROA is calculated using 2/3/5 years rolling windows.	Center for Research in Security Prices (CRSP) & CB
Tobin's Q	(Total assets - book value of equity + market value of equity) /total assets	CB
Stock return	Total annual return on the bank's stock	CRSP
Stock volatility	Standard deviation of excess monthly returns, calculated relative to the value-weighted market index.	CRSP
Asset volatility	Volatility of asset measured in percentage per annum.	CRSP & CB
EDF	Default Frequency as the percentile ranking of a bank's default risk based on its distance to default (constructed from (Bharath and Shumway 2008), see Appendix 3.A.2).	Compustat
Tenure	Number of years that the CEO has worked in the bank.	ExecuComp (EC)
Age	Age of CEO	EC & BoardEx (BE)
MBA	An indication equal to 1 if the CEO has an MBA degree.	BE
PhD	An indication equal to 1 if the CEO has a PhD degree.	EC & BE
Female	An indicator equal to one if the CEO is a woman.	EC & BE
Distress(ROE)	An indicator equal to 1 if the CEO worked at a bank that belonged to the lowest decile of Compustat banks based on ROE in a given year.	CB & Proxies
Distress(Annual stock return)	An indicator equal to 1 if the CEO worked at a bank that belonged to the lowest decile of Compustat banks based on cumulative annual stock return.	CB & Proxies
Distress(Tobin's Q)	An indicator equal to 1 if the CEO worked at a bank that belonged to the lowest decile of Compustat banks based on Tobin's Q in a given year.	CB & Proxies
Distress(Z-score)	An indicator equal to 1 if the CEO worked at a bank that belonged to the lowest decile of Compustat banks based on Z-score in a given year.	CRSP & CB & Proxies
Distress(EDF)	An indicator equal to 1 if the CEO worked at a bank that belonged to the highest decile of Compustat banks based on EDF in a given year.	Compustat & Proxies
Distress(Stock Volatility)	An indicator equal to 1 if the CEO worked at a bank that belonged to the highest decile of Compustat banks based on stock volatility in a given year.	CRSP & Proxies

3.A.2 Measure of *EDF*

We follow Bharath and Shumway (2008) and measure expected default frequency as follows:

$$DD_{it} = \frac{ln(\frac{Equity_{it}+Deb_{it}}{Debt_{it}}) + (r_{it-1} - 0.5\sigma^2_{Vit}) \times T_{it}}{\sigma_{Vit} \times \sqrt{T_{it}}} \tag{3.4}$$

$$\sigma_{Vit} = \frac{Equity_{it}}{Equity_{it} + Debt_{it}} \times \sigma_{Eit} + \frac{Debt_{it}}{Equity_{it} + Debt_{it}} \times \sigma_{Dit} \tag{3.5}$$

$$\sigma_{Dit} = 0.05 + 0.25 \times \sigma_{Eit} \tag{3.6}$$

and

$$EDF_{it} = N(-(\frac{ln(\frac{Equity_{it}+Deb_{it}}{Debt_{it}}) + (r_{it-1} - 0.5\sigma^2_{Vit}) \times T_{it}}{\sigma_{Vit} \times \sqrt{T_{it}}})) = N(-DD_{it}) \tag{3.7}$$

where $Equity_{it}$ is the market value of equity in millions of dollars and is taken from CRSP, estimated as the share price times the number of shares outstanding; $Debt_{it}$ is the face value of debt in millions of dollars computed from Compustat as the sum of debt in current liabilities (Compustat quarterly data [dlcq]) and 0.5 of long-term debt (Compustat quarterly data [dlttq]). r_{it-1} is the prior year's annual return of the bank, estimated as monthly stock returns over the prior year; σ_{Vit} is the asset volatility measured in percentage per annum and is calculated from $Equity_{it}$, as shown in Equation 3.5. T_{it} is assumed as a 1 forecasting horizon. σ_{Eit} is the stock return volatility for bank i during year t estimated using the monthly stock return from the prior year. $N(-DD_{it})$ is the cumulative standard normal distribution function, implying a probability of defualt.

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