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## Co-opted Boards and the Obfuscation of Financial Reports

This study investigates the relationship between board co-option and the obfuscation of financial disclosures in a comprehensive sample of 9,620 10-K filings by 1,076 US-listed firms between 1996 and 2018. Our empirical results are consistent with our hypotheses that board co-option partly explains the obfuscation of financial reports. *Ex-post* tests reveal that the co-option effect is most pronounced in firms led by less able managers and is attenuated in the presence of a female CEO. Our findings are consistent with a stakeholder-agency perspective as they suggest that board capture weakens the ability of directors to discharge their fiduciary duties, particularly the provision of readable financial statements to stakeholders. Our results are robust to the use of alternative co-option measures, obfuscation metrics, model specifications, and potential endogeneity concerns. Overall, we contribute to the growing literature on financial statement readability by underscoring the critical role of effective monitoring in shaping the quality of firms' communication with stakeholders. Our results have important implications for governance regulation and policy.

**Key words:** Board co-option; Board monitoring; Corporate governance; Female CEOs; Financial statement readability; Managerial ability; Obfuscation.

Co-option denotes board capture by the chief executive officer (CEO) and the consequent lack of effective monitoring (Coles *et al.*, 2014). This arises because directors appointed following the incumbent CEO's assumption of office will likely assign their loyalty to the CEO, thus increasing management's behavioural latitude and discretion in decision-making (Coles *et al.*, 2014; Lim *et al.*, 2020). Empirical measures of co-option, therefore, capture 'the fraction of the board

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appointed after the CEO assumed office' (Coles *et al.*, 2014, p. 1751). Earlier studies exploring the economic consequences of co-option find that co-opted boards are associated with lower dividend payouts and turnover–performance sensitivity (Coles *et al.*, 2014; Jiraporn and Lee, 2018) but higher insider trading profitability and risk-taking (Lee *et al.*, 2021; Rahman *et al.*, 2021). Firms with co-opted boards are also prone to stock price crashes (Kao *et al.*, 2020), associated with higher corporate misconduct (Zaman *et al.*, 2021), and face more debt covenant restrictions from lenders (Lim *et al.*, 2020). However, the effect of board co-option on the obfuscation or readability of financial statements is still unexplored—an issue we address in this study.

Financial reports (such as 10-K reports) are critical for communicating value-relevant and other information of interest to various stakeholders. These reports have a large textual component—over 80%, on average (Hasan, 2020; Li *et al.*, 2008). Therefore, it is vital that they are written in a clear or readable manner, free from obfuscation.<sup>1</sup> The evidence suggests that the readability of financial statements affects firm value, asset pricing, stock price crash risk, investors' trading decisions, cost of debt, investment efficiency and the quality of analyst forecasts, amongst other important firm outcomes (Biddle *et al.*, 2009; De Franco *et al.*, 2015; Hwang and Kim, 2017; Kim *et al.*, 2019; Miller, 2010). Nonetheless, prior research finds that managers produce obfuscated or difficult-to-read reports to hide unfavourable information and protect themselves from scrutiny (Bacha and Ajina, 2020; Nadeem, 2022; Rahman and Kabir, 2023; Xu *et al.*, 2022). Closely related to our study, Rahman and Kabir (2023), for example, explore whether board independence impacts the readability of financial statements. Their evidence suggests that managers may produce obfuscated reports to avoid costly board monitoring by independent directors (Rahman and Kabir, 2023).<sup>2</sup> This finding by Rahman and Kabir (2023) is particularly concerning as it highlights the possibility that independent directors—a vital element of the Sarbanes-Oxley 2002 governance reform—might be ineffective as managers obfuscate disclosures to avoid board monitoring. We complement Rahman and Kabir (2023) by turning our attention to the timing of board appointments—the sequence in which directors are appointed—to understand why some managers produce obfuscated reports despite the presence of independent directors.

Drawing on stakeholder-agency theory, we hypothesize that board co-option causes financial reporting obfuscation. This is because co-opted boards do not effectively fulfil their fiduciary duty of protecting the interest of all stakeholders—including ensuring the preparation of readable financial statements—due to their

<sup>1</sup> Standard measures of readability or obfuscation (including Bog, Fog, and Flesch-Kincaid indices) are constructed so that lower values indicate higher readability or lower obfuscation while higher values indicate lower readability or higher obfuscation (Bonsall *et al.*, 2017b). Consequently, the terms 'readability' and 'obfuscation' are used as antonyms in this study.

<sup>2</sup> On the other related studies, Bacha and Ajina (2020) find that readability improves with corporate social responsibility performance; Xu *et al.* (2022) provide evidence that firms located in more corrupt regions produce less readable reports; Nadeem (2022) contends that female directors on the board improve the readability of financial reports.

loyalty and allegiance to the CEO, irrespective of whether they are appointed as independent or executive directors. Effective (high) board monitoring results in collective decision-making, whereby final decisions are an outcome of negotiations and compromises between different board members. Co-opted board members may scrutinize less and compromise more due to their loyalty to the CEO. The CEO, being poorly monitored, may thus oversee more obfuscated reports to reduce scrutiny from other stakeholders. The literature also suggests that CEOs vary in terms of their abilities (Bertrand and Mullainathan, 2003; Murphy and Zabojnik, 2004; Silva, 2010), whereby high-ability managers, relative to their low-ability counterparts, are more likely to thrive under a poor monitoring environment (Adams and Ferreira, 2007; Balsmeier *et al.*, 2017; Faleye *et al.*, 2011). Therefore, we conjecture that high-ability managers may be able to leverage low board control to make effective decisions. Consequently, the relationship between co-option and financial statement obfuscation should be attenuated by CEO ability.

We further consider an important factor that may weaken the hypothesized relationship between the level of board co-option and financial statement obfuscation—the gender of the CEO. Female directors, in general, have been shown to be more ethical, less prone to agency problems, less overconfident, more risk-averse, less likely to manage earnings, more conservative, and less likely to engage in securities fraud (Adhikari *et al.*, 2019; Cumming *et al.*, 2015; McGuinness *et al.*, 2017). Therefore, we expect the hypothesized effect of co-opted boards on financial statement obfuscation to be weaker in firms led by female CEOs.

Our empirical tests utilize a panel dataset of 1,076 US-listed firms with available data between 1996 to 2018.<sup>3</sup> Following Coles *et al.* (2014), we primarily measure board co-option as the percentage of board members hired after the CEO's tenure began. We deploy alternative measures of financial statement (10-K reports) obfuscation, including the Bog index (Bonsall *et al.*, 2017b), Fog index (Li *et al.*, 2008), and Flesch-Kincaid index. Our Bog index measure is collected from Brian Miller's repository, while our Fog and Flesch-Kincaid indices are generated (by us) in Python from parsed 10-K filings. Larger values of the indices (Bog, Fog, and Flesch-Kincaid) indicate less readable or more obfuscated 10-K reports.

Consistent with our hypothesis, we find a positive relationship between board co-option and the various measures of financial statement obfuscation, suggesting that poor board monitoring arising from co-option partly explains managers' obfuscation of financial reports. In economic terms, after controlling for other determinants of readability, a standard deviation increase in co-option leads to an 18.38 percentage points (or 0.023 standard deviations) increase in the obfuscation (or decrease in the readability) of 10-K reports. The positive association between co-option and financial reporting obfuscation mainly persists in sub-samples of low-ability managers and in firms led by male CEOs. This is consistent with our view that stakeholder-agency issues drive the effect we document. Our results are

<sup>3</sup> We select this sample period because of the availability of data for co-option and obfuscation measures.

robust to controlling for several firm- and industry-level attributes that impact financial reporting choices, alternative measures of co-option, alternative measures of obfuscation, and alternative model specifications. Our results are also robust after controlling for potential endogeneity using panel regressions and a two-stage least squares approach. Our two-stage least squares results provide some evidence of causation—poor monitoring *causes* the obfuscation of financial reports. Overall, these results underscore the importance of managerial ability by suggesting that high-ability managers can potentially thrive under poor board monitoring. The results also suggest that female CEOs may require less monitoring than their male counterparts to achieve the same outcomes.

We make three notable contributions to the board co-option literature. Firstly, to our knowledge, this is the first empirical study exploring the impact of board co-option on the quality of corporate communication—the readability of financial reports. Here, we particularly extend prior studies exploring the financial impact of co-opted boards (Jiraporn and Lee, 2018; Kao *et al.*, 2020; Lee *et al.*, 2021; Zaman *et al.*, 2021) by highlighting an important non-financial outcome—the readability of financial reports. Our work complements Rahman and Kabir (2023) by presenting new evidence that the lack of board oversight resulting from the timing of board appointments impacts the nature of corporate communication. Secondly, our findings add to studies examining the consequences of financial reporting readability (Biddle *et al.*, 2009; Bloomfield, 2002; Bozanic and Thevenot, 2015; Core, 2001; De Franco *et al.*, 2015; Miller, 2010) by explaining why some firms may produce obfuscated reports in the first place. Specifically, while the aforementioned studies use readability as an explanatory variable, we deploy co-option as a factor that explains readability. Our work complements the budding literature, providing evidence that managers produce obfuscated reports to mitigate the risk of exposing tax avoidance and earnings management activities (Lo *et al.*, 2017; Nguyen, 2021). Finally, we contribute to the literature exploring the role of CEO gender (Belot and Serve, 2018; Smith *et al.*, 2006) and CEO ability (Bertrand and Mullainathan, 2003; Murphy and Zabojnik, 2004; Silva, 2010) in shaping firm outcomes. Here, we provide new evidence on how managerial traits, including gender and managerial ability, can alleviate some of the governance issues, notably the lack of adequate oversight, prevalent in today's corporations.

## BACKGROUND AND HYPOTHESES DEVELOPMENT

### *Theoretical Framework: Stakeholder-Agency theory*

Conventional agency theory contends that the separation between owners and managers in public corporations and the associated conflicts of interest between both parties create agency problems (Jensen and Meckling, 1976). Specifically, without effective monitoring, opportunistic managers may deploy their firms' resources for their own benefit, thus expropriating wealth from shareholders (Jensen and Meckling, 1976). The governance literature posits that the board of

directors, particularly its independent directors, plays a crucial monitoring role. When effective, independent directors can mitigate corporate misconduct (Jain and Zaman, 2020) and curb the opportunistic behaviour of managers (Hambrick *et al.*, 2015; Jiang *et al.*, 2016). Notwithstanding, several studies show that the presence of independent directors in the boardroom does not always prevent corporate wrongdoing (Cumming *et al.*, 2015; Dah *et al.*, 2014) because directors' capacity to monitor managers may be impaired under certain conditions, thus reducing their ability to mitigate agency conflicts (Boivie *et al.*, 2016; Cavaco *et al.*, 2017; Neville *et al.*, 2019).

Similarly, conventional stakeholder theory suggests that managers have responsibilities towards and, indeed, implied contracts with different stakeholder groups (Freeman, 1984; Hill and Jones, 1992). Financial statements are the main channel through which managers communicate their firms' activities with all stakeholders, and hence, these statements are a critical tool for monitoring, assessing, and enforcing those implicit contracts.

Given our paper explores how the structure of the board influences the readability of financial statements, we draw on a stakeholder-agency theoretical framework (Hill and Jones, 1992) that recognizes the agency issues in our setting, as well as managers' responsibility to furnish *all* stakeholders with informative, readable, and accessible financial statements. The stakeholder-agency theoretical framework views a firm as a nexus of contracts and relationships between a firm and different groups of stakeholders, including shareholders, debtholders (creditors, lenders), employees, customers, suppliers, and the broader society (Hill and Jones, 1992). These stakeholders have diverse interests and expectations from the firm, and they delegate managers to act in their stead. However, managers may not always act in their best interest due to agency problems, such as conflicts of interest, information asymmetry, and moral hazards.

The theory suggests that the behaviour of managers can be influenced by the power dynamics among stakeholders, the system of governance in place (such as the board of directors), the incentives to encourage specific actions and the monitoring structures designed to align the stakeholders' interests with those of their agents (Hill and Jones, 1992). The stakeholder-agency theoretical framework may thus allow us to understand how the interactions and conflicts among stakeholders and agents shape corporate decision-making, governance practices, and, ultimately, organizational outcomes. In the context of financial statement readability, for example, board capture by management may allow management (primarily, the CEO) to further their own interest rather than the broader interests of stakeholders. Managers may thus provide obfuscated reports to stakeholders to further reduce external scrutiny.

### *The Readability of Financial Disclosures*

From a stakeholder-agency perspective, periodic reports are the main channel through which the agent provides an account of the operations of the business to the principal and other stakeholders (Freeman, 1984; Hill and Jones, 1992). The

nature of financial reporting is shaped by financial reporting standards and other regulations and, hence, varies across different institutional settings. The US Securities Exchange Act of 1934 mandated the disclosure of Form 10-K reports by all publicly traded companies, in addition to annual reports (Nadeem, 2022). Relative to annual reports to shareholders, Form 10-K reports are more comprehensive and may contain, amongst other information, information on the firm's company history, structure, compensation of its executives, equity position, information on subsidiaries, and audited financial statements. Form 10-K reports, therefore, carry a significant amount of text (narrative disclosures), and hence, the firm's style of writing these reports (specifically, their readability) is critical for effectively conveying this vital information to market participants and other stakeholders (Bloomfield, 2002; Courtis, 2004; Loughran and McDonald, 2014). Consequently, the US Securities and Exchange Commission (SEC), in 1998, adopted the 'plain English rule', which required firms to use plain English guidelines in preparing their disclosures in order to improve their readability. Nonetheless, prior research suggests that the readability of the disclosures in Form 10-K reports has continued to deteriorate over the last three decades, thus negatively impacting decision-making by key stakeholders that rely on this information (Loughran and McDonald, 2014; Nadeem, 2022).

Indeed, one strand of the readability literature highlights the adverse effects of complex and obfuscated textual disclosures. For example, Abernathy *et al.* (2019) find that obfuscated disclosures are associated with greater audit risk, more substantive audit report lag, and, consequently, higher audit fees. Lehavy *et al.* (2011) show that firms with obfuscated disclosures have greater dispersion in analysts' forecasts and experience higher post-filing return volatility. Furthermore, Kim *et al.* (2019) link less understandable disclosures to a higher likelihood of stock price crashes and Bonsall *et al.* (2017a) associate complex disclosures with a greater cost of debt and higher credit risk. These studies suggest that firms may deliberately obfuscate financial statements to conceal vital information. However, this concealment exacerbates the information asymmetry between these companies and their primary stakeholders, thereby resulting in several adverse consequences.

Another strand of the readability literature explores the drivers of financial statement obfuscation. Our study more closely aligns with this strand of the extant research. Specifically, prior studies explore how firms' characteristics, including economic attributes, executive compensation, operating models, governance features, managerial characteristics, T and workforce diversity, amongst others, affect annual report readability (E-Vahdati *et al.*, 2023; Li *et al.*, 2008; Wruck and Wu, 2021; Xu *et al.*, 2018). Li *et al.* (2008), for instance, provide evidence that companies with lower earnings or poorer performance tend to produce reports that are more challenging to comprehend. In relation, research suggests that companies suspected of managing their earnings create more obfuscated or difficult-to-read reports (Lo *et al.*, 2017). These findings, therefore, suggest that firms may seek to conceal poor performance from their stakeholders by producing less readable or obfuscated reports. Other studies attribute complex reporting to managerial characteristics. For example, Hasan (2020) finds that firms with

low-ability managers produce more obfuscated 10-K reports while Wruck and Wu (2021) document that CEOs with greater Vega (sensitivity of CEO's pay to stock price) deliver less informative disclosures. In the same vein, the research suggests that female CEOs (E-Vahdati *et al.*, 2023) as well as older CEOs (Xu *et al.*, 2018) produce more readable financial reports.

Yet, other studies look to the board (the monitoring unit of the firm) for answers as to why some firms produce obfuscated reports. Previous studies generally concur that female directors exhibit a relatively higher level of risk aversion compared to their male counterparts (Nadeem, 2022). However, they also contribute a diverse array of perspectives, expertise, experiences, skills, and values to the board (Nadeem, 2022; Tunyi *et al.*, 2023). Consequently, they improve their firms' information environment and hence, board oversight and the monitoring of managers (Srinidhi *et al.*, 2011; Wahid, 2019). Consistent with this expectation, Nadeem (2022) finds that firms with more female directors on their boards issue more readable financial disclosures (10-K reports). Besides this recent work, there is a paucity of research examining how board dynamics impact the readability of companies' financial disclosures. Our study explores how the monitoring environment (specifically, the relationship between the CEO and other members of the board—board co-option) impacts the readability of financial disclosures.

#### *Hypothesis: Board Co-option and the Obfuscation of 10-K Disclosures*

The stakeholder-agency theoretical perspective suggests that management divulges information to decrease the information asymmetry between firms and stakeholders (Hill and Jones, 1992; Mitchell *et al.*, 2016), fulfil their fiduciary duty (Zaman *et al.*, 2021), and, importantly, signal their firm's competitiveness (Healy and Palepu, 2001). Companies pay attention to stakeholders depending on their urgency, legitimacy, and power (Mitchell *et al.*, 1997), and firms issuing readable financial statements view their stakeholders as important players in their sustainability, productivity, and value-creation journey (Tan *et al.*, 2022). However, firms may be inclined to produce less readable statements if they do not value their stakeholders.

Governance studies highlight the importance of an effective board in mitigating several agency issues (Chhaochharia and Laeven, 2009; Klapper and Love, 2004; Zaman *et al.*, 2021). This literature emphasizes the critical monitoring role of several governance elements, including different board committees (Beasley *et al.*, 2000) and independent directors (Cotter *et al.*, 1997), and the importance of the characteristics of these governance elements (e.g., gender (Kirsch, 2018; Tunyi *et al.*, 2023), managerial ability (Demerjian *et al.*, 2013) and CEO tenure (Ali and Zhang, 2015), amongst others). However, recent studies have explored how CEOs' affiliations with firm directors might weaken the monitoring environment, resulting in negative consequences (Coles *et al.*, 2014; Jiraporn and Lee, 2018; Lim *et al.*, 2020). Poor monitoring under co-opted boards arises from the board's allegiance to the CEO, diminishing its capacity or inclination to hold the CEO accountable (e.g., through termination) for any excesses, non-compliance, or



malffeasance (Coles *et al.*, 2014). Therefore, co-opted boards can boost executives' belief in their invincibility due to their lack of scrutiny (Tang *et al.*, 2015). Consistent with this argument, prior research links board co-option to higher earnings management, more stringent debt covenants, higher agency conflicts, and lower CEO forced turnover (Cassell *et al.*, 2018; Coles *et al.*, 2014; Jain and Zaman, 2020; Lim *et al.*, 2020).

Building on the stakeholder-agency theoretical perspective, we argue that a firm's propensity to issue more complex (obfuscated) financial statements at the cost of stakeholder interests is higher if the board is co-opted. This arises due to low board influence/scrutiny and management's (or the CEO's) desire to promote self-interests, obscure their firm's activities, and avoid further external scrutiny. Therefore, we develop our hypothesis as follows:

H1: Board co-option has a positive impact on financial reporting obfuscation, *ceteris paribus*.

## DATA AND METHODOLOGY

### *Data*

Our hypothesis is tested using US firms that are listed on the NYSE, NASDAQ, and AMEX. Our data comes from various sources. Firms' accounting information is obtained from Compustat. Governance data is collected from BoardEx. Data on board co-option measures pertaining to Coles *et al.* (2014) is collected from Lalitha Naveen's repository.<sup>4</sup> The Bog index (Bonsall *et al.*, 2017b), our measure of the level of obfuscation in 10-K reports, comes from Brian Miller's repository.<sup>5</sup> The Fog and Flesch-Kincaid indices are our alternative obfuscation measures (used in robustness checks). We use Python (3.11.0) to directly estimate the Fog and Flesch-Kincaid indices for 10-K filings submitted by firms to the US SEC through the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system. We collect already parsed 10-K filings used in Loughran and McDonald (2014) from Bill McDonald's repository. The parsing process is standard and fully discussed in Loughran and McDonald (2014).<sup>6</sup> The three indices (Bog, Fog, and Flesch-Kincaid) are measured such that larger values indicate lower readability or higher obfuscation. Per our hypothesis (H1), we expect a positive relationship between these indices and our measure of co-option. Managerial ability scores from (Demerjian *et al.*, 2012) are collected from Peter Demerjian's data repository.<sup>7</sup>

<sup>4</sup> Co-option data: <https://sites.temple.edu/lnaveen/data/>.

<sup>5</sup> Bog data: <https://sites.google.com/iu.edu/professorbrianpmiller/bog-data>.

<sup>6</sup> Parsed 10-K files: <https://sraf.nd.edu/sec-edgar-data>.

<sup>7</sup> Managerial ability data: <https://peterdemerjian.weebly.com/managerialability.html>.

The data from different sources is merged using unique identifiers (including gvkeys, cusips, and tickers) and years. Consistent with prior studies, we exclude financials (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) as these firms have unique financial reporting requirements. Our sample is further constrained by the available co-option data (coverage from 1995 to 2018). Our final sample comprises 9,620 firm-year observations for 1,076 US-listed firms covering the period from 1995 to 2018.

### *The Empirical Model*

We use equation 1 to explore whether board co-option leads to the obfuscation of firms' financial disclosures (in 10-K reports) as hypothesized in H1:

$$Obfuscation_{it} = \beta_0 + \beta_1 Co-option_{it-1} + \sum \beta_k controls_{it-1} + v_j + v_t + \varepsilon_{it} \quad (1)$$

where  $Obfuscation_{it}$  is our dependent variable that measures the level of obfuscation (or ease of readability) of the disclosures in the 10-K report submitted by firm  $i$  in year  $t$  through the US SEC's EDGAR database. The predictor variable, board co-option ( $Co-option_{it} - 1$ ), is a proxy for the level of board capture and, hence, poor monitoring. We discuss our variables in detail below. The model controls for firm characteristics and other governance features that might shape the obfuscation of their financial reports (Bonsall *et al.*, 2017a; Cazier and Pfeiffer, 2016; Hasan, 2020; Lim *et al.*, 2018; Loughran and McDonald, 2014; Rahman and Kabir, 2023). We also control for industry ( $v_j$ ) and year ( $v_t$ ) fixed effects to account for industry and time-invariant factors that may influence the obfuscation of 10-K reports.

### *Dependent Variable: Obfuscation*

Given the critique around textual analysis (Bonsall *et al.*, 2017b; Loughran and McDonald, 2014), we deploy several measures of obfuscation to enhance the robustness of our conclusions. Our main measure of obfuscation is the Bog index (Bonsall *et al.*, 2017b) that embodies plain English writing principles endorsed by linguistic experts and promoted by the SEC (Bonsall *et al.*, 2017b). The measure is widely used in prior studies (see, for example, Hasan, 2020; Nadeem, 2022; Rahman and Kabir, 2023) and is generated by the StyleWriter software based on the following model;

$$Bog\ Index_{it} = Sentence\ Bog_{it} + Word\ Bog_{it} - Pep_{it} \quad (2)$$

where a higher Bog index signifies a less readable, more convoluted or more obfuscated 10-K document. *Sentence Bog* captures obfuscation resulting from long sentences, *Word Bog* accounts for word difficulty and plain English style problems, while *Pep* discounts various writing attributes that enhance a reader's

understanding of a piece of text (Bonsall *et al.*, 2017b). The Bog index data for US firms is made publicly available by Bonsall *et al.* (2017b). Hence, consistent with other studies (see, for example, Hasan, 2020; Rahman and Kabir, 2023), we use the already derived measure in our analysis.

For robustness, we confirm our results using two other obfuscation measures; the Gunning Fog and the Flesch–Kincaid readability indices (Biddle *et al.*, 2009; Li *et al.*, 2008; Loughran and Mcdonald, 2014). Both indices capture the difficulty of reading a text as a function of the average length of the words and sentences in the text. We estimate the Fog<sup>8</sup> and Flesch–Kincaid<sup>9</sup> indices for our sample of parsed 10-K filings using freely available libraries in Python 3.11.0.

#### *Independent Variable: Co-option*

Following Coles *et al.* (2014), board co-option is defined as the fraction of directors on the board who were appointed subsequent to the CEO assuming office. The underlying argument is that directors appointed after the CEO are likely to be poor monitors as they may be the CEO’s ‘candidate’ or may credit the CEO with their appointment. We deploy two proxies. The first proxy, *Co – option*, is the ratio of co-opted directors to board size.

$$Co-option_{it} = \frac{\text{Number of co-opted directors}_{it}}{\text{Board size}_{it}} \quad (3)$$

The second proxy, tenure-weighted co-option, is the total tenure of co-opted directors as a proportion of the total tenure of all directors on the board. This measure considers variations in directors’ tenure within co-opted boards, acknowledging that longer-serving directors may exert greater influence.<sup>10</sup>

$$Co-option\_TW_{it} = \frac{\sum_{n=1}^{\text{Board size}} \text{Tenure}_{it} \times \text{Co-opted Dummy}_{it}}{\sum_{n=1}^{\text{Board size}} \text{Tenure}_{it}} \quad (4)$$

#### *Control Variables*

Following the literature on readability (Cazier and Pfeiffer, 2016; Li *et al.*, 2008; Lim *et al.*, 2018; Lo *et al.*, 2017), we use two sets of controls, firm and board characteristics that can impact the readability of financial reports produced by

<sup>8</sup>  $Gunning\ Fog\ Index = 0.4 \left( \frac{\text{Words}}{\text{Sentences}} + 100 \frac{\text{Complex Words}}{\text{Words}} \right)$ .

<sup>9</sup>  $Flesch - Kincaid\ index = 0.39 \left( \frac{\text{Words}}{\text{Sentences}} \right) + 11.8 \left( \frac{\text{Syllables}}{\text{Words}} \right) - 15.59$ .

<sup>10</sup> in additional tests, we also explore how co-option amongst different director-types (independent and executive) influence our results. Consistent with Coles *et al.* (2014), we define co-opted independent directors and co-opted executive directors (Co-opted NEDs and Co-opted EDs) as the fraction of the board made up of co-opted independent (and executive) directors, respectively.

firms. Prior research suggests that firms may produce obfuscated reports to obscure performance, particularly when oversight (potentially from creditors and auditors) or market discipline is weak (Bacha and Ajina, 2020; Nadeem, 2022; Rahman and Kabir, 2023; Xu *et al.*, 2022). However, larger and more complex firms can be expected to produce relatively more complex reports due to the nature of their business. We, therefore, control for profitability (Loss dummy), Tobin's q (a measure of value), sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, audit quality (Big 4 auditor), financial distress (Z Score), financial constraints (Kaplan and Zingales, 1997a), capital expenditures, net working capital, and discretionary accruals (Dechow *et al.*, 1995), as these capture different dimensions of performance, market discipline, operational complexity, and the monitoring environment (Danbolt *et al.*, 2016; Tunyi *et al.*, 2024a, 2019). Additionally, we control for board characteristics that reflect the monitoring environment, including board size, board independence, and CEO-Chairman duality. In additional tests later in our study, we control for other factors, including firm age, earnings volatility, non-missing items in financial reports, Delaware incorporation, Special items in financial statements, business segments, and geographic segments, that may influence the readability of financial statements (Hasan, 2020; Rahman and Kabir, 2023).<sup>11</sup> We present the full definitions of all variables in our study in Appendix A.

## EMPIRICAL RESULTS

### *Descriptive Statistics*

Table 1 presents summary statistics for all variables in the study.<sup>12</sup> Our main variables of interest are measures of obfuscation (Bog, Fog, and Flesch-Kincaid indices). The mean (median) values for the Bog, Fog, and Flesch-Kincaid indices for the firms in our sample are 82.998 (83.000), 19.659 (19.624), and 17.229 (17.129), respectively. The mean Bog and Fog index values reported here are slightly less than the 95.0 and 22.5 mean values reported by Bonsall *et al.* (2017b) but comparable to those reported in other studies (Hasan, 2020; Lehavy *et al.*, 2011; Lim *et al.*, 2018). A Fog index greater than 18 indicates that the text is 'unreadable' (Li *et al.*, 2008) while StyleWriter considers a Bog index of below 20 as indicative of 'excellent writing' and an index greater than 70 as indicative of poor writing or worse (Bonsall and Miller, 2017; Hasan, 2020). Overall, consistent with prior studies (Bonsall *et al.*, 2017b; Li *et al.*, 2008), the 10-K filings in our sample are generally less readable than other business-related publications such as

<sup>11</sup> We thank an anonymous reviewer for suggesting these additional controls. Our results are robust to the inclusion of different sets of control variables and the exclusion of all control variables.

<sup>12</sup> Our continuous variables have been winsorized at the 1st and 99th percentile to address outliers.

TABLE 1

SUMMARY STATISTICS

	N	Mean	SD	P25	Median	P75	Min	Max
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Panel A: Measures of obfuscation &amp; board co-option</b>								
Bog index	9,620	82.987	7.730	78.000	83.000	88.000	50.000	163.000
Fog index	8,102	19.659	1.515	18.709	19.624	20.511	14.055	30.688
Flesch Kincaid index	8,102	17.229	1.468	16.290	17.129	17.954	11.740	28.405
Co-option	9,620	0.463	0.317	0.200	0.429	0.714	0.000	1.000
Co-option TW	9,620	0.301	0.325	0.040	0.169	0.468	0.000	1.000
<b>Panel B: Firm- and board-level controls</b>								
Loss dummy	9,620	0.103	0.304	0.000	0.000	0.000	0.000	1.000
Tobin's Q	9,620	2.038	1.218	1.264	1.683	2.372	0.446	16.003
Sales growth	9,620	0.073	0.153	-0.003	0.065	0.143	-0.491	0.984
Leverage	9,620	0.175	0.143	0.038	0.166	0.273	0.000	0.729
Firm size	9,620	21.263	1.436	20.189	21.121	22.160	17.813	26.307
Free cash flow	9,620	0.062	0.077	0.020	0.062	0.102	-0.427	0.779
Tangible assets	9,620	0.298	0.213	0.136	0.242	0.413	0.001	0.970
Concentration	9,620	0.088	0.060	0.055	0.072	0.102	0.027	0.858
Big 4 auditor	9,620	0.886	0.318	1.000	1.000	1.000	0.000	1.000
Z score	9,620	5.161	4.901	2.764	3.988	5.832	-1.386	98.141
Financial constraints	9,620	0.259	1.208	-0.108	0.384	0.875	-25.348	4.140
Discretionary accruals	9,620	-0.012	0.063	-0.040	-0.008	0.021	-0.584	0.482
Capital expenditure	9,620	0.057	0.051	0.024	0.042	0.072	0.000	0.528
Net working capital	9,620	0.223	0.179	0.092	0.208	0.340	-0.546	0.879
Board size	8,648	9.257	2.289	8.000	9.000	11.000	3.000	26.000
Board independence	8,648	0.726	0.156	0.625	0.750	0.857	0.000	1.000
CEO-Chair duality	8,648	0.648	0.478	0.000	1.000	1.000	0.000	1.000
<b>Panel C: Moderating variables</b>								
Managerial ability	8,927	0.002	0.128	-0.076	-0.030	0.043	-0.303	0.663
Female CEO	9,620	0.034	0.181	0.000	0.000	0.000	0.000	1.000
<b>Panel D: Additional controls</b>								
Firm age	9,620	3.285	0.362	3.091	3.401	3.584	1.792	3.892
Earnings volatility	7,469	0.030	0.027	0.013	0.022	0.038	0.001	0.402
Non-missing items	9,620	5.893	0.108	5.796	5.924	5.981	5.598	6.118
Delaware incorporation	9,620	0.605	0.489	0.000	1.000	1.000	0.000	1.000
Special items	9,440	-0.012	0.043	-0.011	-0.002	0.000	-1.080	0.382
Business segments	9,441	1.774	0.818	1.386	1.946	2.485	0.000	3.555
Geographic segments	9,441	1.921	0.819	1.386	1.946	2.565	0.000	4.431

This table presents summary statistics for variables in the study. All variables are fully defined in Appendix A. The dataset covers 1,076 US firms listed between 1995 and 2018.

the *Wall Street Journal* (Siano and Wysocki, 2018), with relatively longer words (with more syllables), longer sentences, and more complex words. The significant variability in our measures of obfuscation is worth noting. For example, the

minimum value of the Bog index in our sample is 50.000, and the maximum is 163.000, with a standard deviation of 7.730.

On average, 46.3% of directors in the sampled firms are co-opted. This is similar to the 47.0% reported by Coles *et al.* (2014) for a slightly earlier period (1996–2010). When adjusted for tenure, the mean tenure-weighted co-opted directors is 30.1%. Overall, the statistics point to considerable co-option amongst directors of US public firms. It is, therefore, interesting to explore whether the cross-sectional variation in the readability or obfuscation of 10-K reports we have documented in Table 1 is partly explained by differences in co-option across firms.

In Table 1, we also present summary statistics for the control variables used in our regressions. The average value of the loss dummy (0.103), Tobin's q (2.038), sales growth (0.073), leverage (0.175), firm size (21.263), free cash flow (0.062), tangible assets (0.298), concentration (0.088), Big 4 auditor (0.886), Z score (5.161), financial constraints (0.259), discretionary accruals (−0.012), capital expenditures (0.057), net working capital (0.223), board size (9.257), board independence (0.726), and CEO-chair duality (0.648) are consistent with expectations, as per prior research using US data over a comparable period (E-Vahdati *et al.*, 2023; Kim *et al.*, 2019; Lee *et al.*, 2021; Rahman and Kabir, 2023; Tunyi, 2021; Tunyi *et al.*, 2023).

### *Co-option and Obfuscation*

Our baseline analysis explores the relationship between board co-option and the obfuscation of 10-K reports using a multiple regression framework. Prior to running our analysis, we explore pairwise-correlations (in Appendix B) and variance inflation factors (untabulated) to allay concerns around multicollinearity. Following this, we estimate our baseline regression (equation 1) with the Bog index (as our main measure of obfuscation), including our two measures of co-option sequentially. Our results are presented in Table 2.

Columns (1) and (2) of Table 2 explore the relationship between co-option and obfuscation of financial disclosures in the absence of any control variables. In columns (3) and (4), we include several firm controls, industry, and year-fixed effects. In columns (5) and (6), we further include three governance controls (i.e., board independence, board size, and CEO-Chair duality).<sup>13</sup> Consistent with our hypothesis (H1) of a positive relationship between co-option and the obfuscation of financial reports, we find a strong and consistently positive relationship between our measures of obfuscation and board co-option. This relationship is robust to the inclusion of different sets of controls and different measures of board co-option, as well as industry and year-fixed effects. Economically, a standard deviation increase in co-option (the percentage of co-opted directors and tenure-weighted co-opted directors) decreases readability

<sup>13</sup> Some of our governance data is missing, so the inclusion of governance controls leads to a reduction in our usable sample from 9,620 to 8,648 observations.

TABLE 2

BOARD CO-OPTION AND THE OBFUSCATION OF FINANCIAL REPORTS

Variables	Dependent variable: Bog Index					
	(1)	(2)	(3)	(4)	(5)	(6)
Co-option	1.118*** (0.253)		0.475** (0.191)		0.580*** (0.211)	
Co-option TW		1.548*** (0.247)		0.586*** (0.186)		0.656*** (0.206)
Loss dummy			1.265*** (0.253)	1.263*** (0.253)	1.110*** (0.270)	1.105*** (0.270)
Tobin's Q			-0.355*** (0.083)	-0.357*** (0.083)	-0.349*** (0.092)	-0.351*** (0.092)
Sales growth			0.467 (0.458)	0.456 (0.458)	0.274 (0.492)	0.274 (0.492)
Leverage			0.181 (0.600)	0.174 (0.599)	-0.292 (0.657)	-0.304 (0.657)
Firm size			0.270*** (0.050)	0.274*** (0.050)	0.406*** (0.062)	0.406*** (0.062)
Free cash flow			-2.791* (1.517)	-2.801* (1.516)	-2.947* (1.588)	-2.949* (1.588)
Tangible assets			-1.619*** (0.594)	-1.606*** (0.594)	-1.167* (0.624)	-1.155* (0.623)
Concentration			1.297 (2.143)	1.355 (2.142)	2.548 (2.177)	2.590 (2.175)
Big 4 auditor			0.179 (0.218)	0.182 (0.218)	0.174 (0.230)	0.172 (0.229)
Z score			-0.019 (0.017)	-0.020 (0.017)	-0.010 (0.023)	-0.011 (0.023)
Financial constraints			0.223*** (0.077)	0.220*** (0.077)	0.215** (0.083)	0.213** (0.083)
Discretionary accruals			-1.343 (1.476)	-1.348 (1.475)	-1.630 (1.549)	-1.641 (1.548)
Capital expenditure			-2.195 (2.176)	-2.194 (2.175)	-3.137 (2.276)	-3.114 (2.275)
Net working capital			-0.051 (0.518)	-0.046 (0.518)	-0.015 (0.569)	0.004 (0.568)
Board size					-0.238*** (0.036)	-0.231*** (0.036)
Board independence					3.974*** (0.523)	4.003*** (0.524)
CEO-Chair duality					-0.423*** (0.148)	-0.429*** (0.147)
Constant	82.469*** (0.140)	82.521*** (0.107)	78.108*** (1.135)	78.050*** (1.135)	74.733*** (1.265)	74.720*** (1.263)
Observations	9,620	9,620	9,620	9,620	8,648	8,648
Adj. R-squared	0.002	0.004	0.449	0.450	0.458	0.458
Years	23	23	23	23	23	23
Industries	42	42	42	42	42	42
Firms	1,076	1,076	1,076	1,076	999	999
Industry FE	No	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes

This table presents coefficient estimates from OLS regressions exploring the relationship between co-option (predictor variable) and the readability or obfuscation of 10-K reports (outcome variable). The independent variables are lagged by 1 year. All variables are fully defined in Appendix A. Robust standard errors of coefficient estimates are presented in parentheses. \*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10% levels, respectively.

(or increases obfuscation) by 35.44 (column 1) and 50.31 (column 2) percentage points (pp), respectively. Put differently, a standard deviation increase in co-option (tenure-weighted co-option) increases obfuscation by 0.046 (0.065) standard deviations.<sup>14</sup> This increase is economically meaningful, as prior research (Bonsall and Miller, 2017; Hasan, 2020; Rahman and Kabir, 2023) notes that the Bog index does not vary significantly, and hence, small changes are economically important.<sup>15</sup>

As expected, the economic impact of co-option on readability reduces when we control for several other factors that may affect the readability of financial reports. Specifically, in columns (5) and (6), a standard deviation increase in co-option (tenure-weighted co-option) is associated with an 18.38pp (21.24pp) increase in obfuscation.<sup>16</sup> Taken together, our results suggest that, as hypothesized, the absence of efficient monitoring due to board co-option leads to an economically large and statistically significant increase in the obfuscation of financial disclosures (10-K reports) issued by management.

We use several control variables in our regression models and find that their estimated coefficients are stable across columns (3) to (6) in Table 2. The direction of the relationship between our control variables and our measure of obfuscation is broadly consistent with prior studies. For example, consistent with the literature (Hasan, 2020; Rahman and Kabir, 2023), poorly-performing, loss-making, low market to book (Tobin's q), and large firms with smaller boards appear to produce more obfuscated reports. Our results also suggest that cash constraint firms (low free cash flow and high financial constraints) are associated with more obfuscated financial reports. Consistent with Rahman and Kabir (2023), in our sample, more independent boards are associated with less readable 10-K reports.

The results in Table 2 corroborate our first hypothesis that CEOs oversee the production of more obfuscated financial reports when the board is co-opted, perhaps to obscure financial information and promote their self-interest while reducing external scrutiny. In principle, boards, particularly when independent, can effectively monitor and control decisions made by executive directors under the direction of the CEO. However, in practice, the CEO may influence board control by nominating new (co-opted) directors with similar views or social ties (Hwang and Kim, 2009) and those that are likely to be sympathetic (Finkelstein

<sup>14</sup> Considering column (1) in Table 2, the coefficient of co-option is 1.118 with a 0.317 standard deviation (Table 1). Therefore, a standard deviation increase in co-option increases financial statements' obfuscation by 35.44pp (Standard deviation of co-option \* beta coefficient of co-option \* 100 = 0.317 \* 1.118 \* 100 = 35.44pp). The standard deviation of Bog index (Table 1) is 7.730. Hence, a standard deviation increase in co-option is associated with a 0.046 standard deviation increase in obfuscation ((Standard deviation of co-option \* beta coefficient of co-option)/Standard deviation of Bog index = (0.317 \* 1.118)/7.730 = 0.046).

<sup>15</sup> Rahman and Kabir (2023), for example, explore the link between board independence and the Bog index, noting that a standardized coefficient of 0.043 or 4.31% is economically significant in their context.

<sup>16</sup> Put differently, in columns (5) and (6), a standard deviation increase in co-option (tenure-weighted co-option) is associated with a 0.024 (0.027) standard deviation increase in obfuscation.



and Hambrick, 1989). Our evidence is consistent with a stakeholder-agency theory of financial reporting practice (Coles *et al.*, 2014; Jiraporn and Lee, 2018; Lim *et al.*, 2020; Wintoki and Xi, 2019).

#### *Additional Analyses: the Role of CEO Characteristics*

Our baseline analysis (Table 1) explores the link between co-option and the obfuscation of financial reports. We have shown that co-opted boards produce less readable reports. In this section, we explore two CEO characteristics that may affect this relationship, notably the ability of the CEO (managerial ability) and the CEO's gender.

*Managerial ability* CEOs have varying abilities, and their ability is reflected in personal and organizational outcomes (Baik *et al.*, 2011; Bertrand and Mullainathan, 2003; Demerjian *et al.*, 2013; Murphy and Zbojnik, 2004; Silva, 2010; Tunyi *et al.*, 2019). In relation to personal outcomes, higher-ability CEOs enjoy more favourable labour market outcomes (Fee and Hadlock, 2003) while their lower-ability counterparts experience unfavourable labour market demand (Gibbons and Murphy, 1992). In relation to organizational outcomes, prior studies document a positive association between the CEO's ability and organizational performance (Demerjian *et al.*, 2012), initial public offering outcomes (Chemmanur *et al.*, 2010), credit risk assessment (Bonsall *et al.*, 2017a), corporate innovation (Chen *et al.*, 2015), and tax avoidance (Koester *et al.*, 2017), amongst others. Chemmanur *et al.* (2010), for example, argue that organizations with high-quality managers achieve better initial public offering outcomes because their managers convey information about the firm to outsiders more credibly. Relating to our work, prior studies explore the relationship between the CEO's ability and financial reporting quality (Baik *et al.*, 2011; Chemmanur *et al.*, 2010; Demerjian *et al.*, 2013). Demerjian *et al.* (2013), for example, examine the impact of managerial ability on financial reporting quality and find that more able managers are associated with improved earnings quality in the form of higher earnings and accruals persistence, better accrual estimations, and lower errors relating to provisions for bad debt. Additionally, Baik *et al.* (2011) find that more able managers issue more management forecasts, and their forecasts tend to be more accurate. We extend this line of inquiry by exploring whether managerial ability attenuates the negative impact of co-option on financial reporting readability.

The governance literature concedes that tight monitoring and scrutiny by the board may adversely impact firms. For instance, a study by Coles *et al.* (2008) suggests that the optimal board structure depends on the complexity of the business and the importance of firm-specific knowledge. Consistent with their view, the authors (Coles *et al.*, 2008) find that firm value in R&D-intensive firms increases with the number of insiders on the board because insiders have firm-specific knowledge. Similarly, other studies (see, for example, Adams and Ferreira, 2007; Balsmeier *et al.*, 2017; Faleye *et al.*, 2011) contend that intense

board oversight from independent directors dampens the CEO's trust in the board, impedes strategic information sharing with directors (and consequently weakens the quality of directors' strategic advice), encourages managerial short-termism, impairs corporate innovation, diminishes acquisition performance, and incentivizes earnings management. This may suggest that the importance of board scrutiny in shaping firm outcomes may depend on the ability of the CEO. Specifically, the benefits of heightened board scrutiny may be weaker in firms with higher-ability CEOs. Drawing on the foregoing discussion, we expect the positive relation between co-option and obfuscation to be more pronounced when the CEO has low-ability.

We adopt the Demerjian *et al.* (2012) measure of managerial ability, which has been used across several prior studies (see, for example, Tunyi *et al.*, 2023). We first split our sample into two sub-samples for low and highability managers. We define low- and high-ability relative to the industry-year median values of managerial ability for each firm-year observation in our sample. In columns (1) to (4) of Table 3, we run our baseline regression across each subsample.<sup>17</sup>

The results show that the estimated coefficient on co-option is positive and statistically significant for the subsample of low-ability CEOs as shown in columns (1) and (2) of Table 3. For high-ability CEOs, the estimated coefficient on our proxies of co-option are positive, albeit insignificant (columns 3 and 4), suggesting that board co-option does not necessarily lead to poor financial statement readability when managerial ability is high. We confirm these results more formally in columns (5) and (6), where we demonstrate that managerial ability negatively moderates the impact of board co-option on the readability of financial reports. The coefficient of the interaction term is negative and significant at the 5% level.

Panel 1a of Figure 1 shows the average marginal effect of co-option on obfuscation at different levels of managerial ability. As shown in Panel 1a, the positive impact of co-option on the obfuscation of financial reports declines as managerial ability increases. Indeed, the positive impact disappears at high levels of managerial ability (e.g., at managerial ability scores  $>0.164$  or the top decile).<sup>18</sup>

These results suggest that high-ability managers produce readable reports even in poor monitoring environments, while their low-ability counterparts require strong monitoring to produce such reports. Our results extend the debate over CEO abilities (Bertrand and Mullainathan, 2003; Murphy and Zbojnik, 2004; Silva, 2010) by showing how CEO ability shapes reporting under different monitoring conditions.

<sup>17</sup> The Demerjian database from which the managerial ability data is drawn did not have data for all firm-year observations in Table 2. Hence, the number of observations in columns (5) and (6) of Table 3 is lower than those in columns (5) and (6) of Table 2. This also explains the lower number of observations in subsequent tables (e.g., Table 4) that control for managerial ability.

<sup>18</sup> In untabulated results, we find that the effect of co-option on obfuscation becomes negative but statistically insignificant ( $p$ -values  $>0.1$ ) at managerial ability scores  $>0.164$ .

TABLE 3

MANAGERIAL ABILITY, BOARD CO-OPTION, T AND REPORT OBFUSCATION

Variables	Dependent variable: Bog Index					
	Low-ability subsample		High-ability subsample		Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Co-option	0.758*** (0.278)		0.267 (0.323)		0.445** (0.214)	
Co-option TW		0.890*** (0.272)		0.214 (0.314)		0.556*** (0.207)
Co-option # Managerial ability					-3.379** (1.559)	
Co-option TW # Managerial ability						-3.166** (1.493)
Managerial ability					1.907** (0.962)	1.316* (0.767)
Loss dummy	1.064*** (0.353)	1.060*** (0.353)	0.655 (0.432)	0.654 (0.431)	1.170*** (0.272)	1.168*** (0.272)
Tobin's Q	-0.473*** (0.149)	-0.471*** (0.150)	-0.264** (0.119)	-0.265** (0.119)	-0.323*** (0.095)	-0.325*** (0.095)
Sales growth	-0.428 (0.702)	-0.445 (0.701)	0.921 (0.691)	0.930 (0.691)	0.343 (0.494)	0.339 (0.494)
Leverage	-0.069 (0.930)	-0.059 (0.928)	-1.006 (0.929)	-1.024 (0.928)	-0.939 (0.672)	-0.941 (0.671)
Firm size	0.583*** (0.097)	0.580*** (0.097)	0.231*** (0.089)	0.231*** (0.089)	0.386*** (0.065)	0.383*** (0.065)
Free cash flow	-3.680 (2.320)	-3.693 (2.323)	-3.825* (2.162)	-3.839* (2.160)	-2.690* (1.619)	-2.682* (1.619)
Tangible assets	-0.931 (0.875)	-0.901 (0.874)	-2.175** (0.935)	-2.173** (0.935)	-0.970 (0.642)	-0.941 (0.641)
Concentration	-2.825 (2.734)	-2.804 (2.731)	12.734*** (3.653)	12.732*** (3.651)	3.082 (2.196)	3.132 (2.196)
Big 4 auditor	0.642** (0.315)	0.644** (0.315)	-0.399 (0.335)	-0.403 (0.335)	0.177 (0.237)	0.178 (0.237)
Z score	0.016 (0.036)	0.017 (0.036)	-0.041 (0.031)	-0.041 (0.031)	-0.027 (0.026)	-0.028 (0.026)
Financial constraints	0.314** (0.130)	0.307** (0.129)	0.186* (0.105)	0.186* (0.105)	0.191** (0.086)	0.188** (0.086)
Discretionary accruals-	-1.327 (2.158)	-1.339 (2.159)	-2.113 (2.257)	-2.137 (2.257)	-1.446 (1.571)	-1.438 (1.570)
Capital expenditure	-1.570 (3.457)	-1.503 (3.457)	-4.994* (3.026)	-5.007* (3.025)	-3.776 (2.308)	-3.741 (2.309)
Net working capital	0.425 (0.811)	0.448 (0.810)	-0.961 (0.794)	-0.949 (0.794)	0.029 (0.596)	0.048 (0.595)
Board size	-0.189*** (0.051)	-0.181*** (0.051)	-0.231*** (0.052)	-0.230*** (0.052)	-0.249*** (0.037)	-0.243*** (0.037)
Board independence	2.799*** (0.726)	2.849*** (0.726)	4.608*** (0.740)	4.611*** (0.740)	3.897*** (0.523)	3.927*** (0.524)
CEO-Chair duality	-0.159 (0.204)	-0.174 (0.202)	-0.733*** (0.219)	-0.722*** (0.218)	-0.319** (0.151)	-0.333** (0.150)
Constant	71.765*** (1.927)	71.767*** (1.922)	77.932*** (1.855)	77.977*** (1.854)	74.713*** (1.327)	74.724*** (1.325)

(Continues)

TABLE 3  
CONTINUED

Variables	Dependent variable: Bog Index					
	Low-ability subsample		High-ability subsample		Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Observations	4,686	4,686	3,960	3,960	7,984	7,984
Adj. <i>R</i> -squared	0.461	0.461	0.460	0.460	0.418	0.418
Years	23	23	21	21	21	21
Industries	42	42	40	40	41	41
Firms	853	853	733	733	959	959
Industry & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

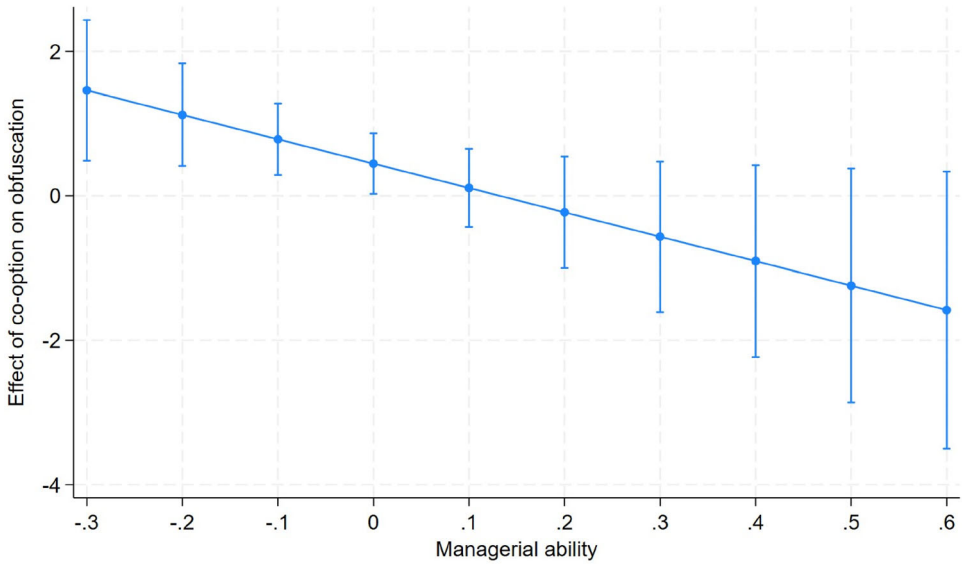
This table explores the moderating effect of managerial ability on the relationship between board co-option and the obfuscation of 10-K reports. Columns 1 & 2 (3 & 4) explore the link between co-option and obfuscation for firms with low-ability (high-ability) managers. Columns 5 & 6 present moderating effects. All variables are defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10% levels, respectively.

*CEO gender* Prior research suggests that female CEOs bear distinct characteristics that differentiate them from male CEOs in terms of decision-making. For instance, the research suggests that the CEO's gender influences risk aversion (Jianakoplos and Bernasek, 1998; Vandegrift and Brown, 2005; Wei, 2007), ethical behaviour (Ford and Richardson, 1994), and experience (Adams *et al.*, 2007), with women being the better of the two. The research also suggests that female directors, in general, are less prone to agency problems, less overconfident, more conservative, less likely to manage earnings, and less likely to engage in securities fraud (Adhikari *et al.*, 2019; Cumming *et al.*, 2015; McGuinness *et al.*, 2017; Tunyi *et al.*, 2023). Prior studies contend that female-dominated boards produce more reliable financial reports (Krishnan and Parsons, 2008; Srinidhi *et al.*, 2011) due to women's superior monitoring abilities (Filatotchev and Boyd, 2009; Melero, 2011). We contend that because women are more ethical, more conservative, less likely to manage earnings, and more risk-averse, firms led by female CEOs will produce more readable financial reports even in the absence of significant board monitoring (i.e., board co-option). Specifically, we expect that the positive association between co-option and obfuscation will be weaker when the CEO is female.

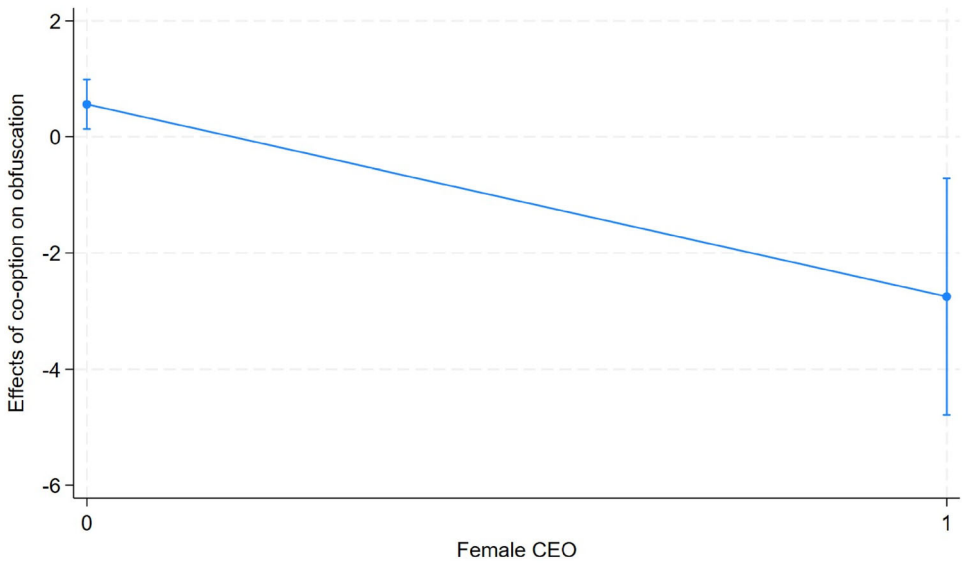
Our findings are presented in Table 4. We estimate our baseline results for subsamples of firms with female CEOs in columns (1) and (2) and those with male CEOs in columns (3) and (4). In (1) and (2), we find that the relationship between co-option and obfuscation is negative, albeit insignificant, for firms with female CEOs. This suggests that board co-option does not necessarily lead to the production of obfuscated reports when the CEO is female. Put differently, female CEOs do not appear to leverage the absence of strong monitoring to produce obfuscated reports. On the contrary, we find that our main results—board co-

FIGURE 1

AVERAGE MARGINAL EFFECTS OF CO-OPTION ON OBFUSCATION (WITH 95% CI)



(a) Managerial ability



(b) CEO Gender

CO-OPTION AND OBFUSCATION

TABLE 4

THE ALLEVIATING ROLE OF CEO GENDER

Variables	Dependent variable: Bog Index					
	Firms with Female CEOs		Firms with Male CEOs		All firms	
	(1)	(2)	(3)	(4)	(5)	(6)
Co-option	-1.975 (1.226)		0.677*** (0.217)		0.561** (0.218)	
Co-option TW		-2.033 (1.396)		0.749*** (0.210)		0.672*** (0.210)
Co-option # Female CEO					-3.312*** (1.063)	
Co-option TW # Female CEO						-3.907*** (1.068)
Female CEO					1.223** (0.555)	0.816** (0.410)
Managerial ability					0.297 (0.615)	0.319 (0.615)
Loss dummy	2.398** (1.045)	2.407** (1.041)	1.047*** (0.279)	1.043*** (0.279)	1.188*** (0.273)	1.186*** (0.273)
Tobin's Q	-0.249 (0.498)	-0.265 (0.494)	-0.336*** (0.094)	-0.338*** (0.094)	-0.323*** (0.095)	-0.325*** (0.095)
Sales growth	1.574 (2.440)	1.541 (2.452)	0.229 (0.502)	0.229 (0.502)	0.327 (0.495)	0.325 (0.494)
Leverage	3.132 (3.161)	3.313 (3.184)	-0.480 (0.659)	-0.494 (0.659)	-0.958 (0.672)	-0.969 (0.671)
Firm size	0.419 (0.316)	0.419 (0.318)	0.406*** (0.064)	0.407*** (0.064)	0.389*** (0.065)	0.388*** (0.064)
Free cash flow	11.844 (7.229)	11.896 (7.230)	-3.187** (1.625)	-3.192** (1.625)	-2.573 (1.616)	-2.567 (1.616)
Tangible assets	-3.836 (3.752)	-4.016 (3.788)	-1.086* (0.634)	-1.074* (0.634)	-1.006 (0.641)	-0.996 (0.640)
Concentration	26.197 (16.037)	23.721 (15.896)	1.699 (2.241)	1.727 (2.239)	3.340 (2.201)	3.300 (2.196)
Big 4 auditor	-0.739 (1.424)	-0.682 (1.426)	0.208 (0.235)	0.207 (0.235)	0.170 (0.237)	0.174 (0.237)
Z score	-0.275 (0.245)	-0.271 (0.244)	-0.011 (0.024)	-0.012 (0.024)	-0.031 (0.026)	-0.032 (0.026)
Financial constraints	-0.421 (0.307)	-0.415 (0.309)	0.246*** (0.081)	0.243*** (0.080)	0.187** (0.085)	0.184** (0.085)
Discretionary accruals	12.442* (6.969)	12.500* (7.009)	-1.997 (1.590)	-2.014 (1.589)	-1.320 (1.570)	-1.324 (1.569)
Capital expenditure	-2.809 (9.580)	-2.400 (9.526)	-2.683 (2.338)	-2.653 (2.337)	-3.607 (2.305)	-3.566 (2.304)
Net working capital	0.816 (2.776)	0.690 (2.757)	0.120 (0.583)	0.140 (0.583)	0.010 (0.595)	0.012 (0.595)
Board size	-0.409** (0.172)	-0.427** (0.173)	-0.233*** (0.037)	-0.226*** (0.037)	-0.246*** (0.037)	-0.241*** (0.037)
Board independence	-3.766 (3.628)	-4.121 (3.663)	4.110*** (0.535)	4.140*** (0.535)	3.885*** (0.525)	3.905*** (0.525)
CEO-Chair duality	0.041 (0.898)	0.028 (0.917)	-0.450*** (0.152)	-0.455*** (0.150)	-0.329** (0.151)	-0.340** (0.150)

(Continues)

TABLE 4  
CONTINUED

Variables	Dependent variable: Bog Index					
	Firms with Female CEOs		Firms with Male CEOs		All firms	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	80.326*** (7.448)	80.695*** (7.527)	74.587*** (1.300)	74.584*** (1.297)	74.596*** (1.326)	74.614*** (1.323)
Observations	325	325	8,320	8,320	7,984	7,984
Adj. R-squared	0.545	0.544	0.458	0.459	0.418	0.419
Years	22	22	23	23	21	21
Industries	25	25	42	42	41	41
Firms	108	108	987	987	959	959
Industry & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

This table explores the moderating effect of the CEO’s gender on the relationship between co-option and the obfuscation of 10-K reports. Columns 1 & 2 (3 & 4) explore the link between co-option and obfuscation for firms with female (male) CEOs. Columns 5 & 6 present moderating effects. All variables are fully defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1, 5, and 10% levels, respectively.

option drives the obfuscation of financial reports—are primarily driven by firms with male CEOs. Specifically, in columns (3) and (4), we find a strong positive relationship between co-option and the obfuscation of financial reports in our subsample of firms led by male CEOs. These results are statistically significant at the 1% level. The results in columns (5) and (6) confirm that the gender of the CEO plays a statistically significant (at the 1% level) moderating role in shaping the board co-option–financial statement obfuscation nexus. In column (5), for example (also see Panel 1b of Figure 1 for average marginal effects analysis), we find that for male CEOs, a unit increase in co-option leads to a 0.560 units increase in obfuscation (significant at the 5% level). However, for female CEOs, a unit increase in co-option leads to a 2.751 units (0.561–3.312) decline in obfuscation (significant at the 1% level). Overall, the results in Table 4 and Figure 1 provide an important caveat to our hypothesis and baseline results.

### Robustness Checks

*Alternative measures of obfuscation* We deploy several checks to allay concerns about the robustness of our results and deepen the insights from our findings. Our first robustness check is around our measure of obfuscation. So far, we have used the Bog index of Bonsall *et al.* (2017b), a more recent measure of obfuscation, which has been used by several recent studies (Hasan, 2020; Nadeem, 2022; Tan *et al.*, 2022). Bonsall *et al.* (2017b) and Loughran and McDonald (2014) argue that components of other more frequently used measures of obfuscation (such as the Fog and Flesch-Kincaid indices of Li *et al.* (2008)) are poorly specified in financial

TABLE 5

## ALTERNATIVE MEASURES OF OBFUSCATION

Variables	DV: Gunning Fog Index		DV: Flesch-Kincaid Index	
	(1)	(2)	(3)	(4)
Co-option	0.157*** (0.054)		0.120** (0.054)	
Co-option TW		0.167*** (0.053)		0.145*** (0.052)
Control variables	Yes	Yes	Yes	Yes
Constant	18.670*** (0.326)	18.670*** (0.326)	14.648*** (0.324)	14.639*** (0.324)
Observations	7,394	7,394	7,394	7,394
Adj. <i>R</i> -squared	0.179	0.179	0.127	0.127
Years	22	22	22	22
Industries	42	42	42	42
Firms	930	930	930	930
Industry & Year FE	Yes	Yes	Yes	Yes

The table explores the relationship between board co-option and alternative measures of readability or obfuscation: Fog (columns 1 & 2) and Flesch-Kincaid (columns 3 & 4) indices. All models control for other determinants of readability (in our base model, Table 2, including loss dummy, Tobin's Q, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity. The full version of the table is available from the authors on request. All variables are fully defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10% levels, respectively.

applications. For robustness, however, we explore whether our baseline results remain robust when we use these alternative, albeit less reliable, measures of textual obfuscation or readability.

Our results from using these alternative measures are presented in Table 5.<sup>19</sup> All our models in Table 5 incorporate control variables including loss dummy, Tobin's q, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity.<sup>20</sup>

In columns (1) and (2) of Table 5, we document a positive and statistically significant (at the 1% level) relationship between measures of co-option and the Fog index, after controlling for other determinants of obfuscation. Similarly, in columns (3) and (4), we document a positive and significant (at the 5% level) relationship between board co-option and the Flesch-Kincaid index. A unit increase in co-option leads to a 15.7% to 16.7% (12.0% to 14.5%) increase in the Fog (Flesch-Kincaid) index. These results are consistent with our hypothesis

<sup>19</sup> The number of observations in Table 5 is lower than the number in Table 2 due to missing data on the Fog and Flesch-Kincaid indices for several observations. See Table 1 for summary statistics. <sup>20</sup> The full version of the table is available from the authors on request.



(H1) that the obfuscation of financial reports is partly driven by the absence of adequate monitoring because of co-option. The results also confirm that our findings are robust to our choice of measurement of obfuscation.

*Co-opted director type* We then turn our attention to the nature of board co-option. Here, we consider whether the link between board co-option and obfuscation depends on the type of director (executive vs. non-executive) that is co-opted. Presumably, executive directors are vital in the day-to-day running of organizations and may have a more substantive role in the preparation and sign-off of financial reports. Further, the CEO may wield more power over co-opted executive directors who are their subordinates relative to co-opted non-executive directors who are external to the firm. We may, therefore, find that obfuscation is higher when executive directors are co-opted relative to when non-executive directors are co-opted. To assess this, we explore the relationship between co-option within each group of directors (executive, ED vs. non-executive, NED) and the obfuscation of financial reports. We define co-opted NEDs (EDs) as the fraction of NEDs (EDs) within the board that are co-opted. Our results are presented in columns (1) and (2) of Table 6.<sup>20</sup>

In column (1) (and column (2)) of Table 6, we test the link between the proportion of co-opted NEDs (and EDs) and the level of obfuscation of 10-K reports. We find a positive (coefficient of 0.506 and 1.597, respectively) and statistically significant (at least at the 10% level) relationship between co-option across either type of directors and our measure of obfuscation (Bog index). This emphasizes the importance of both types of directors in ensuring the readability of financial disclosures. However, we find that our results are stronger for co-opted executive directors than for co-opted non-executive directors. Specifically, a standard deviation increase in co-option amongst non-executive directors (Co-opted NED) leads to a 13.08pp (or 0.018 standard deviations) increase in the Bog index of 10-K reports. Meanwhile, a standard deviation increase in co-option amongst executive directors (Co-opted ED) leads to a 22.62pp (or 0.030 standard deviations) increase in the Bog index of financial reports. These results suggest that the co-option of executive directors has a stronger impact on the obfuscation of financial reports. The difference in coefficients (not presented for brevity) is statistically significant at the 1% level.

*Regulation: the SEC Plain English Mandate and the Sarbanes-Oxley Act* The 1998 SEC Plain English Mandate (SPEM) required US firms issuing prospectuses to communicate in plain English. Following prior studies (Bonsall *et al.*, 2017b;

<sup>20</sup> All our models in Table 6 control for other determinants of readability including loss dummy, Tobin'sq, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity. The full version of the table is available from the authors on request.

CO-OPTION AND OBFUSCATION

TABLE 6

CO-OPTED DIRECTOR TYPE AND THE PLAIN ENGLISH MANDATE

Variables	Dependent variable: Bog Index				
	(1) Co-opted Director type		(2) The SEC Plain English Mandate(SPEM)		
	(1)	(2)	Pre-SPEM (3)	Post-SPEM (4)	All (5)
Co-opted NEDs	0.506*				
	(0.274)				
Co-opted EDs		1.597***			
		(0.609)			
Co-option			1.759*	0.468**	3.705***
			(0.965)	(0.231)	(0.900)
Co-option # Plain English Mandate					-2.876***
					(0.924)
Plain English Mandate					6.273***
					(0.524)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	75.063***	74.504***	76.987***	74.867***	60.798***
	(1.320)	(1.338)	(6.610)	(1.383)	(1.415)
Observations	7,442	7,442	652	6,429	7,082
Adj. R-squared	0.438	0.439	0.349	0.395	0.361
Years	22	22	2	19	21
Industries	41	41	38	40	41
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No

This table explores whether (1) the type of co-opted director, i.e., independent versus executive (in columns 1 & 2), and (2) the SEC 1998 Plain English Mandate (in columns 3 to 5), impact the readability of firms' financial (10-K) disclosures. Co-opted NEDs (EDs) is the fraction of NEDs (EDs) within the board that are co-opted. Plain English Mandate is operationalized as an indicator that takes a value of one after 1998 and a value of zero otherwise. All models control for other determinants of readability (in our base model, Table 2, including loss dummy, Tobin's Q, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity. The full version of the table is available from the authors on request. All variables are fully defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10% levels, respectively.

Tan *et al.*, (2022), we assume that SPEM led to improvements in the readability of firms' prospectuses filed with the SEC but also their other SEC filings, including financial (10K) reports, through spillovers in good writing. It may, therefore, be the case that our results are driven by an earlier period when the Plain English Mandate did not apply (pre-SPEM) and, therefore, lack currency. To address this issue and evidence currency to our findings, we explore whether our results disappear after the 1998 SPEM. Specifically, we re-estimate our baseline results for the pre-SPEM and post-SPEM periods. Our findings are presented in columns (3) to (5) of Table 6.

Contrary to this assertion, we find that our results persist in the post-SPEM period. Specifically, we find a positive relationship between co-option and obfuscation both in the pre-SPEM (column 3) and post-SPEM periods (column 4). However, as anticipated, the 1998 SPEM weakens the impact of co-option on the obfuscation of financial reports. The difference in the coefficient (not presented for brevity) is statistically significant at the 1% level. We further confirm this in column (5), where we document a negative and statistically significant (at the 1% level) interaction effect. This finding suggests that regulation may play an important role in mitigating poor financial reporting when internal monitoring is weak. Importantly, our results suggest that the problem of poor readability of financial reports resulting from poor monitoring is a current one, which has been partly addressed by the 1998 SPEM but persists in firms today.

The Sarbanes-Oxley Act of 2002 (SOX) is another regulation that may influence our inferences because it strengthened firms' governance in various ways. Notably, SOX led to an exogenous increase in board monitoring due to increased board and auditor independence. SOX also directly increased scrutiny on the CEO and CFO by making them individually responsible (personal liability) for the completeness and accuracy of their firm's financial reports. While we have controlled for board independence and year effects, we may still find that our results are weaker following the enactment of SOX. We find some evidence that the effect of board co-option on the readability of 10-K reports was weaker following the enactment of SOX but these results (available as Appendix C) are only statistically significant (at the 5% level) for our tenure-weighted measure of co-option.

*Addressing endogeneity* We acknowledge the problem of endogeneity (omitted variable bias and reverse causality) in our analyses and conduct additional tests to allay this concern. Our hypothesis argues that co-option 'causes' the obfuscation of financial disclosures. While it may be difficult to theoretically explain how the reverse might be true (i.e., how obfuscation of financial reports may *cause* board co-option), we have lagged our independent variables by one period across all our analyses (see equation 1) in a bid to mitigate a potential reverse causality issue.<sup>21</sup>

Despite the fact that we have included several uncorrelated firm-, industry- and board-level controls in all our models, we cannot rule out the problem of omitted variable bias. To partly address this problem and evidence causation, we take three further measures. Firstly, we expand our set of control variables to include other controls that have been used in recent studies, including Rahman and Kabir (2023) and Hasan (2020). These additional control variables include firm age, earnings volatility, non-missing items in Compustat, Delaware incorporation dummy, Special items in financial statements, and the number of business

<sup>21</sup> All our results are qualitatively similar, and our conclusions are robust to the use of contemporaneous dependent and independent variables.

segments and geographic segments. We fully define these additional controls in Appendix A. Our results with additional controls are presented in Table 7.<sup>22</sup>

As shown in Table 7, we find that our baseline results are qualitatively similar and robust to the inclusion of additional controls. Specifically, the positive and significant relationship between board co-option and measures of obfuscation persists. The use of new controls reduces our number of useful observations from 8,648 in column (5) of Table 2 to 6,459 in column (1) of Table 7.

Our second strategy to address potential omitted variable bias is to estimate panel regressions with firm- and year-fixed effects to control for other possible unobservable firm-, industry- and country-level (macro-economic, institutional, etc.) factors that may be driving our results. Our results of these tests are presented in columns (1) and (2) of Table 8.<sup>23</sup> Here, we find that our results across our two measures of co-option remain robust. Specifically, in columns (1) and (2), we still find a positive and significant (at the 10% and 5% levels, respectively) relationship between co-option and obfuscation.

Finally, we address our endogeneity issues (omitted variable bias) and establish *causation* by using a two-stage least square regression approach (2SLS). In the first stage, we use two plausibly exogenous instruments for board co-option—the median value of co-option for a firm’s industry-year subgroup (Co-option Median) and board co-option in the earliest year that a firm appears in our sample (Co-option Earliest). The rationale for using these two instruments is as follows.

Co-option Median is exogenous to the firm as the firm cannot determine the levels of co-option in its peers and vice versa (the exogeneity criteria for instrument validity) but the firm cannot deviate too far from the norms of its industry in terms of board changes (the relevance criteria for instrument validity). Consistent with Chaivisuttangkun and Jiraporn (2021), Co-option Earliest is also, perhaps, a suitable instrument because it is unlikely to have been influenced by co-option before that year as CEOs are less likely to have had the time to engage in co-opted board appointments at that point (the exogeneity criteria). This is more so the case as our measure of co-option varies over time with changes in the composition of the board. Notwithstanding, practices around board appointments may persist over time (the relevance criteria). We confirm the validity of the instruments by computing the relevant statistics and present our results in columns (3) to (6) of Table 8.

<sup>22</sup> All our models in Table 7 control for other determinants of readability, including loss dummy, Tobin’sq, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity. The full version of the table is available from the authors on request.

<sup>23</sup> All models in Table 8 control for other determinants of readability. These control variables are suppressed for brevity. The full version of the table is available from the authors on request.

TABLE 7

ADDITIONAL CONTROL VARIABLES

Variables	Bog Index		Fog Index		Flesch Kincaid index	
	(1)	(2)	(3)	(4)	(5)	(6)
Co-option	0.852*** (0.279)		0.130** (0.062)		0.101 (0.062)	
Co-option TW		0.994*** (0.282)		0.135** (0.060)		0.126** (0.060)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
<i>Additional control variables</i>						
Firm age	-1.876*** (0.295)	-1.794*** (0.296)	-0.075 (0.063)	-0.065 (0.063)	-0.040 (0.062)	-0.028 (0.063)
Earnings volatility	8.859*** (3.020)	8.886*** (3.021)	-0.057 (0.702)	-0.056 (0.702)	-0.305 (0.695)	-0.301 (0.695)
Non-missing items	11.930*** (2.237)	11.845*** (2.235)	2.338*** (0.542)	2.324*** (0.542)	1.963*** (0.540)	1.951*** (0.540)
Delaware incorporation	0.092 (0.159)	0.089 (0.159)	0.154*** (0.037)	0.154*** (0.037)	0.133*** (0.037)	0.133*** (0.037)
Special items	-0.552 (2.412)	-0.606 (2.407)	0.072 (0.460)	0.063 (0.459)	0.059 (0.463)	0.052 (0.462)
Business segments	1.028*** (0.095)	1.030*** (0.095)	0.054** (0.022)	0.054** (0.022)	0.065*** (0.022)	0.065*** (0.022)
Geographic segments	0.668*** (0.107)	0.668*** (0.107)	-0.017 (0.023)	-0.017 (0.023)	-0.007 (0.023)	-0.007 (0.023)
Constant	3.494 (13.199)	3.804 (13.183)	5.441* (3.191)	5.508* (3.189)	3.339 (3.181)	3.373 (3.179)
Observations	6,459	6,459	5,710	5,710	5,710	5,710
Adj. R-squared	0.308	0.309	0.149	0.149	0.109	0.110
Years	21	21	20	20	20	20
Industries	41	41	41	41	41	41
Firms	801	801	741	741	741	741
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

The table explores the relationship between co-option and alternative measures of readability of 10-K reports (Bog, Fog, and Flesch-Kincaid indices) after including additional control variables. Main control variables, suppressed for brevity, include loss dummy, Tobin's Q, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. The full version of the table is available from the authors on request. All variables are fully defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10% levels, respectively.

We present the first-stage regression results in columns (3) and (4) of Table 8. The results suggest that both instruments are strong predictors of the level of co-option on the board. The coefficients of the instruments are positive and statistically significant at the 1% level. Our under-identification tests (not presented for brevity) provide evidence that the instruments are 'relevant'. For example, the Kleibergen-Paap rk LM statistics are over 3,500 in both cases (columns 3 and 4), with  $p$ -values of 0.000). Also, we reject the null hypothesis that the instruments are weak since the Cragg-Donald Wald F statistic and Kleibergen-Paap rk Wald F statistic (greater than 8,000 in all cases) are both significantly

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TABLE 8

PANEL FIXED EFFECTS AND TWO-STAGE LEAST SQUARES REGRESSIONS

Variables	Dependent variable: Bog Index					
	(1) Panel fixed effects		(2) Two-stage least squares			
	(1)	(2)	First stage		Second stage	
			(3)	(4)	(5)	(6)
Co-option	0.371* (0.202)				0.989*** (0.255)	
Co-option TW		0.480** (0.222)				0.946*** (0.264)
Co-option Median			0.439*** (0.004)			
Co-option Earliest			0.197*** (0.006)			
Co-option TW (Median)				0.379*** (0.005)		
Co-option TW (Earliest)				0.323*** (0.008)		
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	69.271*** (4.110)	69.376*** (4.105)	-0.163*** (0.039)	-0.193*** (0.041)	65.158*** (1.642)	65.177*** (1.639)
Observations	8,559	8,559	8,648	8,648	8,648	8,648
Adj. R-squared	0.780	0.780	0.700	0.682	0.458	0.458
Firm FE	Yes	Yes	No	No	No	No
Industry FE	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

The table explores the relationship between co-option and the readability of financial reports after controlling for endogeneity using (1) panel fixed effects and (2) two-stage least squares (2SLS) regressions. Panel regression results are presented in columns 1 & 2. The first (second)stage results for the 2SLS regression is presented in columns 3 & 4 (5 & 6). Co-option Median and Co-option Earliest (and their tenure-weighted versions) are instruments included in the first stage of the 2SLS regression. All models control for other determinants of readability (in our base model, Table 2, including loss dummy, Tobin's Q, sales growth, leverage, firm size, free cash flow, tangible assets, industry concentration, Big 4 auditor, Z score, financial constraints, discretionary accruals, capital expenditure, net working capital, board size, board independence, and CEO-Chair duality. These control variables are suppressed for brevity. The full version of the table is available from the authors on request. All variables are fully defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10% levels, respectively.

larger than the benchmarks suggested in the literature (Stock and Yogo, 2005; Stock *et al.*, 2002). Overall, our confirmatory tests provide some evidence that our instruments meet the required thresholds for validity and are, thus, correctly excluded from the second-stage regressions (columns (5) and (6) of Table 8).

Our second-stage regression results based on instrumented measures of co-option are presented in columns (5) and (6) of Table 8. We find a strong positive relationship (significant at the 1% level) between the instrumented measures of co-option and the level of obfuscation of financial reports. These 2SLS regression results provide some evidence that poor monitoring *causes*, at least in part, the poor readability of firm financial reports that we observe.

## CONCLUSION

Prior research has documented several consequences of board co-option (which results in poor board monitoring) including, lower turnover-performance sensitivity, lower dividend payouts, higher risk-taking, increased stock price crash risk, higher corporate misconduct, more debt covenant restrictions, and higher insider trading, amongst others (Coles *et al.*, 2014; Jiraporn and Lee, 2018; Kao *et al.*, 2020; Lim *et al.*, 2020; Zaman *et al.*, 2021). We extend this growing body of research by exploring its impact on financial reporting practices, specifically the readability of financial reports. Our work draws on a stakeholder-agency perspective (Hill and Jones, 1992) as managers have a fiduciary duty to prepare and provide financial reports that adequately address the needs of a wide group of stakeholders, including but not limited to shareholders.

Empirically, we test the effect of co-option on financial reporting readability using a sample of 1,076 US firms from 1996 to 2018. For our baseline, we use the Coles *et al.* (2014) measure of co-opted boards to capture board monitoring and the Loughran and McDonald (2014) Bog index as our main proxy for the degree of obfuscation of financial reports (10-K reports). Our baseline results provide evidence that board co-option is significantly associated with the obfuscation of financial reports. Our subsequent two-stage least squares regression results provide some evidence of causation, that is, board co-option, at least partially, causes the obfuscation of financial reports. We also demonstrate that co-option amongst executive directors (as opposed to non-executive directors) has a higher impact on readability.

We show that the co-option–obfuscation nexus is moderated by two important CEO characteristics; the ability of the CEO and the CEO's gender. On CEO ability, we find that our results are mainly driven by low-ability CEOs and are insignificant in the subsample of high-ability CEOs. Specifically, co-option mainly causes obfuscation when CEO ability is low. This suggests that low-ability CEOs exploit the poor monitoring environment to renege on their fiduciary duty of furnishing stakeholders with readable financial statements. On CEO gender, we also find that the co-option–obfuscation nexus we have documented only persists in a sub-sample of firms with male CEOs. The relationship is negative, albeit insignificant, for our sub-sample of firms with female CEOs.

We also demonstrate that our results are robust to several methodological choices, including alternative measures of readability, different measures of co-option, and alternative controls, as well as firm-, industry-, and year-fixed effects. Our results contribute towards a broader stakeholder-agency theory of a firm (Hill and Jones, 1992) by showing how the lack of adequate monitoring may lead to negative outcomes for all stakeholders, including shareholders. Specifically, we provide evidence on how co-opted directors renege on their fiduciary duty of working in the best interest of all stakeholders by ensuring the release of readable financial reports due to their allegiance to the CEO. Our results also highlight the important role of CEO ability in environments when monitoring is weak. Our work contributes to the literature exploring the influence of women on corporate

boards (Krishnan and Parsons, 2008; McGuinness *et al.*, 2017; Srinidhi *et al.*, 2011; Tunyi *et al.*, 2023) by showing that female CEOs may require less monitoring than male CEOs to achieve the same outcome. Importantly, this study contributes to the burgeoning research on board co-option (Coles *et al.*, 2014; Jiraporn and Lee, 2018; Lim *et al.*, 2020) and readability (Bonsall *et al.*, 2017b; Hasan, 2020; Nadeem, 2022) by providing evidence that co-option is an important driver of complex financial reporting. Our findings offer some insights for policymakers on how the sequence of appointments of directors on the board can impact the quality of disclosures by weakening the monitoring environment. However, we provide an important caveat by showing that this weak monitoring only translates to the production of obfuscated disclosures when CEOs have a low ability or other incentives to pursue their own interests ahead of those of their stakeholders.

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APPENDIX A  
DEFINITION OF VARIABLES

Variables	Definition
<b>Panel A: Dependent variables</b>	
Bog Index	<p>The Bonsall <i>et al.</i> (2017b) Readability index is generated using StyleWriter, the Plain English Editor. The data is freely available from the authors (Bonsall <i>et al.</i>, 2017b) and is generated as follows;</p> $Bog\ index = Sentence\ Bog + Word\ Bog - Pep$ <p>Sentence Bog captures obfuscation due to long sentences, Word Bog captures obfuscation through the use of difficult and problem words, and Pep captures the use of names and interesting words that enhance the clarity of texts.</p>
Fog index	<p>The Gunning Fog Readability index (Bonsall <i>et al.</i>, 2017b; Li <i>et al.</i>, 2008) is estimated in Python 3.11.0 from the number of words (Words), sentences (Sentence) and complex words (Complex Words) in the text as follows;</p> $Gunning\ Fog\ index = 0.4 \left( \frac{Words}{Sentences} + 100 \frac{Complex\ Words}{Words} \right)$
Flesch-Kincaid Index	<p>The index is estimated in Python 3.11.0 from the total number of words (Words), sentences (Sentences) and syllabi (Syllabus) in the text as follows;</p> $Flesch - Kincaid\ index = 0.39 \left( \frac{Words}{Sentences} \right) + 11.8 \left( \frac{Syllabus}{Words} \right) - 15.59$
<b>Panel B: Independent variables</b>	
Co-option	Represents the fraction of the board consisting of directors appointed after the sitting CEO assumed office (Coles <i>et al.</i> , 2014, p. 1751).
Co-option TW	Tenure-weighted co-option is estimated as the sum of the tenure of all co-opted directors as a proportion of the total tenure of all directors on the board (Coles <i>et al.</i> , 2014, p. 1757).
<b>Panel C: Control variables</b>	
Loss dummy	Takes a value of one when a firm reports a loss and a value of zero, otherwise.
Tobin's Q	Market value of equity plus the book value (BV) of debt, scaled by the BV of total assets.
Sales growth	Change in sales as a ratio of previous sales.
Leverage	The ratio of a firm's long-term debt to its total assets.
Firm size	The natural log of total assets.
Free cash flow	Free cash flow (estimated as cash flow from operations minus capital expenditures) as a proportion of assets.
Tangible assets	A firm's fixed assets (including property, plant & equipment) as a proportion of its assets.

(Continues)

*CO-OPTION AND OBFUSCATION*

APPENDIX A

CONTINUED

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**Panel C: Control variables**

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Concentration (industry)	Proxied using the Herfindahl-Hirschman index (HHI) estimated from revenue-based market shares within 4-digit SIC code industries.
Big 4 auditor	An identifier for firms audited by Big 4 audit firms.
Z score	Altman Z-score measure of the risk of financial distress.
Financial constraints	The Kaplan-Zingales measure of financial constraints or KZ index (Kaplan and Zingales, 1997b).
Discretionary accruals	Derived from the modified-Jones model (Dechow <i>et al.</i> , 1995; Tunyi <i>et al.</i> , 2024b).
Capital expenditure	Total capital expenditure as a fraction of total assets.
Net working capital	Total working capital (the difference between current assets and current liabilities) as a fraction of total assets.
Board size	The number of directors on a firm's board.
Board independence	The fraction of the board made up of non-executive directors.
CEO duality	An indicator variable for instances when a firm's chief executive officer (CEO) doubles as its board chairman.
Industry	Fama & French 48 industry classification (groupings).

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**Panel D: Additional control variables**

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Firm age	"Age" is the number of years of data coverage by Compustat or CRSP (Center for Research in Securities Prices) or the number of years since a firm's IPO (Compustat), whichever is higher. Firm age is the natural log of age.
Earnings volatility	Standard deviation of a firm's operating profit to asset ratio over the last five years.
Non-missing items	Natural log of the number of non-missing items from a firm's Compustat data.
Delaware incorporation	An identifier for firms incorporated in the state of Delaware.
Special items	The ratio of the value of 'special items' to total assets.
Business segments	Natural log of the number of business segments reported in the segment reports.
Geographic segments	Natural log of the number of geographic segments reported in the segment reports.

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APPENDIX B  
CORRELATION MATRIX

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Co-option	1								
(2) Co-option TW	0.93*	1							
(3) Loss dummy	-0.01	-0.01	1						
(4) Tobin's Q	0.05*	0.06*	-0.20*	1					
(5) Sales growth	0.06*	0.06*	-0.25*	0.24*	1				
(6) Leverage	-0.08*	-0.08*	0.06*	-0.29*	-0.05*	1			
(7) Firm size	-0.08*	-0.10*	-0.10*	-0.05*	-0.03*	0.32*	1		
(8) Free cash flow	0.03*	0.03*	-0.24*	0.46*	0.02	-0.21*	-0.02	1	
(9) Tangible assets	-0.06*	-0.07*	0.03	-0.17*	0.00	0.25*	0.16*	-0.32*	1
(10) Concentration	-0.02	-0.03*	-0.02	0.04*	-0.03*	0.03*	0.07*	0.03*	-0.03*
(11) Big 4 auditor	-0.05*	-0.05*	-0.01	-0.01	-0.03*	0.06*	0.17*	0.05*	-0.02
(12) Z score	0.09*	0.10*	-0.17*	0.67*	0.18*	-0.45*	-0.25*	0.34*	-0.18*
(13) Financial constraints	0.02	0.03*	0.11*	-0.15*	0.11*	0.39*	0.05*	-0.27*	0.11*
(14) Discretionary accruals	-0.04*	-0.04*	-0.28*	-0.03*	0.07*	0.06*	0.11*	-0.44*	0.17*
(15) Capital expenditure	0.00	-0.01	-0.04*	0.04*	0.16*	0.02	-0.01	-0.40*	0.67*
(16) Net working capital	0.10*	0.11*	-0.02	0.18*	0.04*	-0.39*	-0.42*	0.15*	-0.49*
(17) Board size	-0.14*	-0.20*	-0.07*	-0.07*	-0.09*	0.21*	0.55*	-0.01	0.13*
(18) Board independence	-0.04*	-0.05*	0.00	-0.02	-0.09*	0.09*	0.23*	0.09*	-0.12*
(19) CEO-Chair duality	0.22*	0.19*	-0.01	-0.05*	-0.01	0.05*	0.14*	-0.03*	0.08*
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(11) Big 4 auditor	0.00	1							
(12) Z score	-0.02	-0.07*	1						
(13) Financial constraints	-0.06*	0.04*	-0.21*	1					
(14) Discretionary accruals	0.03*	0.00	0.04*	0.00	1				
(15) Capital expenditure	-0.04*	-0.07*	0.00	0.08*	0.04*	1			
(16) Net working capital	-0.01	-0.09*	0.46*	-0.21*	0.00	-0.26*	1		
(17) Board size	0.06*	0.08*	-0.23*	-0.04*	0.06*	-0.02	-0.33*	1	
(18) Board independence	0.03	0.17*	-0.11*	-0.04*	-0.04*	-0.15*	-0.07*	0.09*	1
(19) CEO-Chair duality	0.05*	-0.01	-0.08*	0.02	0.03*	0.02	-0.13*	0.11*	0.00

The table shows pairwise correlation coefficients for pairs of key variables in the study. Variables are fully defined in Appendix A.

APPENDIX C  
THE EFFECT OF THE SARBANES–OXLEY ACT

Variables	Dependent variable: Bog Index					
	Pre-SOX		Post-SOX		Full period	
	(1)	(2)	(3)	(4)	(5)	(6)
Co-option	0.580 (0.408)		0.568** (0.238)		1.157*** (0.407)	
Co-option TW		0.844** (0.399)		0.574** (0.234)		1.541*** (0.391)
Post SOX # Co-option					-0.442 (0.467)	
Post SOX # Co-option TW						-0.943** (0.451)
Post SOX					5.248*** (0.279)	5.323*** (0.221)
Loss dummy	0.955** (0.480)	0.940* (0.481)	0.761** (0.321)	0.757** (0.321)	1.509*** (0.284)	1.494*** (0.284)
Tobin's Q	0.072 (0.174)	0.081 (0.175)	-0.547*** (0.109)	-0.551*** (0.109)	-0.196** (0.095)	-0.194** (0.095)
Sales growth	0.644 (0.819)	0.655 (0.818)	0.277 (0.602)	0.277 (0.602)	-0.603 (0.483)	-0.584 (0.483)
Leverage	-5.089*** (1.410)	-5.002*** (1.409)	0.912 (0.728)	0.884 (0.728)	1.582** (0.686)	1.555** (0.685)
Firm size	0.341*** (0.131)	0.340*** (0.131)	0.339*** (0.071)	0.339*** (0.071)	0.606*** (0.066)	0.603*** (0.066)
Free cash flow	-4.879 (3.029)	-5.026* (3.034)	-2.567 (1.858)	-2.551 (1.859)	-2.242 (1.612)	-2.312 (1.615)
Tangible assets	-2.664** (1.230)	-2.648** (1.227)	-0.657 (0.721)	-0.654 (0.721)	-2.185*** (0.650)	-2.152*** (0.649)
Concentration	-1.991 (5.899)	-1.690 (5.884)	1.322 (2.515)	1.336 (2.513)	8.219*** (2.294)	8.183*** (2.293)
Big 4 auditor	0.364 (0.325)	0.364 (0.325)	0.025 (0.307)	0.028 (0.307)	0.064 (0.237)	0.057 (0.237)
Z score	-0.210*** (0.053)	-0.214*** (0.054)	0.066** (0.028)	0.067** (0.028)	0.006 (0.025)	0.003 (0.025)
Financial constraints	1.137*** (0.203)	1.116*** (0.202)	0.055 (0.076)	0.055 (0.076)	0.202** (0.081)	0.198** (0.081)
Discretionary accruals	-4.458 (2.760)	-4.574* (2.759)	-1.922 (1.837)	-1.927 (1.838)	-0.088 (1.608)	-0.195 (1.610)
Capital expenditure	-9.739** (3.938)	-9.838** (3.939)	-2.636 (2.753)	-2.563 (2.753)	-4.523* (2.321)	-4.574** (2.322)
Net working capital	0.502 (1.305)	0.513 (1.303)	-0.128 (0.611)	-0.110 (0.612)	-0.715 (0.594)	-0.674 (0.594)
Board size	-0.335***	-0.326***	-0.110***	-0.104**	-0.356***	-0.346***

(Continues)



Variables	Dependent variable: Bog Index					
	Pre-SOX		Post-SOX		Full period	
	(1)	(2)	(3)	(4)	(5)	(6)
Board independence	(0.064) 4.067***	(0.064) 4.163***	(0.042) 3.708***	(0.042) 3.713***	(0.038) 5.922***	(0.038) 5.997***
CEO-Chair duality	(0.780) -0.087	(0.784) -0.121	(0.663) -0.461***	(0.663) -0.457***	(0.527) -1.086***	(0.527) -1.075***
Constant	(0.325) 74.573***	(0.322) 74.485***	(0.164) 76.997***	(0.162) 77.025***	(0.154) 66.271***	(0.152) 66.285***
Observations	(2.621) 2,736	(2.618) 2,736	(1.494) 5,912	(1.489) 5,912	(1.312) 8,648	(1.308) 8,648
Adj. R-squared	0.308	0.309	0.149	0.149	0.109	0.110
Years	7	7	16	16	23	23
Industries	40	40	41	41	42	42
Firms	627	627	770	770	999	999
Industry & Year FE	Yes	Yes	Yes	Yes	Yes	Yes

The table explores the relationship between board co-optation and the readability of 10-K reports before and after the Sarbanes-Oxley Act of 2002. All variables are defined in Appendix A. Robust standard errors are presented in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10% levels, respectively.

### SUPPORTING INFORMATION

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**Appendix S1:** Online Appendix