Essays on Empirical Corporate Finance

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Abstract

In this dissertation, I examine important questions in empirical corporate finance. The research topics include "Words before exit": CEO linguistic patterns and forced turnover outcomes in the first chapter, "Interlocks in the shadow": how big firms lead information flow in the second chapter, and "What do all these vice presidents do?": the costs and benefits of senior executive employment in the third chapter. All chapters are co-authored with Professor Ali Akyol.

The first chapter examines CEO language style during the final earnings conference calls before forced turnovers to identify speech patterns that precede dismissal and assess whether linguistic attributes can serve as predictive signals of forced turnover. Our findings reveal that CEOs nearing dismissal display distinct verbal communication patterns compared to their peers who retain their positions. Specifically, increased use of first-person pronouns, analytical language, power-related words, and a present-focused orientation is associated with a higher likelihood of forced turnover. In contrast, greater use of third-person pronouns, authentic language, affective words, and tentative language correlates with a lower likelihood of dismissal. These results remain robust when comparing fired CEOs to similarly situated retained CEOs using propensity score matching, entropy balancing, and difference-in-difference analyses. Furthermore, our analysis shows that these linguistic shifts are specific to CEOs, as CFOs do not display similar patterns. Additionally, we find that new CEOs following forced turnovers exhibit distinct communication styles compared to their ousted predecessors.

The second chapter investigates how information flows through board interlocks in corporate networks, focusing on the asymmetric influence of larger firms on smaller connected firms. We use the COVID-19 pandemic as a natural experiment, as the rare event of earnings guidance withdrawals surged due to heightened uncertainty and economic volatility, creating a unique setting to study disclosure behavior. Analyzing a sample of U.S. public firms, we find that smaller firms are significantly more likely to withdraw earnings guidance after larger, connected peers do especially when connected through experienced audit committee members. These findings reveal that information transmission via interlocks is asymmetric, driven by firm size and director expertise, and that such effects become more visible during periods of crisis.

In the third chapter, we examine when senior executive employment creates or destroys shareholder value by studying vice president (VP) in U.S. public firms. Using comprehensive data

from 2005–2024, we construct industry-adjusted measures of excess VP employment relative to economically comparable peers. We find that excess VP employment is associated with lower firm value on average, but this relation varies systematically with firm characteristic, market conditions and considering governance measures. In particular, excess VP employment is positively associated with firm value in large firms and during periods of heightened economic stress. These findings are robust to a range of identification and robustness tests, including matching-based approaches, instrumental variables, and alternative peer benchmarks.

Keywords: Linguistic patterns, CEO forced turnover, Earning conference calls, Board interlock, Guidance withdrawal, Vice president, Firm value

To my husband,

for his endless love, patience, and support

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“Words Before Exit”: CEO Linguistic Patterns and Forced Turnover Outcomes

1. Introduction

Deciding whether to retain or dismiss a CEO following poor performance is one of the most critical responsibilities of corporate boards. CEO departures can significantly impact a firm's strategy, operations, and overall performance, often heightening uncertainty among stakeholders (Jenter and Kanaan, 2015; Walsh and Seward, 1990). The transition to a new CEO further amplifies market uncertainty, which can only be mitigated through subsequent firm performance and disclosures (Bochkay et al., 2019). Research on CEO turnover suggests that corporate boards evaluate CEO quality based on firm performance and other indicators before making retention decisions (Jenter and Kanaan, 2015). One such indicator is the CEO's communication style, particularly during earnings conference calls, which serves as a crucial channel for signaling managerial competence to external stakeholders (Bochkay et al., 2019). In this study, we contribute to the CEO turnover literature by examining the verbal communication of CEOs during their final earnings conference call, identifying linguistic attributes that are associated with their eventual ousting and providing a novel perspective on the predictive power of language in forecasting executive tenure outcomes.

Communication researchers have shown that specific language features significantly influence how audiences perceive and evaluate both the speaker and the message itself (Miller et al., 2007). Listeners draw inferences about a speaker's attitude based on the language used during communication (Sperber and Wilson, 1987; Vonk, 1998, 2002; Pan et al., 2018). Previous studies in impression management highlight that top executives use various communication and disclosure strategies to shape stakeholder perceptions (e.g., Merkl-Davies and Brennan, 2007; Li, 2008; Graffin et al., 2011; Washburn and Bromiley, 2014). As König et al. (2018) note, "CEOs are under pressure not only to carefully select the details they wish to share with infomediaries but also to package that information in a way that reduces complexity and subtly directs infomediaries' attention toward a positive interpretation."

Quarterly earnings conference calls are among the most important forms of disclosure for external stakeholders and capital markets (Frankel et al., 1999; Kimbrough, 2005). These dynamic, less structured events offer valuable insights compared to static, formal disclosures such as the annual 10-K filing (Frankel et al., 1999; Blau et al., 2015). Given the nature of these calls, CEOs have considerable discretion in shaping the information presented to influence stakeholders (Matsumoto et al., 2011; Pan et al., 2018). For instance, managers often strategically externalize

poor performance by attributing it to market or industry conditions through blame statements in their speech during earnings conference calls (Noh and Zhou, 2022). Recent research has explored the impact of CEO verbal communication on stock performance, analyst assessments, and investor opinions (Pan et al., 2018; Green et al., 2019; Guo et al., 2021; Noh and Zhou, 2022; Pollock et al., 2023). However, the extent to which CEOs alter their language style just before being ousted remains underexplored. This gap is crucial because if words can indeed influence markets, it raises an important question: Do CEOs communicate differently just before they are fired compared to their counterparts who remain in position?

CEOs' language style is reflected in the types and frequencies of words they use (Pan et al., 2018). Theories of language analysis suggest that word frequencies can indicate the degree of attention to specific domains (Boyd and Schwartz, 2021). For example, pronouns serve as indicators of the focus of attention rather than just grammatical elements. Similarly, emotion words do not directly convey the experience of emotions; instead, they function as tools for signaling attention to affective states. A growing body of literature uses textual analysis to examine the linguistic choices executives make when communicating firm performance and news (Henry, 2006; Tetlock et al., 2008; Mayew and Venkatachalam, 2012; Price et al., 2012; De Amicis et al., 2021). Language style not only mirrors the speaker's mood and thoughts but also shapes how the audience interprets the message. For instance, mood congruence or consistency can enhance the persuasiveness of information (Mayer et al., 1992; DeSteno et al., 2004). Given that language plays a crucial role in forming audience impressions, it significantly influences both the quality and quantity of message delivery (Larrimore et al., 2011; Toma and D'Angelo, 2015). Our study builds on prior research by applying textual analysis to CEO verbal communication, focusing on linguistic elements such as personal pronouns, affective and cognitive language, and temporal orientations.

We examine a sample of 45,438 CEO-quarter conference call observations, including 224 unique forced turnovers, between 2010 and 2018. As earnings conference calls serve as crucial communication channels for CEOs to signal their ability and competence to the market and corporate board (Pan et al., 2018; Bochkay et al., 2019; Green et al., 2019; Noh and Zhou, 2022), we argue that CEOs strategically select their language to influence stakeholders' perceptions prior to their dismissal. In other words, we contend that these CEOs are likely aware of their impending departure, and this awareness is reflected in their verbal communication during their final

conference calls. Using textual analysis, we measure a broad range of linguistic attributes in conference call transcripts, such as the use of personal pronouns, analytical thinking, authenticity, affective and power-related words, and temporal focus. Our analyses reveal that specific language attributes in conference calls are significantly associated with forced CEO turnover. Notably, the use of more analytical language, frequent first-person singular pronouns, power-related words, and a present-focused orientation is significantly associated with a higher likelihood of CEO dismissal. In contrast, a greater use of authentic language, third-person pronouns, affective words, and tentative language is linked to a lower likelihood of forced turnover.

The results remain robust when using both propensity score matching (PSM) and entropy balancing methods to address potential selection bias and endogeneity concerns. We match firms with forced CEO turnover to those without CEO turnover, ensuring that they share similar characteristics. By pairing each CEO's conference call prior to dismissal with a call from a CEO who retained their position—based on firm-level characteristics—we achieve comparable firm performance between the two groups. Thus, the PSM and entropy balancing approaches enable us to examine differences in linguistic measures, showing that fired CEOs tend to use more analytical language, more first-person pronouns, and fewer affective and tentative words compared to CEOs who remained in their roles.

Furthermore, we investigate the verbal communication of new CEOs during their first earnings conference call following both forced and voluntary turnovers. Using a difference-in-difference analysis, our findings show that new CEOs after a forced turnover significantly alter their speech patterns during these initial calls, compared to the changes observed in new CEOs following a voluntary turnover. Additionally, we examine CFOs' verbal communication to determine whether these linguistic patterns are unique to CEOs. The results indicate that the shifts in communication style before forced turnovers are specific to the CEO role, as CFOs do not exhibit similar linguistic changes.

Our paper provides valuable insights into the predictive power of CEO language styles in anticipating forced turnovers, highlighting how a CEO's choice of words during conference calls can signal their impending dismissal. These findings contribute to a deeper understanding of the dynamics of CEO verbal communication during conference calls and its implications for forced turnover.

This study advances our understanding of CEO language style by providing a comprehensive analysis of how linguistic attributes in CEOs' verbal communication are linked to their forced turnover. Our study, thus, adds to the growing body of literature on the determinants of forced CEO turnovers and the information signals communicated to the market and corporate boards (Campbell et al., 2011; Jenter and Kanaan, 2015; Dasgupta et al., 2018; Jenter and Lewellen, 2021). Additionally, we contribute to the literature on CEO communication during voluntary disclosures, such as earnings conference calls, and their impact on stakeholders and the market (Matsumoto et al., 2011; Price et al., 2012; Pan et al., 2015; Blau et al., 2015; Bochkay et al., 2019). We emphasize the significance of conference calls as dynamic information channels for external stakeholders by showing that specific linguistic features in CEOs' speech during their final earnings call are predictive of their dismissal. These findings provide valuable insights into how CEO language style influences career outcomes, revealing that CEOs facing imminent dismissal strategically adjust their language, and that these adjustments can serve as early indicators of forced turnover.

2. Literature review

There is an extensive body of literature on corporate disclosure that examines how firm performance influences managerial communication and disclosure practices. Prior research has explored how executives adjust their disclosures in response to performance outcomes (Li, 2008; Brown and Tucker, 2011) and how managers' personal characteristics shape the nature and tone of these communications (Bertrand and Schoar, 2003; Davis et al., 2015). These studies generally operate under the premise that market demand for information stems from uncertainty surrounding firm performance, paired with managers' private insights and strategic intent. Since CEOs are central to the formulation and communication of firm policies, strategies, and disclosures, any uncertainty about their capabilities amplifies the market's need for information to reduce ambiguity and risk. Supporting this notion, Bochkay et al. (2019) find that CEOs' forward-looking statements in conference calls tend to decline as their tenure progresses and the market gains a clearer understanding of their abilities.

While the existing literature has deepened our understanding of how executives, particularly CEOs, adjust disclosure practices in response to firm performance and managerial characteristics, less is known about how CEOs communicate in high-stakes situations, such as in

the period leading up to a forced departure. Our study addresses this gap by integrating insights from research on corporate communication, CEO turnover, and earnings conference calls. Specifically, we investigate whether CEOs exhibit distinctive language patterns in their final conference call before dismissal. By doing so, we contribute to a more nuanced understanding of CEO discourse under conditions of personal and organizational uncertainty. To guide this analysis, we structure our literature review into three key sections that build on these intersecting research streams.

2.1. Literature on language and communication

Previous research has demonstrated that language possesses a distinctive ability to reveal key aspects of an individual's personality, cognitive processes, and thinking patterns (Tausczik and Pennebaker, 2010). Studies in communication have shown that specific linguistic features embedded within messages significantly shape audience perceptions and evaluations of both the speaker and the content delivered (Miller et al., 2007). In the corporate context, CEOs' spoken and written language serves as a reflection of their personalities, offering valuable insights into their emotional states, cultural backgrounds, and political views (Chatterjee and Hambrick, 2007; Burgoon et al., 2016). As such, linguistic analysis has emerged as a practical and reliable approach to understanding executive behaviors and decision-making processes (Pennebaker et al., 2003; Markowitz, 2018; Akstinaite et al., 2020).

The literature on corporate communication further highlights that language plays a crucial role in shaping a firm's ability to allocate resources efficiently, as CEOs' linguistic choices influence stakeholder uncertainty, investment decisions, and broader market perceptions (Hales et al., 2011; Guo et al., 2017; König et al., 2018; Pan et al., 2018; Huang et al., 2021; Pollock et al., 2023). This is particularly relevant during moments of organizational stress or uncertainty, when CEO communication becomes even more pivotal.

Aligned with this, the impression management literature examines how executives strategically employ communication tactics to influence market and stakeholder perceptions (Pan et al., 2018). For instance, prior studies have explored how managers selectively choose media outlets to disseminate positive news (Washburn and Bromiley, 2014), manipulate the timing of news releases to minimize the impact of negative events (Graffin et al., 2011), and craft specific

statements to present firm operations and prospects in a favorable light (Pan et al., 2018). Discretionary disclosure strategies serve as a means for executives to justify firm actions and reduce external skepticism through deliberate content framing and narrative construction (Merkl-Davies and Brennan, 2007). Moreover, CEO language can reveal personality traits such as hubris, which, when left unchecked, may result in destructive behaviors and suboptimal corporate outcomes (Craig and Amernic, 2011; Sadler-Smith et al., 2019). Recognizing these linguistic markers provides an important framework for mitigating risks associated with hubristic leadership (Akstinaite et al., 2020).

Taken together, these streams of research suggest that CEO language is not only reflective of internal psychological and strategic factors but also a deliberate tool to manage impressions and shape external narratives.

2.2. Literature on CEO turnover

Previous literature has established a negative relationship between CEO turnover and stock returns, with poor firm performance increasing the likelihood of executive dismissal (Murphy and Zimmerman, 1993). Jenter and Kanaan (2015) further demonstrate that negative industry shocks can also trigger managerial turnover, although firm-specific shocks tend to have a more pronounced effect. Boards of directors, however, are generally cautious in dismissing CEOs due to the disruptive nature of such decisions and the uncertainty surrounding the selection of a capable successor (Duchin and Schmidt, 2013). In this context, periodic CEO disclosures play a critical role in shaping labor market perceptions of CEO competence, which in turn can influence the probability of dismissal (Hermalin and Weisbach, 1998; Jenter and Lewellen, 2021). As a result, CEOs have a strong incentive to manage market perceptions by framing their actions and strategies in a favorable light (Noh and Zhou, 2022).

In a recent study, Noh and Zhou (2022) find that when a board accepts a CEO's attempt to externalize blame for poor performance, the likelihood of dismissal is reduced. This finding highlights the power of CEOs' strategic use of blame in their communication, which serves as an effective tool for influencing both market beliefs and external stakeholder perceptions. Furthermore, CEO turnover and the appointment of a new CEO often lead to increased market uncertainty regarding a firm's future performance, as such transitions are frequently accompanied by strategic changes. This uncertainty can only be mitigated by closely monitoring firm

performance and analyzing the CEO's communication style in subsequent periodic disclosures (Bochkay et al., 2019).

On the whole, while CEO turnover is generally associated with negative market reactions, strategic communication by the CEO—such as managing blame and shaping perceptions—can influence the board's and stakeholders' views on leadership effectiveness, confidence in the CEO's ability to navigate challenges, and overall managerial competence, potentially reducing the likelihood of dismissal. Our understanding of these dynamics can be further enriched by examining how CEO language evolves in the final stages of tenure, particularly before forced turnover.

2.3. Literature on earnings conference calls

Earnings conference calls are a vital form of voluntary disclosure to external stakeholders and capital markets (Frankel et al., 1999; Kimbrough, 2005). These calls typically consist of two segments: the management discussion (MD), where quarterly (or annual) results are presented, and the question-and-answer (Q&A) session, where financial analysts engage with management. Unlike formal documents such as annual reports, press releases, and news articles, which are static and highly scripted (Blau et al., 2015), conference calls provide a dynamic, less structured environment. This format allows executives to reveal their personal communication style more spontaneously, offering valuable insights that market participants and stakeholders can analyze (Price et al., 2012; De Amicis et al., 2021).

Much of the research on conference calls has focused on qualitative characteristics of the information conveyed, such as managers' tone (Price et al., 2012) and linguistic complexity (Bushee et al., 2011). Earnings call transcripts have also been used to assess managerial knowledge (Li et al., 2014), disclosure horizon (Brochet et al., 2015), and spontaneity (Lee, 2016). Recent studies have expanded this body of literature by examining how CEOs' disclosure practices evolve over their tenure and how these practices influence investor perceptions and stock returns (Noh and Zhou, 2022; Rennekamp et al., 2022).

CEOs use these calls not only to present earnings but also to clarify and promote investor reactions to the disclosed information (Hollander et al., 2010). Previous studies suggest that managers often use concrete language to justify firm performance, which can positively influence investor sentiment (Pan et al., 2018). Furthermore, attributes such as the newness, simplicity, and

unscripted nature of CEO verbal communication are associated with greater investor consensus (Guo et al., 2021). CEO personality traits, such as extraversion, have been linked to enhanced investor recognition and favorable firm outcomes (Green et al., 2019). In a similar vein, the language style of high-profile, or "celebrity" CEOs—characterized by positivity, concreteness, certainty, and self-regard—has a notable impact on stakeholder perceptions (Green et al., 2019; Pollock et al., 2023).

Overall, previous studies highlight the significant role of CEO communication, particularly in the context of earnings conference calls, CEO turnover, and corporate disclosure practices. Research consistently shows that the language used by CEOs offers valuable insights into their personalities, cognitive processes, and strategic intent, which can profoundly influence investor perceptions and market outcomes. CEOs strategically manage their communication to shape stakeholder beliefs, justify firm performance, and mitigate uncertainty, especially during periods of executive turnover or organizational transition. The dynamics of language in earnings calls, from tone to linguistic complexity, reflect both individual leadership traits and broader corporate strategies. This body of research sets the stage for our study, which aims to deepen our understanding of how CEO language shifts in the final stages of their tenure, particularly leading up to forced turnover, and how these linguistic shifts may signal the impending dismissal of a CEO. By integrating insights from the fields of corporate communication, CEO turnover, and disclosure practices, our study offers a comprehensive approach to understanding the intersection of leadership, language, and market reactions.

3. Data and methodology

In this section, we describe our data and outline the methodology we use to examine the linguistic patterns of CEOs during earnings conference calls and their association with forced turnover. We first describe the data collection process, including the identification of CEO turnover events and the compilation of firm-level financial data in Section 3.1. Then, we discuss the use of Linguistic Inquiry and Word Count (LIWC) software to analyze various linguistic attributes in CEO speech, focusing on standard linguistic dimensions, psychological processes, and cognitive traits in Section 3.2. In Section 3.3, we present summary statistics for firm and CEO characteristics.

3.1. Data

We begin our sample collection by sourcing data from the ExecuComp database, covering the period from 2010 to 2018. The sample starts in 2010, following the financial crisis, to avoid including turnovers influenced by recession-related factors. We end the sample in 2018 to exclude the economic volatility and potential forced turnovers (and associated CEO appointments) linked to the COVID-19 period. We identify CEO turnovers by tracking changes in the CEO flag within ExecuComp. To classify turnover events, we hand-collect news reports from Factiva and examine proxy statements to determine whether each departing CEO left voluntarily or was forced out, as forced turnovers are often disguised as retirements. We exclude interim CEOs from the sample and categorize each turnover event as either forced or voluntary based on the available information from news announcements.

Following the classification scheme of Parrino (1997) and Campbell et al. (2011), a turnover is classified as forced if it meets one or more of the following criteria: (1) the departure was not announced at least six months in advance; (2) the departing CEO is under the age of 60 and does not leave due to health issues, death, or to accept another position elsewhere; (3) the departing CEO does not remain on the firm's board of directors after stepping down; or (4) the CEO retires or resigns under questionable circumstances, or the company explicitly fires, demotes, or forces the CEO out (e.g., due to policy disagreements). Panel A of Table 1 presents the total number of CEO turnover events, including both overall turnovers and forced turnovers, for each year in the sample. As shown, we identify 1,706 CEO turnovers out of 18,131 firm-year observations in ExecuComp, of which 347 (20.3%) are classified as forced. The remaining 1,359 are classified as voluntary turnovers (e.g., due to retirement).

Next, we obtain quarterly earnings conference call transcripts from Capital IQ. Firm-level financial data is collected from several databases, including Compustat, the Center for Research in Security Prices (CRSP), the Institutional Brokers Estimate System (I/B/E/S), and Thomson Reuters. The sample selection process, after merging all data sources, is summarized in Panel B of Table 1. Panel B outlines the step-by-step refinement of our dataset to ensure comprehensive coverage of quarterly CEO turnover events, with a particular focus on forced turnovers. We begin with 1,706 CEO turnover observations from ExecuComp, which we convert to a quarterly format and merge with firms that have complete data in Compustat and CRSP, yielding 69,087 observations, including 319 forced turnovers. Finally, adding earnings conference call transcripts

from Capital IQ results in a final dataset comprising 45,438 CEO-quarter observations, including 224 cases of forced turnovers and 923 cases of voluntary turnovers.

[Insert Table 1 here]

3.2. Textual analysis of CEO language

There is a growing body of literature in finance analyzing various forms of textual data, beginning with the work of Tetlock (2007), with many studies focusing on corporate disclosures and linguistic attributes. For example, prior research examines company disclosures to measure tone (Tetlock et al., 2008; Loughran and McDonald, 2011), uncertainty (Loughran and McDonald, 2013), and readability (Li, 2008). Textual analysis has become a widely used tool among scholars for conducting content analysis. Words play a critical role in shaping audience perceptions, and even subtle variations in word choice can reveal important insights into a speaker's motives and beliefs (Berry et al., 1997; Semin, 2008; Pan et al., 2018). Notably, two messages conveying similar content can vary significantly in their effectiveness depending on the specific words used (Pennebaker and King, 1999). For instance, the use of function words—such as pronouns, articles, and conjunctions—is closely linked to how people express their social and psychological worlds, and the ability to use these words effectively in speech reflects basic social skills (Tausczik and Pennebaker, 2010).

Linguistic attributes serve as "honest signals" of a speaker's intentions, reflecting their motivations, beliefs, and attitudes (Pentland, 2008). For instance, personal pronouns reveal attentional focus (Rude et al., 2004), while verb tenses offer insights into how individuals cognitively process events (Pasupathi, 2007). People tend to use the past tense more often when discussing disclosed or resolved situations and the present tense when referring to ongoing or undisclosed events (Pasupathi, 2007; Tausczik and Pennebaker, 2010). Both pronoun use and verb tense choices help pinpoint the focus and orientation of speech, shedding light on speakers' priorities and intentions (Kacewicz et al., 2014; Burgoon et al., 2016). Additionally, individuals who experience uncertainty often rely on more tentative language and filler words (Tausczik and Pennebaker, 2010). Prior linguistic research also shows that verbs and quantitative terms are typically more concrete and precise than adjectives or vague quantifiers, which are commonly used when people generalize (Semin et al., 2005; Larrimore et al., 2011). Collectively, these studies highlight that an individual's cognition, motives, and behaviors are shaped by their circumstances,

and their communication style offers meaningful clues about their psychological state and situational context.

We measure the linguistic attributes of earnings conference calls using the Linguistic Inquiry and Word Count (LIWC) software. LIWC is a word-counting tool equipped with validated dictionaries that have demonstrated both internal reliability and external validity (Pennebaker and Chung, 2012). The software analyzes conference call transcripts by matching each word in the text to entries in its dictionary and calculating the percentage of words that fall into each predefined category. For each transcript, LIWC generates approximately eighty output variables. These include summary language metrics (such as analytical thinking, clout, authenticity, and emotional tone), general text descriptors (e.g., words per sentence, the percentage of target words captured by the dictionary, and the proportion of words longer than six letters), standard linguistic dimensions (e.g., the percentage of pronouns, articles, verbs), categories related to psychological constructs (e.g., affective and cognitive processes, drives), personal concern categories (e.g., work, home, leisure), informal language markers (e.g., assents, fillers, swear words, netspeak), time orientation (past, present, and future), and punctuation usage (e.g., periods, commas).

We focus on the linguistic measures extracted by LIWC that capture standard linguistic dimensions, as well as psychological and cognitive processes, all of which have been explored across various strands of prior literature. Panel A of Table 2 reports summary statistics for these linguistic attributes, alongside firm-level and CEO-level variables, for two groups: CEOs who remained in their positions ("No Turnover," using all conference calls not followed by a turnover) in Columns (1) to (3), and CEOs who were forced out ("Forced Turnover," using only the last conference call before dismissal)) in Columns (4) to (6). Columns (7) and (8) present the differences in linguistic measures between the two groups. We find notable differences in linguistic attributes between dismissed and retained CEOs. For instance, the average use of the pronoun "I" is 0.700 in the forced turnover sample, compared to 0.613 in the no-turnover sample—a statistically significant difference at the 1% level. Similarly, the use of tentative language averages 1.17 for retained CEOs and 1.08 for dismissed CEOs, with this difference being statistically significant at the 5% level.

Additionally, we include the mean and standard deviations of these linguistic measures from the LIWC manual (the last two columns) to illustrate how CEO language differs from that of the general population. Notably, CEOs exhibit higher levels of analytical thinking, with an average

analytic score of 91.31 for No Turnover CEOs and 91.59 for Forced Turnover CEOs, compared to LIWC's grand mean of 56.34. This suggests that CEOs, regardless of turnover status, tend to adopt a distinct communication style, setting them apart from the average speaker captured by LIWC benchmarks.

[Insert Table 2 here]

As discussed in Section 2, earnings conference calls provide CEOs with a platform to strategically shape perceptions of their leadership and firm performance. The variations in communication style observed in Table 2 may reflect deeper psychological and cognitive dynamics, potentially signaling CEOs' awareness of their risk of dismissal. In our analysis, we examine these linguistic differences to assess their relationship with forced turnovers.

3.3. Firm and CEO characteristics

Panel B of Table 2 presents firm and CEO characteristics for those who experienced forced turnover compared to those who remained in their positions. Several notable differences emerge between the two groups. Firms with forced CEO turnover tend to have significantly lower return on assets (ROA) (0.002 vs. 0.011, *p-value* = 0.000) and higher reported losses (0.129 vs. 0.083, *p-value* = 0.012), indicating poorer financial performance preceding dismissal. Additionally, firms with forced turnovers have a lower market-to-book ratio (MTB) (1.761 vs. 2.004, $p = 0.007$), suggesting that investors may perceive them as having lower growth potential. CEO tenure (measured as the natural logarithm of the number of years between the CEO's appointment date and the current period's end date) is slightly lower for those who are forced out (1.736 vs. 1.862, $p = 0.050$), which may imply that recently appointed CEOs are at a higher risk of dismissal. Moreover, ownership stakes are significantly lower for dismissed CEOs (0.008 vs. 0.021, $p = 0.000$), possibly reflecting weaker alignment with shareholder interests. Age (measured as the natural logarithm of the CEO's age) also differs slightly, with dismissed CEOs being slightly younger on average (3.991 vs. 4.043, $p = 0.000$). The gender composition of forced turnover cases shows a lower proportion of female CEOs (0.068 vs. 0.047, $p = 0.000$). In contrast, leverage, analyst following, institutional ownership, and earnings surprise do not show statistically significant differences between the two groups. These findings highlight key firm- and CEO-level characteristics associated with forced turnover, particularly in terms of financial underperformance, tenure, ownership, and demographic attributes.

4. Choosing linguistic measures of forced CEO turnover

Language conveys crucial information about our identity, thoughts, emotions, and psychological states (Pennebaker, 2011). Therefore, it is reasonable to assume that language style varies across different contexts, revealing distinct verbal patterns. In this study, we explore the linguistic features of CEOs during earnings conference calls and their association with forced turnover.

To guide our analysis, we select word categories based on a comprehensive review of prior research. Various strands of literature have examined linguistic markers related to deceptive language, persuasive communication, and cognitive emotions in speakers' language styles. Previous studies in the context of financial reporting have demonstrated how language can signal deceptive behavior. For example, Larcker and Zakolyukina (2012) analyzed linguistic cues in CEO and CFO statements during earnings conference calls to predict deceptive financial reporting, such as auditor changes and late filings. In our study, we apply linguistic markers from this literature to examine whether CEOs use strategic language to project confidence, authority, focus, control over narratives, and to shift blame or alter temporal framing in their conference calls before being forced out.

Researchers have explored the use of "I" pronouns across various strands of literature, yielding mixed findings in the context of deception. Some studies suggest that liars tend to use fewer self-references (Newman et al., 2003; Larcker and Zakolyukina, 2012), while others highlight the ambiguous relationship between linguistic measures and deception, which can vary depending on the theoretical framework (Hauch et al., 2015; Markowitz and Hancock, 2019). In negative situations, lies often involve fewer first-person singular pronouns, potentially as a psychological distancing mechanism (Newman et al., 2003; Hauch et al., 2015). However, in neutral contexts, lies may feature more frequent use of first-person singular pronouns, perhaps to enhance the speaker's credibility (Pennebaker, 2011; Larcker and Zakolyukina, 2012; Hauch et al., 2015). In this study, we examine the emotional and affective content of earnings conference calls to better understand the use of self-referential pronouns. Specifically, we focus on the "I" pronoun and words related to the "affective process" from LIWC's linguistic categories to assess whether CEOs display signs of deceitful behavior before being forced out.

The degree to which a speech is well-rehearsed is another key linguistic indicator explored in deception literature (Larcker and Zakolyukina, 2012; Vrij, 2014). When speakers communicate

authentically or honestly, they tend to speak more spontaneously, with less premeditation. Authenticity also reflects the extent to which a person self-monitors their speech (Newman et al., 2003; Kalichman and Smyth, 2023; Markowitz et al., 2023). Therefore, we include the "authentic" category from LIWC to examine its relationship with forced CEO turnover. Additionally, prior literature suggests that the use of tentative language may signal psychological distancing between the speaker and their statements (Newman et al., 2003; Larcker and Zakolyukina, 2012). As such, we also incorporate the "tentative" category from LIWC in our analysis of linguistic markers to further investigate the connection between language and forced turnover.

Speakers may craft persuasive arguments or use specific language to appear more convincing when making deceptive claims. Pan et al. (2018) discuss how CEOs' use of concrete language enhances the persuasiveness of their messages and generates positive investor reactions. Another study demonstrates that a higher level of analytical thinking is positively associated with message persuasiveness (Ta et al., 2022). Speakers who exhibit greater analytical thinking tend to use words that reflect formal, logical thought patterns, while those with less analytical thinking often rely on more intuitive and personal language (Pennebaker et al., 2014; Jordan et al., 2019). Consequently, we examine the "analytic" category in LIWC, which captures the analytical thinking of CEOs as previous research has shown that this linguistic marker is associated with the persuasiveness of conference calls (Ta et al., 2022).

Temporal focus reflects a speaker's attention to the past, present, and future (Bluedorn and Wright, 2003; Shipp et al., 2009; Gamache and McNamara, 2019). Gamache and McNamara (2019) discuss how a CEO's temporal focus shapes their perspective and influences their sensitivity to media coverage during major acquisitions. A present focus, in particular, signals an orientation toward the current moment—what is happening "here and now" (Nadkarni and Chen, 2014). Given that our study examines CEO speech patterns during their final conference call before being ousted, understanding their present focus is crucial, as it reflects their attention to the immediate situation. Therefore, we incorporate the "present focus" category from LIWC to assess its association with forced turnover.

In the literature on linguistic psychological processes, Lerner and Keltner (2000) explore how specific emotions influence judgment and decision-making. For example, the use of the pronoun "they" is linked to greater externalization in situations that evoke anger. To assess the "affective process" in CEO verbal communication, we examine the frequency of the pronoun

"they" as a measure of externalization. In the context of the final conference call before forced turnover, the use of "they" reflects how CEOs externalize responsibility or blame. We compare this with the "tentative" measure, which signals psychological distance from their statements.

A study on CEO hubris finds that the use of power-related words is an indicator of excessive CEO confidence (Akstinaite et al., 2020). Language, especially in the context of deceptive behavior and persuasive communication, is a valuable tool for analyzing psychological processes and personality traits (Garrard et al., 2014). One key indicator of hubris identified by Garrard et al. (2014) is the use of power expressions. Therefore, we analyze the use of power-related words from LIWC to assess the level of CEO confidence during the final conference calls before their dismissal.

5. Empirical tests and results

In this section, we present the empirical tests and results that investigate the relationship between CEO language style and forced turnover. We begin by conducting panel data regressions in Section 5.1, where we explore the association between various linguistic attributes in CEOs' verbal communication and the likelihood of forced turnover. This approach allows us to account for firm-level characteristics and potential confounding variables. In Section 5.2, we address concerns related to selection bias and endogeneity by employing propensity score matching (PSM) and entropy balancing techniques. These methods enable us to compare firms with and without forced turnovers while ensuring that the matched samples exhibit similar characteristics, thereby providing more robust and reliable results. Together, these empirical strategies offer comprehensive insights into the predictive power of CEO language style in anticipating forced turnover.

5.1. Panel data regressions

In this section, we investigate the relationship between CEO linguistic measures extracted from LIWC and the likelihood of forced turnover. To do so, we employ a logistic regression model. Our dependent variable, *ForcedTurnover*, is binary—taking a value of one if the CEO is forced out and zero if there is no turnover. The key linguistic measures included in our analysis are "analytic," "authentic," "I" pronoun, "they" pronoun, "affective process," "tentative," "power,"

and "focus present," as outlined in the previous section. Our primary analysis focuses on linguistic features extracted from the management discussion (MD) section of earnings conference calls. For robustness, we also examine the relationship using linguistic measures from the question-and-answer (Q&A) section of the calls.

Consistent with prior studies (e.g., Pan et al., 2018; Bochkay et al., 2019; De Amicis et al., 2021; Comprix et al., 2022; Guo and Zhong, 2023), we control for firm-level characteristics that account for differences in firms' information environments, operations, performance, and uncertainty. These control variables include *Firm Size* (measured as the logarithm of total assets), *ROA* (return on assets, calculated as earnings before extraordinary items scaled by total assets), *MTB* (market-to-book ratio, defined as the market value of equity plus the book value of liabilities divided by the book value of assets), *Return* (average monthly stock return over the quarter), *Leverage* (measured as the ratio of long-term debt to total assets), and *Loss* (an indicator variable equal to one if EPS is negative). Additionally, we include *Earnings Surprise* (measured as the difference per share between actual earnings and the mean consensus analyst forecast, scaled by the stock price at the end of the period), *Following* (analyst following, measured as the logarithm of the number of analysts issuing an earnings forecast), and *Institutional Ownership* (the percentage of institutional holdings, derived from 13-F data, measured as the number of shares held by institutions divided by the total number of shares outstanding).

Furthermore, we control for CEO characteristics, including *Tenure* (measured as the natural logarithm of the number of years between the CEO's appointment date and the current period's end date), *Age* (measured as the natural logarithm of the CEO's age), *Gender* (a dummy variable equal to one if the CEO is female and zero if male), and *Ownership* (measured as the percentage of shares owned by the CEO). These controls align with prior research (e.g., Pukthuanthong et al., 2018; Green et al., 2019; Noh and Zhou, 2022). All these variables are also defined in the Appendix.

We start by testing whether these CEO attributes provide any indication that a dismissal is approaching by estimating the following regression, which compares forced turnovers to cases with no turnover:

$$ForcedTurnover_{it} = \beta_0 + \beta_i\, LIWC\, Var_{it} + \alpha_1 Firm\, Size_{it} + \alpha_2 ROA_{it} + \alpha_3 MTB_{it} + \alpha_4 Leverage_{it} + \alpha_5 Return_{it} + \alpha_6 Earning\, Surprise_{it} + \alpha_7 Loss_{it} + \alpha_8 Following_{it} + \alpha_9 Intsown_{it} + \alpha_{10} CEOTenure_{it} + \alpha_{11} CEOAge_{it} + \alpha_{12} CEOGender_{it} + \alpha_{13} CEOown_{it} + \delta_1 Time\, FE_t + \delta_2 (Firm\, FE_i\ or\ Industry\, FE_i) + \varepsilon_{it} \quad (1)$$

where *ForcedTurnover*$_{it}$ is an indicator variable equal to one if there is a forced turnover between the current and the next conference call, and zero if no turnover occurs during that interval. *LIWC Var*$_{it}$ is linguistic measures extracted from conference calls in each quarter. Firm and CEO level variables are measured as of the end of the quarter.

Table 3 presents the regression results for the model specified in Equation (1). We estimate Models (1) through (4) by incorporating CEO speech measures and control variables while varying the specifications for fixed effects to control for unobserved time, firm, or industry fixed effects. Specifically, Column (1) reports a logit regression of forced CEO turnover with firm fixed effects and year-quarter fixed effects.[1] Column (2) replaces firm fixed effects with fiscal year and industry fixed effects. Column (3) includes both industry and year-quarter fixed effects, while Column (4) applies industry and quarter fixed effects.

[Insert Table 3 here]

The results in Table 3 indicate that CEO linguistic variables are significantly associated with forced turnover, suggesting that CEOs exhibit distinct language patterns during their final conference calls before dismissal. Across all models, linguistic features such as "analytic," "I" pronoun, "power," and "focus present" are positively and significantly associated with the likelihood of forced turnover. Conversely, variables such as "authentic," "they" pronoun, "affective process," and "tentative" are negatively related to the probability of forced turnover.

For instance, in Model (2), a one-percent increase in the usage of "I" pronoun increases the log-odds of forced turnover by 0.399, corresponding to an approximate 49.08% increase in the odds of forced turnover. This effect is statistically significant at the 5% level (p-value = 0.012). Conversely, a one-percent increase in the usage of "they" pronoun decreases the log-odds of forced

[1] Since Model (1) uses a logistic regression with firm fixed effects, the sample size is considerably smaller. This is because firms with no forced turnovers during the sample period are automatically excluded due to the lack of variation in the dependent variable. To address this limitation, we re-estimate Model (1) of Table 3 and the same model of related tables using a linear OLS model, which retains more observations. The OLS results are generally consistent with those from Model (1) of Table 3 and the other tables. For example, in untabulated results, we find that all linguistic variables—except *Tentative*—remain statistically significant and retain their expected signs.

turnover by 0.721, or an approximate 51.40% reduction in the odds of forced turnover, also statistically significant at the 5% level (p-value = 0.022).

These results offer important insights into the predictive power of speech variables from CEOs' final conference calls in forecasting forced turnover. Our findings align with prior literature on deception, persuasion, cognitive emotions, and psychological processes, reinforcing the rationale for selecting specific linguistic features. Notably, the increased use of first-person singular pronouns suggests a heightened self-focus, while the reduced use of affective words indicates a more neutral speech pattern—both commonly associated with deceptive behavior. These findings are consistent with previous research on the role of emotional content in detecting deception (Pennebaker, 2011; Larcker and Zakolyukina, 2012; Hauch et al., 2015).

Furthermore, in line with recent studies (Kalichman and Smyth, 2023; Markowitz et al., 2023), we find that authenticity is negatively associated with forced CEO turnover. A lower authenticity measure further supports the presence of deceptive behavior, suggesting that, during their final conference call, departing CEOs exhibit more carefully managed communication and heightened self-monitoring.

In their well-rehearsed speeches preceding dismissal, CEOs tend to use more analytical language, likely to enhance the persuasiveness of their statements. This finding aligns with the work of Pennebaker et al. (2014) and Ta et al. (2022), which link analytical language to more persuasive message delivery. This persuasive effort is reflected in a reduced psychological distance from their statements, as evidenced by the lower frequency of tentative words. Similar to Lerner and Keltner (2000), we observe a negative coefficient on the "they" pronoun, suggesting a decreased tendency to externalize responsibility is associated with a higher likelihood of dismissal, indicating attributing outcomes by a stronger self-focus rather than external factors. Additionally, consistent with Akstinaite et al. (2020) on CEO hubris, the increased use of power-related words signals heightened confidence in their verbal communication. A stronger focus on the present further suggests that these CEOs are possible well aware of their current circumstances, emphasizing the immediate "here and now." Collectively, these findings suggest that language used during critical organizational events carries meaningful signals about potential changes in executive leadership.

Our analysis of firm-level controls shows that return on assets (ROA), stock return, and the market-to-book ratio (Models 1 and 3) are negatively and significantly associated with the

likelihood of forced CEO turnover. This suggests that larger firms, as well as those with higher profitability, better stock performance, and a stronger market valuation, are less likely to experience CEO dismissals. Conversely, leverage exhibits a significant positive relationship with forced turnover, indicating that CEOs of highly leveraged firms face a greater likelihood of dismissal, likely due to the increased risk of financial distress. However, factors such as earnings surprise, loss measures, the number of analysts following the firm, and the percentage of institutional ownership do not appear to have a significant impact on forced CEO turnovers. Regarding CEO characteristics, those CEOs longer tenures and female CEOs are more likely to be dismissed, whereas CEOs with larger ownership stakes and older CEOs face a lower likelihood of dismissal.

Next, we analyze the linguistic features of CEO conference calls leading up to forced turnovers, focusing on the last four conference calls prior to dismissal. This analysis provides insights into whether CEOs gradually adjust their language in anticipation of potential dismissal, suggesting that they may become aware of their impending exit—or at least recognize the possibility—well before it occurs. The results of the logistic regressions for the trend analysis are presented in Table 4 by following the same CEOs with a forced turnover over four consecutive conference calls before they are dismissed. Table 4 consists of four panels, each corresponding to one of the four conference calls preceding a forced turnover. The panels reveal a clear trend in language changes across the fourth (-4), third (-3), second (-2), and first (-1) conference calls before forced CEO turnovers. In the fourth conference call, nearly a year before the forced turnover (Panel A), no significant linguistic shifts are observed, indicating stability in language use. However, from the third conference call onward (Panel B), subtle changes begin to appear, particularly in variables such as affective processes and present focus, though these shifts are still modest. By the second conference call (Panel C), these changes become more pronounced, with certain linguistic dimensions showing statistically significant variations. This suggests that CEOs' communication becomes increasingly sensitive as forced turnover approaches. The most dramatic shifts are evident in the final conference call (-1) (Panel D), where linguistic variables such as analytic thinking, pronoun use, and expressions of authenticity show highly significant changes.[2]

[2] The number of observations differs slightly between Table 3 and Table 4. Table 3 includes more observations because it considers only the last conference call for each CEO and excludes only the final call preceding voluntary turnovers (since the analysis compares forced turnovers to no turnovers). In contrast, Table 4 excludes the last four conference

These findings suggest that CEOs adjust their communication style in meaningful ways as their forced turnover becomes imminent, with the magnitude of change increasing progressively closer to their dismissal.

[Insert Table 4 here]

Next, we examine voluntary turnovers in a manner similar to our analysis of forced turnovers in Table 3, to assess whether CEOs exhibit specific linguistic patterns prior to voluntary departures. Table 5 presents the logistic regression results for voluntary CEO turnover, with the dependent variable being binary: equal to 1 if the CEO turnover was voluntary and 0 if there was no turnover. Both tables assess the predictive power of linguistic features from CEOs' earnings call discussions, focusing specifically on the management discussion (MD) section. While the primary focus of this study is on forced turnover, Table 5 highlights that voluntary turnover is also associated with significant linguistic patterns. Notably, the "authentic" linguistic measure shows a significant negative relationship with voluntary turnover. Similarly, the use of the "I pronoun" maintains a strong positive relationship with both types of turnover, emphasizing the potential impact of a self-referential communication style on turnover outcomes.

[Insert Table 5 here]

However, linguistic variables such as "analytic," "they" pronoun, "affective process," "tentative," "power," and "focus present" show weaker or insignificant relationships with voluntary turnover, in contrast to their stronger and more significant effects in predicting forced turnover. For example, the use of "they" pronoun is significantly negative at the 5% level in Model (1) of Table 3, but it is insignificantly negative in Model (1) of Table 5 (p-value = 0.905). Overall, these results suggest that emotional expression, uncertainty, and a focus on the present in communication may play a more crucial role in scenarios leading to CEO dismissals than in voluntary exits.

In conclusion, our analysis demonstrates that certain CEO linguistic features are significantly associated with forced turnover. The patterns of language used by CEOs evolve as they approach dismissal, with notable shifts in self-referential language, emotional expression, and focus on the present. While these linguistic variables are strongly linked to forced turnover, their relationship with voluntary turnover is weaker, highlighting the distinct communication patterns

calls prior to voluntary turnovers, ensuring consistency in the sample. This is because Table 4 analyzes linguistic trends over the final four calls leading up to either a forced turnover or no turnover.

in each scenario. These findings provide valuable insights into how CEO communication may signal impending leadership changes and contribute to our understanding of the psychological and cognitive dynamics leading to CEO dismissals.

5.2. Propensity score matching and entropy balancing

To ensure that our results are not driven by differences in firm or CEO characteristics, we employ propensity score matching (PSM) and entropy balancing. These methods allow us to create a more comparable control group by matching or reweighting firms without CEO turnover to those with forced turnover, thereby reducing selection bias and improving the validity of our findings.

For the PSM method, we perform a one-to-one match for each fired CEO's conference call with that of a CEO who remained with the company (no turnover). We select the pairs that are most similar based on the estimated logit model using firm-level characteristics, implementing nearest-neighbor matching with a caliper of 0.01 to minimize the risk of poor matches. The objective of PSM in our analysis is to compare CEOs' linguistic measures between the treatment group (forced turnover) and the control group (no turnover) while ensuring similar firm performance. We consider firm size, stock return, ROA, and market-to-book ratio, as these are key indicators of firm performance and profitability (e.g., Frye and Pham, 2018; Pukthuanthong et al., 2018; Fan et al., 2021). As a result, 222 out of 224 CEO conference call observations with a forced turnover are successfully matched with conference call observations from CEOs with no turnover. Once treatment and control samples are matched, we examine the verbal measures used during the CEOs' conference calls. The significance of differences in linguistic features between the two groups is assessed using t-statistics.

We present the results of the propensity score matching analysis in Table 6. Panel A reports the outcomes of the initial step, which involves performing a logit regression of the forced CEO turnover variable on firm characteristics such as firm size, stock return, ROA, and market-to-book ratio as noted above. The findings in Panel A show that the treated sample (forced turnover) and the control sample (no turnover) exhibit similar levels of firm characteristics across all three matching specifications. Specification 1 matches firms within the same industry (as defined by the first two digits of the Standard Industrial Classification) and the same fiscal quarter. Specification 2 matches firms within the same industry, while Specification 3 matches firms within the same industry and the same fiscal year. The results are consistent across all three specifications,

confirming that the two matched groups (forced turnover and no turnover) have comparable firm performance.

In Panel B of Table 6, we present the differences in linguistic measures between the forced turnover sample and the matched no turnover sample in the column titled "Forced vs. No Turnover." Consistent with the results in Table 3, Panel B shows that CEOs in the forced turnover group use a higher level of analytical language and a lower level of authenticity (Specification 1 and 3). Their speech also contains a higher frequency of "I" pronoun and a lower frequency of "They" pronoun across all three specifications. Furthermore, fired CEOs use fewer affective words in their conference calls (Specification 2), display lower levels of tentative language (Specifications 1 and 2), and exhibit a greater use of power-related words (Specification 1) and a stronger focus on the present (Specification 3). These findings provide consistent evidence, reinforcing the panel regression results, that dismissed CEOs demonstrate specific linguistic features prior to their dismissal relative to non-departing CEOs.

[Insert Table 6 here]

We further complement the propensity score matching approach by conducting a conditional logit regression on our matched sample. Table 7 presents the results of this regression for the three matched samples. The regressions on that matched samples with similar firm characteristics underscores that these CEOs adopt distinct linguistic styles independent of firm-specific factors, potentially signaling their awareness of an impending dismissal. The findings confirm the presence of CEO-specific verbal communication patterns during conference calls prior to forced turnover. Specifically, we observe that certain linguistic features—such as less frequent use of "They" pronoun, and increased use of present-focused language—are consistently associated with CEOs who experience forced turnover. The negative relationship with authenticity suggests that these CEOs may use a less transparent communication style, possibly to manage perceptions as they navigate challenging circumstances. Additionally, the significant positive association with present-focused language indicates an emphasis on immediate issues, reflecting an acute awareness of current pressures. These patterns align with prior research on linguistic cues discussed in Section 4, illustrating how specific verbal choices can signal an approaching CEO dismissal.

[Insert Table 7 here]

We also conduct an entropy balancing analysis to further validate the robustness of our findings. Table 8 presents the results of this analysis in two panels. Panel A compares performance variables between firms experiencing forced CEO turnover and those without turnover, both before and after weighting. The results show that, after applying entropy balancing, the forced turnover and control samples exhibit similar performance characteristics, ensuring comparability between the two groups. Panel B examines the differences in linguistic measures between CEOs in forced turnover firms and those in no turnover firms after weighting. The results are consistent with those from the propensity score matching approach, further confirming that linguistic features such as lower authenticity, increased use of present-focused language, and reduced use of "They" pronoun are associated with CEOs experiencing forced turnover. This additional analysis supports the robustness of our findings and provides further evidence that linguistic cues can serve as meaningful indicators of an impending CEO dismissal.

[Insert Table 8 here]

In conclusion, both the propensity score matching (PSM) and entropy balancing analyses provide robust support for our findings regarding the relationship between CEO linguistic features and forced turnover. The PSM results demonstrate that the forced turnover and control groups exhibit comparable firm performance, ensuring that observed linguistic differences are not driven by firm-specific characteristics. Similarly, the entropy balancing analysis corroborates these results by aligning performance variables across the two groups and confirming that linguistic features, such as reduced authenticity and increased present-focused language, are consistently associated with CEOs facing forced turnover. Together, these complementary methodologies strengthen the validity of our conclusions, highlighting that distinct verbal communication patterns precede CEO dismissals, independent of firm performance, and providing further evidence of the predictive power of CEO speech in turnover scenarios.

6. Supplementary analysis

The panel regression, propensity score matching, and entropy balancing analyses indicate that CEOs' linguistic patterns during their final conference calls are significantly associated with forced turnover. To further explore these linguistic features, we analyze a sample of newly appointed CEOs following both forced and voluntary turnovers. Using a difference-in-differences regression, we examine changes in verbal communication as firms transition to new CEOs. This

analysis reinforces our main findings by demonstrating that CEOs' communication styles shift prior to dismissal while also highlighting how the nature of turnover influences the linguistic patterns of their successors.

Additionally, we investigate CFOs' speech during earnings conference calls, specifically focusing on their language style before a CEO's forced departure. This analysis helps determine whether linguistic shifts are unique to CEOs or if other top executives, such as CFOs, also adjust their speech patterns in anticipation of a leadership change. Finally, as a robustness check, we analyze the question-and-answer (Q&A) portion of earnings calls to compare linguistic measures with those extracted from the management discussion (MD) section. Since CEOs likely have greater control over the content in the MD section, we expect the observed language shifts to be more pronounced there than in the Q&A segment.

Collectively, these supplementary analyses provide further evidence that CEOs modify their language before a forced turnover, suggesting an awareness of their impending dismissal.

6.1. Do new CEOs have distinct communication patterns?

Using a sample of incoming CEOs following forced turnovers, we analyze the linguistic differences between the speech patterns of ousted CEOs during their final conference calls and those of newly appointed CEOs during their first conference call after taking over. From the full sample of CEOs in ExecuComp, we identify a new CEO following each turnover, defining a binary variable equal to one when a new CEO first appears in the firm. This process yields 151 new CEO conference call observations out of 224 forced turnover cases. Table 9 reports differences in language style during conference calls after a new CEO takes over following a turnover. Panel A presents linguistic measures for new CEOs succeeding a forced turnover, while Panel B examines new CEOs following a voluntary turnover.

[Insert Table 9 here]

The findings in Panel A indicate that incoming CEOs are less analytical and exhibit greater authenticity, suggesting a more spontaneous speaking style in their first conference call compared to the final conference call of ousted CEOs. A higher frequency of "I" pronouns and increased use of affective language suggest a shift away from a strategic or less transparent communication style, reinforcing the notion that efforts to manage perceptions may intensify in the final conference calls before a CEO's dismissal. We also observe that incoming CEOs are more likely to focus on the

present than dismissed CEOs. At the same time, we do not observe significant differences in the use of "They" pronoun, tentative language, or power-related words.

Examining new CEOs' language after voluntary turnovers in Panel B, we find that they exhibit lower tentativeness and use fewer power-related words compared to their retired predecessors. Similar to the final conference calls before a forced turnover, new CEOs' first conference calls maintain a strong present focus. The findings on "I" pronoun usage and present focus suggest that new CEOs emphasize immediacy and personal agency, aligning with the need to project control and confidence during their initial public appearances.

Prior research by Bochkay et al. (2019) suggests that newly appointed CEOs tend to exhibit greater optimism early in their tenure, which declines over time. They measure optimism as the difference between the number of positive and negative words, scaled by the total word count. In our analysis, the affective process captures the overall emotional tone in CEOs' speech, and we find that it is significantly higher for incoming CEOs.

To further investigate this heightened emotional expression, – in an unreported table – we examine the positive and negative emotion categories, which are subcomponents of the affective process in LIWC. Our findings indicate that new CEOs use more positive and fewer negative emotion words in their first conference calls following a forced turnover. For instance, the average score for positive emotion words is 4.363 for new CEOs compared to 3.839 for fired CEOs, a difference that is statistically significant at the 1% level. In terms of negative emotion words, new CEOs score 0.438 words versus 0.505 for fired CEOs, a difference that is significant at the 10% level. These patterns suggest that new CEOs tend to communicate with greater optimism and less negativity as they take over leadership.

Next, we examine whether variations in new CEOs' speech patterns are influenced by the type of turnover. To do so, we perform a difference-in-difference analysis to determine whether new CEOs' verbal communication differs significantly following a forced turnover compared to a voluntary turnover. Our sample includes 728 cases of voluntary turnovers and 149 cases of Forced turnovers with observations for new CEOs' conference calls.

The difference-in-difference approach allows us to capture not only changes in linguistic attributes but also the direction of these changes in LIWC-derived measures after a new CEO assumes control while controlling for firm characteristics. We implement this framework using the full sample of new CEOs following both types of turnovers, comparing linguistic changes between

transitions from a fired CEO to a new CEO and from a retired CEO to a new CEO. The following specification outlines our approach:

$$LIWC\ Var_{it} = \beta_0 + \beta_1\ FV_{it} \times Post_{it} + \beta_2\ FV_{it} + \beta_3\ Post_{it} + \alpha_1\ Firm\ Size_{it} + \alpha_2 ROA_{it} + \alpha_3 MTB_{it} + \alpha_4 Leverage_{it} + \alpha_5 Return_{it} + \alpha_6 Earning\ Surprise_{it} + \alpha_7 Loss_{it} + \alpha_8 Following_{it} + \delta_1 Time\ FE_t + \delta_2 Firm\ FE_i + \varepsilon_{it} \quad (2)$$

In this specification, $LIWC\ Var_{it}$ represents the linguistic measures ("Analytic," "Authentic," "I" pronoun, "They" pronoun, "Affective Process," "Tentative," "Power," and "Focus Present") in the final conference call of departing CEOs and the first conference call of newly appointed CEOs. FV_{it} is a treatment indicator denoting the type of turnover, taking a value of 1 for forced turnovers and 0 for voluntary turnovers. $Post_{it}$ is an indicator variable that equals 1 for new CEOs and 0 for departing CEOs in conference call observations. Other control variables are consistent with those described in Equation (1). The coefficient β_1 represents the difference-in-difference estimator, capturing the impact of forced turnover on the linguistic style of new CEOs relative to those who assume leadership following an ordinary (voluntary) turnover.

The results of the difference-in-difference specification are presented in Table 10 and are generally consistent with the findings in Table 3, which highlight linguistic differences in newly appointed CEOs following a forced turnover. The linguistic features—analytical thinking, "I" pronoun usage, affective process, tentative words, and present focus—retain consistent directional effects. Specifically, newly hired CEOs who take over after a forced turnover exhibit lower analytical thinking, greater use of self-referential words, higher expression of emotion, fewer tentative words, and an increased focus on the present in their first conference call compared to incoming CEOs following a voluntary turnover.

[Insert Table 10 here]

Overall, these findings suggest that newly appointed CEOs adjust their verbal communication style more noticeably when stepping into a role after a forced turnover than after an orderly transition. Moreover, the results reinforce the earlier evidence that departing CEOs exhibit distinct linguistic patterns before being dismissed. By focusing on linguistic changes after the leadership transition, the difference-in-difference analysis helps isolate the effect of turnover type on new CEOs' communication styles.

6.2. Do CFOs also change their language style?

Earnings conference calls provide an opportunity to analyze the language styles of not only CEOs but also other executives, such as CFOs, who participate in these discussions. To determine whether the linguistic changes observed in CEOs' final conference calls before dismissal are unique to their role, we examine CFOs' speech patterns. Using the matched sample of fired CEOs and non-departing CEOs from firms with similar characteristics (firm size, ROA, stock return, and book-to-market ratio) presented in Table 7, we replace CEOs' speech with that of CFOs.

Out of the 222 matched CEO conference call observations, we identify 213 cases where CFOs participated in the conference calls. By leveraging the matched sample derived from the propensity score matching method, we can analyze differences in CFO communication styles within the same industry and fiscal year. This approach allows us to first explore variations in CFOs' linguistic features between firms that experienced a forced CEO turnover and those that did not. Ultimately, this analysis helps determine whether the observed linguistic changes are specific to CEOs or whether they also extend to other top executives.

Table 11 compares CFO language styles between CFOs in companies with forced CEO turnovers and those in matched companies without turnovers. Each CFO observation from the forced turnover subsample is matched with one from the no-turnover group, with differences reported in the "Forced vs. No" column. The lack of significant results suggests that CFOs do not alter their language style, reinforcing the idea that the observed linguistic shifts are specific to CEOs. [3]

[Insert Table 11 here]

Next, we investigate whether variations in CFOs' speech patterns are influenced by the type of turnover. To do this, we analyze their speech patterns using a difference-in-difference approach to examine whether there are significant differences in CFOs' verbal language following a forced turnover compared to a voluntary turnover. Using the framework in Table 10, we compare changes in CFO linguistic measures between the transitions of fired CEOs to new CEOs and retired CEOs to new CEOs using specification (2). Here, $LIWC\ Var_{it}$ represents linguistic measures ("Analytic," "Authentic," "I" pronoun, "They" pronoun, "Affective Process," "Tentative,"

[3] When we repeat the analysis using matched firms—either from the same industry and fiscal quarter or from the same industry alone—we find no significant change in CFOs' language style.

"Power," and "Focus Present") in the final conference call for CFOs before and after a CEO turnover.

The results of the difference-in-difference analysis are reported in Table 12. The results from the difference-in-difference analysis, which focuses on linguistic changes after the transition, allow us to better isolate the effects of the type of turnover on CFOs. We again find consistent evidence that CFOs do not change their language style. The findings indicate that CFOs' verbal communication before a turnover is similar between the first conference calls following both forced and voluntary turnovers. These results align with those presented in Table 11, which reports the matched sample of CFOs between forced turnover and no turnover. Therefore, our analysis shows that language style changes are specific to CEOs and not CFOs.

[Insert Table 12 here]

6.3. Language styles in Q&A portion of conference calls

We further examine CEO language patterns in the Q&A portion of earnings calls, where responses are less scripted and more reactive. Unlike the management discussion (MD) section, which allows for careful message crafting, the Q&A segment provides a setting where CEOs have less control over their communication, offering a different perspective on linguistic indicators of forced turnover.

Table 13 presents the results of logistic regressions examining the relationship between CEO linguistic measures during the Q&A portion of conference calls and forced CEO turnover. The models include fixed effects for year, and year-quarter, firm, and industry as outlined in Table 3. The results show that while some linguistic measures, such as "analytic" and "I" pronoun, are positively associated with forced turnover, the overall strength of the coefficients is weaker compared to those observed in the management discussion (MD) section, as reported in Table 3. Additionally, several linguistic measures, including "affective process," "tentative," "power," and "focus present," show no significant association with forced turnover.

[Insert Table 13 here]

These findings suggest that the language used in the MD portion of earnings calls provides a stronger and more consistent signal of potential CEO turnover compared to the Q&A section, where the associations are less reliable. This aligns with the argument that CEOs have more control over the prepared and scripted MD section, whereas the Q&A portion is more reactive and less

structured. Therefore, the results highlight that the CEOs' language style during the MD section serves as a channel through which they adjust their verbal communication, indicating that they may be aware of their imminent dismissal.

6.4. Overconfidence as control variable

To account for the potential role of managerial traits in CEO turnover decisions, we incorporate a measure of CEO overconfidence following the options-based approach in Malmendier et al. (2011). Specifically, we classify a CEO as overconfident if they hold deeply in-the-money stock options rather than exercising them, reflecting an optimistic belief about future firm performance. The measure is constructed using ExecuComp data by computing the moneyness of unexercised options and identifying CEOs who persistently retain options with a moneyness of at least 67%.

We merge this measure with our main dataset, resulting in a matched sample of 44,421 firm-year observations. Including overconfidence in the baseline logistic regression does not materially alter our main results. The coefficient on overconfidence is negative and statistically significant, indicating that overconfident CEOs are less likely to experience forced turnover, consistent with prior evidence that such CEOs may resist dismissal or are perceived differently by boards. Importantly, the inclusion of this variable does not affect the estimated effects of the linguistic measures, suggesting that our findings are robust to controlling for CEO behavioral traits.

6.5. Institutional Ownership Structure

To further assess the robustness of our results, we incorporate institutional ownership structure based on the Bushee classification, which distinguishes between dedicated, transient, and quasi-indexer investors. Using data constructed from TR-13F filings, we compute the percentage ownership of each investor type and include these measures as additional controls. The results indicate that none of the institutional ownership variables are statistically significant, suggesting that variation in ownership structure does not affect the likelihood of forced CEO turnover. Importantly, the coefficients and significance levels of the main linguistic variables remain largely

unchanged. This consistency implies that our baseline findings are not driven by differences in institutional ownership composition and are robust to controlling for investor heterogeneity.

7. Conclusion

We examine how CEO language style changes in the final earnings conference calls before dismissal, revealing linguistic patterns that signal impending forced turnover. Through panel regressions, propensity score matching, entropy balancing, and difference-in-difference analyses, we find that CEOs on the brink of dismissal exhibit distinct speech characteristics, including higher analytical language, increased use of first-person pronouns, and lower authenticity. These patterns persist across multiple analytical approaches, reinforcing the robustness of language as a potential indicator of forced turnover.

Further analyses highlight notable differences in the communication styles of newly appointed CEOs following forced versus voluntary turnovers. After a forced turnover, new CEOs tend to adopt a less analytical and more authentic speech style, marking a clear departure from the strategic, and potentially defensive, language of their predecessors. This shift suggests that the nature of a CEO transition—whether forced or voluntary—has a measurable impact on executive communication.

Additionally, our examination of CFOs' language use suggests that these linguistic shifts are specific to CEOs, as CFOs do not exhibit similar changes before a CEO's dismissal. This distinction highlights the unique pressures CEOs face when managing stakeholder perceptions amid leadership uncertainty. Moreover, our comparison of the management discussion (MD) and Q&A portions of conference calls underscores the role of speech control in shaping communication patterns. While CEOs' language in the MD section shows strong and consistent associations with forced turnover, the Q&A segment—being more reactive and unscripted—exhibits weaker and less reliable links to dismissal. This finding reinforces the idea that CEOs strategically manage their language when they have greater control over messaging.

By demonstrating that linguistic cues in earnings conference calls can serve as signals of leadership instability, our study contributes to the literature on executive communication and corporate governance. These findings have meaningful implications for investors, analysts, and corporate boards, offering a new dimension for assessing CEO performance and anticipating leadership changes.

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Appendix A

Variable	Definition
Forced (Voluntary) Turnover	An indicator variable equal to one if there is a forced (voluntary) turnover between the current and the next conference call, and zero if no turnover occurs during that interval.
Analytic	LIWC measure capturing the degree of formal, logical, and hierarchical thinking in CEOs' speech.
Authentic	LIWC measure assessing the level of honesty, personal disclosure, and genuineness in CEOs' speech.
I Pronoun	LIWC measure indicating the frequency of first-person singular pronoun ("I") usage in CEOs' speech.
They Pronoun	LIWC measure indicating the frequency of third-person plural pronoun ("they") usage in CEOs' speech.
Affective Process	LIWC measure representing the frequency of emotion-related words in CEOs' speech.
Tentative	LIWC measure indicating the degree of uncertainty or hesitation in language (e.g., maybe, perhaps).
Power	LIWC measure capturing the use of words related to dominance, leadership, and influence.
Focus Present	LIWC measure reflecting the emphasis on the present time (e.g., now, today) in speech.
Firm Size	Natural logarithm of total assets at the end of the fiscal quarter.
ROA	Return on assets; earnings before extraordinary items divided by total assets.
MTB	Market-to-book; Market value of equity plus book value of liabilities divided by book value of assets.
Return	Average monthly stock return over the quarter
Leverage	Ratio of long-term debt to total assets.
Loss	Indicator variable equal to 1 if earnings per share (EPS) are negative, and 0 otherwise.
Earnings Surprise	Actual earnings per share minus consensus analyst forecast per share divided by stock price at the end of the quarter.
Following	Natural logarithm of the number of analysts issuing an earnings forecast for the firm.
Institutional Ownership	Percentage of shares held by institutional investors, calculated from 13-F filings.
CEO Tenure	Natural logarithm of the number of years between the CEO's appointment date and the end of the current period.
CEO Age	Natural logarithm of the CEO's age.
CEO Gender	Dummy variable equal to 1 if the CEO is female and 0 if male.
CEO Ownership	Percentage of outstanding shares owned by the CEO.

Table 1: Sample selection

This table provides an overview of our sample construction process and the distribution of CEO turnover events. Panel A reports the total number of firm-year observations and cases of CEO turnover and forced turnovers from 2010 to 2018. Forced CEO turnovers are classified based on Parrino (1997) and Campbell et al. (2011). Panel B summarizes our process of creating the final sample.

Panel A: Distribution of annual CEO turnovers from ExecuComp.

Year	Number of Observations	Number of Turnovers	Number of Forced Turnovers	Forced as % of total Turnovers
2010	2,141	180	38	21.1%
2011	2,118	198	42	21.2%
2012	2,091	192	47	24.5%
2013	2,088	183	30	16.4%
2014	2,074	192	43	22.4%
2015	2,004	198	38	19.2%
2016	1,928	196	38	19.4%
2017	1,876	182	30	16.5%
2018	1,811	185	41	22.2%
Total	**18,131**	**1,706**	**347**	**20.3%**

Panel B: Sample selection for quarterly CEO turnovers

	Number of Observations	Number of Forced Turnovers	Voluntary Turnovers
Firm-year observations from ExecuComp	18,131	347	1,359
Firm-quarter observations with Compustat and CRSP data	69,087	319	1,303
Firm-quarter observations with conference call transcripts	45,438	224	923

Table 2: Summary statistics

This table reports summary statistics for the linguistic attributes derived from LIWC in the last conference call (Panel A), along with firm-level and CEO-level variables (Panel B), for staying CEOs (No Turnover), forced-out CEOs (Forced Turnover), and the difference between the two groups. Additionally, the table includes the mean and standard deviation of each linguistic measure as reported in the LIWC manual. The grand means represent the unweighted average across six LIWC genres, while the reported standard deviations (Mean SDs) reflect the unweighted average of standard deviations across those genres.

	No Turnover			Forced Turnover			Difference: No turnover and Forced turnover		LIWC Manual	
Variables	**Mean (1)**	**Median (2)**	**SD (3)**	**Mean (4)**	**Median (5)**	**SD (6)**	**Mean (7)**	**p-Value (8)**	**Grand Mean (9)**	**Mean SD (10)**
Panel A: Linguistic features										
Analytic	91.314	93.110	6.875	91.594	93.225	6.314	-0.279	(0.544)	56.34	17.58
Clout	89.087	90.350	6.537	89.601	90.720	5.903	-0.514	(0.240)	57.95	17.51
Authentic	44.533	43.960	13.485	43.059	41.260	12.526	1.474	(0.103)	49.17	20.92
Tone	81.970	84.940	13.362	81.827	85.795	13.140	0.143	(0.873)	54.22	23.27
Function Words	44.276	43.930	3.826	44.395	43.895	3.537	-0.119	(0.643)	51.87	5.13
I Pronoun	0.613	0.500	0.474	0.700	0.470	0.725	-0.087***	(0.006)	4.99	2.46
We Pronoun	5.833	5.830	1.527	5.912	5.985	1.498	-0.079	(0.441)	0.72	0.83
You Pronoun	0.387	0.300	0.340	0.361	0.250	0.339	0.026	(0.253)	1.70	1.35
She/He Pronoun	0.053	0.000	0.148	0.077	0.000	0.175	-0.025**	(0.013)	1.88	1.53
They Pronoun	0.267	0.190	0.282	0.238	0.170	0.241	0.029	(0.125)	0.66	0.60
Impersonal Pronoun	3.019	2.870	1.106	2.996	2.875	1.111	0.023	(0.754)	5.26	1.62
Prepositions	16.380	16.370	1.302	16.476	16.350	1.188	-0.096	(0.272)	12.93	2.11
Adverbs	2.570	2.370	1.078	2.401	2.225	0.961	0.169**	(0.019)	5.27	1.61
Conjunctions	5.452	5.410	0.991	5.533	5.470	0.956	-0.081	(0.220)	5.90	1.57
Negations	0.249	0.200	0.229	0.232	0.200	0.200	0.017	(0.269)	1.66	0.86
Comparisons	2.750	2.710	0.762	2.786	2.750	0.740	-0.036	(0.478)	2.23	0.95
Interrogatives	0.625	0.580	0.343	0.616	0.575	0.312	0.009	(0.683)	1.61	0.76
Numbers	5.706	5.210	2.693	5.134	4.745	2.384	0.571***	(0.002)	2.12	2.07
Quantifier	2.163	2.110	0.672	2.103	2.060	0.595	0.060	(0.181)	2.02	0.83
Affective Process	4.453	4.370	1.106	4.386	4.400	1.028	0.066	(0.370)	5.57	1.99
Positive Emotion	3.926	3.840	1.078	3.867	3.955	1.001	0.059	(0.411)	3.67	1.63
Negative Emotion	0.503	0.430	0.385	0.500	0.445	0.332	0.003	(0.897)	1.84	1.09
Anxiety	0.094	0.050	0.143	0.090	0.060	0.138	0.004	(0.680)	0.31	0.32
Anger	0.063	0.000	0.109	0.068	0.000	0.120	-0.004	(0.556)	0.54	0.59
Sadness	0.194	0.140	0.219	0.185	0.150	0.173	0.009	(0.538)	0.41	0.40
Social Process	8.947	8.910	2.017	9.085	9.090	1.891	-0.138	(0.307)	9.74	3.38
Cognitive Process	7.076	6.970	1.462	7.075	7.050	1.298	0.002	(0.987)	10.61	3.02
Insight	1.305	1.240	0.580	1.290	1.270	0.518	0.014	(0.717)	2.16	1.08
Discrepancy	0.715	0.660	0.388	0.722	0.690	0.372	-0.007	(0.785)	1.44	0.80
Tentative	1.167	1.070	0.588	1.075	0.990	0.526	0.092**	(0.019)	2.52	1.09
Certainty	1.055	1.010	0.438	1.050	1.060	0.405	0.005	(0.876)	1.35	0.70
Differentiation	1.229	1.150	0.598	1.148	1.055	0.523	0.082*	(0.041)	2.99	1.18

Perceptual Process	1.064	0.980	0.562	1.122	1.070	0.566	-0.059	(0.118)	2.70	1.20
Drives	14.132	14.110	2.441	14.212	14.055	2.334	-0.080	(0.624)	6.93	2.03
Affiliation	6.759	6.730	1.673	6.847	6.805	1.592	-0.088	(0.432)	2.05	1.28
Achieve	3.328	3.270	1.121	3.467	3.500	1.072	-0.139*	(0.064)	1.30	0.82
Power	3.310	3.220	0.969	3.348	3.245	1.000	-0.038	(0.563)	2.35	1.12
Risk	0.324	0.240	0.327	0.322	0.235	0.337	0.002	(0.927)	0.47	0.41
Focus Past	2.188	2.110	0.803	2.106	1.980	0.692	0.082	(0.126)	4.64	2.06
Focus Present	6.462	6.300	1.690	6.598	6.525	1.598	-0.136	(0.229)	9.96	2.80
Focus Future	1.612	1.560	0.640	1.711	1.590	0.698	-0.099**	(0.021)	1.42	0.90
Informal	0.288	0.240	0.237	0.275	0.215	0.303	0.013	(0.418)	2.52	1.65

Panel B: Firm and CEO characteristics

Variables	**No Turnover**			**Forced Turnover**			**Difference: No turnover and Forced turnover**	
	Mean	**Median**	**SD**	**Mean**	**Median**	**SD**	**Mean**	**p-Value**
Firm Size	7.964	7.879	1.744	7.741	7.525	1.914	0.223*	(0.057)
ROA	0.011	0.011	0.025	0.002	0.006	0.031	0.008***	(0.000)
Earning Surprise	0.001	0.000	0.037	0.000	0.000	0.015	0.000	(0.849)
Loss	0.083	0.000	0.276	0.129	0.000	0.336	-0.047**	(0.012)
MTB	2.004	1.551	1.342	1.761	1.400	1.218	0.243***	(0.007)
Leverage	0.224	0.197	0.195	0.245	0.223	0.207	-0.021	(0.122)
Analyst Following	2.233	2.197	0.667	2.205	2.197	0.695	0.028	(0.552)
Return	0.013	0.013	0.060	-0.009	-0.005	0.079	0.022***	(0.000)
Tenure	1.862	1.909	0.817	1.736	1.719	0.582	0.126**	(0.021)
Ownership	0.021	0.006	0.061	0.008	0.004	0.011	0.013***	(0.001)
Age	4.043	4.043	0.119	3.991	4.007	0.095	0.052***	(0.000)
Gender	0.047	0.000	0.211	0.068	0.000	0.252	-0.021	(0.138)
Institutional Ownership	0.813	0.854	0.171	0.805	0.848	0.196	0.008	(0.523)

Table 3: Linguistic variables and forced CEO turnover

This table presents estimated coefficients from a logistic regression of LIWC-derived linguistic measures in CEOs' earnings conference calls on the likelihood of a forced CEO turnover, using the Management Discussion (MD) section of the calls. The four models incorporate various fixed effects, including firm, fiscal year, fiscal quarter, year-quarter, and industry fixed effects. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Forced CEO Turnover			
Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
LIWC linguistic variables				
Analytic	0.103***	0.043**	0.043**	0.042**
	(0.000)	(0.039)	(0.045)	(0.045)
Authentic	-0.023**	-0.017***	-0.016**	-0.017***
	(0.018)	(0.007)	(0.013)	(0.010)
I Pronoun	0.932***	0.399**	0.379**	0.397**
	(0.000)	(0.012)	(0.022)	(0.014)
They Pronoun	-1.067**	-0.721**	-0.715**	-0.710**
	(0.035)	(0.022)	(0.025)	(0.021)
Affective Process	-0.275**	-0.154*	-0.144*	-0.140*
	(0.030)	(0.063)	(0.084)	(0.091)
Tentative	-0.430*	-0.220	-0.212	-0.268
	(0.069)	(0.184)	(0.200)	(0.111)
Power	0.621***	0.214**	0.213**	0.213**
	(0.000)	(0.035)	(0.038)	(0.035)
Focus Present	0.300***	0.195**	0.198**	0.195**
	(0.004)	(0.010)	(0.011)	(0.011)
Control variables				
Firm Size	-0.013	-0.143	-0.149	-0.125
	(0.975)	(0.141)	(0.128)	(0.188)
ROA	-7.824**	-9.384***	-9.176***	-9.226***
	(0.050)	(0.004)	(0.005)	(0.003)
Earnings Surprise	0.349	0.425	0.497	0.504
	(0.905)	(0.557)	(0.543)	(0.499)
Loss	-0.607	-0.085	-0.058	-0.084
	(0.157)	(0.777)	(0.848)	(0.781)
MTB	-0.397**	-0.179	-0.182*	-0.146
	(0.028)	(0.103)	(0.099)	(0.152)
Leverage	2.337*	1.003*	1.010*	1.085**
	(0.057)	(0.072)	(0.068)	(0.047)
Following	0.335	0.220	0.222	0.188
	(0.414)	(0.281)	(0.278)	(0.342)
Return	-1.344	-3.688**	-3.746**	-3.549**
	(0.399)	(0.012)	(0.013)	(0.012)
Tenure	2.592***	0.407***	0.395***	0.388***
	(0.000)	(0.000)	(0.000)	(0.000)

Ownership	-90.511***	-35.875***	-35.867***	-36.267***
	(0.000)	(0.001)	(0.001)	(0.001)
Age	-5.685***	-4.293***	-4.205***	-3.893***
	(0.000)	(0.000)	(0.000)	(0.000)
Gender	0.758	0.678**	0.671**	0.650**
	(0.223)	(0.036)	(0.038)	(0.044)
Institutional Ownership	-0.241	-0.571	-0.561	-0.383
	(0.843)	(0.306)	(0.312)	(0.484)
Constant		7.763**	6.812*	6.359*
		(0.041)	(0.086)	(0.099)
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,859	33,138	33,136	33,138
Pseudo R^2	0.278	0.100	0.113	0.081

Table 4:Trend analyses of linguistic variables and forced CEO turnover

This table presents a trend analysis of estimated coefficients from logistic regressions of LIWC-derived linguistic measures in CEOs' earnings conference calls on the likelihood of a forced CEO turnover. The analysis uses the Management Discussion (MD) section of calls from the fourth conference call before dismissal (-4) through to the last conference call before dismissal (-1). The four models include fixed effects for firm, fiscal year, fiscal quarter, year-quarter, and industry. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Forced CEO turnover using conference call (-4)

Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
Analytic	-0.017	-0.026	-0.021	-0.021
	(0.521)	(0.221)	(0.346)	(0.324)
Authentic	-0.008	-0.005	-0.005	-0.005
	(0.421)	(0.533)	(0.520)	(0.473)
I Pronoun	-0.301	-0.380	-0.392	-0.375
	(0.373)	(0.161)	(0.154)	(0.168)
They Pronoun	-0.706	-0.232	-0.246	-0.230
	(0.126)	(0.499)	(0.473)	(0.498)
Affective Process	-0.148	-0.053	-0.055	-0.063
	(0.278)	(0.564)	(0.549)	(0.500)
Tentative	0.143	-0.039	-0.025	-0.022
	(0.573)	(0.821)	(0.884)	(0.894)
Power	-0.126	-0.180	-0.177	-0.172
	(0.412)	(0.142)	(0.147)	(0.165)
Focus Present	0.009	-0.018	0.002	0.004
	(0.935)	(0.815)	(0.983)	(0.960)
Controls	Yes	Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,018	30,436	29,764	30,782
Pseudo R^2	0.228	0.062	0.087	0.064

Panel B: Forced CEO turnover using conference call (-3)

Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
Analytic	0.053	0.011	0.009	0.008
	(0.106)	(0.652)	(0.706)	(0.730)
Authentic	-0.011	-0.003	-0.005	-0.005
	(0.299)	(0.639)	(0.494)	(0.514)
I Pronoun	-0.522	-0.501**	-0.503**	-0.506**
	(0.177)	(0.044)	(0.041)	(0.042)
They Pronoun	-0.579	-0.211	-0.240	-0.245

	(0.226)	(0.557)	(0.498)	(0.490)
Affective Process	-0.347**	-0.109	-0.113	-0.119
	(0.014)	(0.221)	(0.202)	(0.180)
Tentative	-0.365	-0.348**	-0.360**	-0.368**
	(0.161)	(0.040)	(0.032)	(0.025)
Power	0.175	-0.111	-0.109	-0.106
	(0.265)	(0.269)	(0.283)	(0.294)
Focus Present	0.178	0.099	0.093	0.090
	(0.121)	(0.182)	(0.212)	(0.227)
Controls	Yes	Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,061	30,851	30,056	30,851
Pseudo R^2	0.275	0.072	0.091	0.072

Panel C: Forced CEO turnover using conference call (-2)

Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
Analytic	0.089***	0.036*	0.031	0.031
	(0.010)	(0.066)	(0.115)	(0.112)
Authentic	-0.009	-0.003	-0.002	-0.002
	(0.409)	(0.668)	(0.739)	(0.734)
I Pronoun	0.206	-0.112	-0.119	-0.120
	(0.500)	(0.675)	(0.655)	(0.654)
They Pronoun	-0.639	-0.193	-0.199	-0.203
	(0.197)	(0.556)	(0.543)	(0.530)
Affective Process	-0.542***	-0.171*	-0.171*	-0.169*
	(0.000)	(0.073)	(0.071)	(0.075)
Tentative	-0.367	-0.228	-0.247	-0.266*
	(0.154)	(0.151)	(0.120)	(0.090)
Power	0.230	-0.064	-0.074	-0.077
	(0.132)	(0.512)	(0.455)	(0.435)
Focus Present	0.226**	0.170**	0.151**	0.150**
	(0.047)	(0.014)	(0.033)	(0.031)
Controls	Yes	Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,130	30,859	30,131	30,859
Pseudo R^2	0.286	0.0725	0.085	0.072

Panel D: Forced CEO turnover using conference call (-1)

Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
Analytic	0.121***	0.043**	0.043**	0.042*
	(0.000)	(0.041)	(0.048)	(0.051)
Authentic	-0.024**	-0.018***	-0.017**	-0.017***
	(0.017)	(0.007)	(0.011)	(0.01)
I Pronoun	1.018***	0.395**	0.376**	0.391**
	(0.000)	(0.014)	(0.025)	(0.016)
They Pronoun	-1.253**	-0.751**	-0.749**	-0.750**
	(0.025)	(0.02)	(0.021)	(0.017)
Affective Process	-0.392***	-0.151*	-0.141*	-0.138
	(0.006)	(0.075)	(0.098)	(0.104)
Tentative	-0.496*	-0.227	-0.219	-0.276
	(0.062)	(0.179)	(0.190)	(0.105)
Power	0.696***	0.217**	0.214**	0.218**
	(0.000)	(0.034)	(0.039)	(0.033)
Focus Present	0.362***	0.200***	0.201**	0.199**
	(0.001)	(0.01)	(0.011)	(0.011)
Controls	Yes	Yes	Yes	Yes
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,229	30,862	30,860	30,862
Pseudo R^2	0.367	0.102	0.115	0.083

Table 5:Linguistic variables and voluntary CEO turnover

This table presents the estimated coefficients from logistic regressions of LIWC-derived linguistic measures in CEOs' earnings conference calls on the likelihood of a voluntary CEO turnover, using the Management Discussion (MD) section of the calls. The four models include fixed effects for firm, fiscal year, fiscal quarter, year-quarter, and industry. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	Model (1)	Model (2)	Model (3)	Model (4)
LIWC linguistic variables				
Analytic	-0.000	0.028***	0.027***	0.027***
	(0.987)	(0.007)	(0.009)	(0.009)
Authentic	-0.021***	-0.011***	-0.010***	-0.010***
	(0.000)	(0.003)	(0.006)	(0.004)
I Pronoun	1.204***	1.082***	1.085***	1.082***
	(0.000)	(0.000)	(0.000)	(0.000)
They Pronoun	-0.030	-0.114	-0.079	-0.089
	(0.905)	(0.509)	(0.646)	(0.602)
Affective Process	0.066	0.077*	0.082*	0.088**
	(0.350)	(0.081)	(0.065)	(0.047)
Tentative	-0.211	-0.239***	-0.237***	-0.237***
	(0.124)	(0.004)	(0.004)	(0.004)
Power	0.301***	0.270***	0.265***	0.267***
	(0.000)	(0.000)	(0.000)	(0.000)
Focus Present	0.051	0.046	0.041	0.042
	(0.388)	(0.236)	(0.298)	(0.281)
Control variables				
Firm Size	-0.263	0.069	0.068	0.072
	(0.403)	(0.173)	(0.180)	(0.153)
ROA	-4.326	-3.367	-3.503	-3.358
	(0.183)	(0.157)	(0.135)	(0.148)
Earnings Surprise	-1.136	-0.481	-0.376	-0.404
	(0.667)	(0.118)	(0.311)	(0.281)
Loss	-0.242	-0.189	-0.178	-0.175
	(0.434)	(0.361)	(0.401)	(0.398)
MTB	-0.828***	-0.113**	-0.109**	-0.106**
	(0.000)	(0.041)	(0.045)	(0.048)
Leverage	0.623	0.366	0.359	0.373
	(0.511)	(0.254)	(0.264)	(0.242)
Following	0.200	-0.075	-0.084	-0.090
	(0.506)	(0.509)	(0.462)	(0.420)
Return	0.598	-0.776	-0.460	-0.747
	(0.560)	(0.320)	(0.582)	(0.336)
Tenure	5.283***	0.685***	0.678***	0.680***
	(0.000)	(0.000)	(0.000)	(0.000)
Ownership	-41.572***	-16.091***	-15.978***	-16.192***

	(0.000)	(0.001)	(0.001)	(0.001)
Age	26.264***	6.986***	7.017***	7.056***
	(0.000)	(0.000)	(0.000)	(0.000)
Gender	0.218	0.158	0.147	0.145
	(0.721)	(0.503)	(0.535)	(0.538)
Institutional Ownership	0.196	0.284	0.272	0.346
	(0.844)	(0.430)	(0.454)	(0.328)
Constant		-37.390***	-38.630***	-37.722***
		(0.000)	(0.000)	(0.000)
Industry Effects		Yes	Yes	Yes
Year Effects		Yes		
Quarter Effects				Yes
Year-Quarter Effect	Yes		Yes	
Firm Effects	Yes			
Observations	15,620	33,157	33,157	33,157
Pseudo R^2	0.594	0.180	0.193	0.185

Table 6:Propensity score matching

This table identifies a control sample of firms with non-departing CEOs using a propensity score matching procedure. The propensity score is estimated within industry, fiscal year, and fiscal quarter using three different models. We use firm characteristics—firm size, ROA, return, and MTB—as covariates, and Panel A presents the firm performance variables for the matched samples. Panel B compares the language styles of the fired CEO subsample and the non-departing CEO subsample. Each dismissed CEO observation is matched with one non-departing CEO observation using nearest neighbor matching with a caliper of 0.01. We then compare the means of LIWC linguistic measures between the two CEO groups (No Turnover – Forced Turnover) and report the differences in the column titled "Forced vs. No." *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Comparison of covariates in balanced samples

	Matched samples (industry and fiscal quarter)				Matched samples (industry)				Matched samples (industry and fiscal year)			
Variables	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**
Firm Size	7.749	7.614	0.135	(0.444)	7.749	7.672	0.077	(0.667)	7.749	7.765	-0.016	(0.932)
Return	-0.007	-0.008	0.001	(0.806)	-0.007	-0.013	0.006	(0.302)	-0.007	-0.010	0.003	(0.599)
ROA	0.003	0.006	-0.003	(0.255)	0.003	0.007	-0.004*	(0.094)	0.003	0.003	0.000	(0.972)
MTB	1.764	1.757	0.007	(0.944)	1.764	1.812	-0.048	(0.651)	1.764	1.851	-0.087	(0.447)
Observations	222	222			222	222			222	222		

Panel B: LIWC measures of forced CEO turnover and no turnover

	Matched samples (industry and fiscal quarter)				Matched samples (industry)				Matched samples (industry and fiscal year)			
Variables	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**	**Forced Turnover**	**No Turnover**	**Forced vs. No**	**p-value**
Analytic	91.586	90.371	1.215*	(0.090)	91.586	91.315	0.271	(0.680)	91.586	91.617	-0.031	(0.956)
Authentic	43.103	44.411	-1.308	(0.284)	43.103	45.097	-1.994	(0.114)	43.103	45.534	-2.431*	(0.055)
I Pronoun	0.692	0.661	0.031	(0.616)	0.692	0.596	0.095*	(0.095)	0.692	0.647	0.045	(0.432)
They Pronoun	0.235	0.298	-0.062***	(0.009)	0.235	0.327	-0.092***	(0.001)	0.235	0.288	-0.052*	(0.058)
Affective Process	4.378	4.323	0.055	(0.591)	4.378	4.552	-0.174*	(0.090)	4.378	4.382	-0.005	(0.961)
Tentative	1.077	1.167	-0.090*	(0.073)	1.077	1.183	-0.106*	(0.062)	1.077	1.124	-0.047	(0.358)
Power	3.341	3.116	0.225**	(0.014)	3.341	3.256	0.085	(0.350)	3.341	3.371	-0.030	(0.765)
Focus Present	6.606	6.635	-0.029	(0.858)	6.606	6.368	0.237	(0.115)	6.606	6.288	0.319**	(0.034)

Table 7:Conditional logistic regression results

This table presents the results of conditional logit regressions conducted on three matched samples of CEOs, where matching was based on firm characteristics. The dependent variable in these regressions is an indicator for whether the CEO experienced a forced turnover. The analysis investigates whether specific linguistic features are associated with a higher likelihood of forced CEO dismissal, even after controlling for firm-level factors. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	Matched sample (industry and fiscal quarter)	Matched sample (industry)	Matched sample (industry and fiscal year)
LIWC linguistic variables			
Analytic	0.063	0.111**	0.113**
	(0.118)	(0.032)	(0.049)
Authentic	-0.010	-0.032*	0.012
	(0.412)	(0.052)	(0.423)
I Pronoun	0.255	0.676	-0.476
	(0.453)	(0.238)	(0.435)
They Pronoun	-1.880***	-4.472***	-1.586**
	(0.009)	(0.000)	(0.044)
Affective Process	0.048	-0.742***	0.134
	(0.781)	(0.004)	(0.543)
Tentative	-0.817**	-1.131**	0.026
	(0.026)	(0.021)	(0.945)
Power	-0.010	0.370*	-0.117
	(0.964)	(0.092)	(0.482)
Focus Present	0.213	0.768***	0.564***
	(0.125)	(0.000)	(0.003)
Control variables			
Firm Size	-3.348**	0.161	0.032
	(0.010)	(0.454)	(0.917)
ROA	-368.908***	-2.314	11.436
	(0.008)	(0.824)	(0.656)
Earnings Surprise	-13.248	7.072	20.741
	(0.422)	(0.556)	(0.185)
Loss	0.242	0.191	0.517
	(0.704)	(0.772)	(0.474)
MTB	-5.998**	-0.067	0.021
	(0.011)	(0.746)	(0.971)
Leverage	1.700	0.855	0.851
	(0.109)	(0.392)	(0.412)
Following	0.126	0.053	0.352
	(0.736)	(0.924)	(0.341)
Return	-200.360**	10.935***	11.574
	(0.012)	(0.009)	(0.401)
Tenure	0.829***	0.992**	1.295***

	(0.005)	(0.011)	(0.006)
Ownership	-41.606**	-18.242*	-37.334***
	(0.018)	(0.056)	(0.008)
Age	-4.911***	-5.514**	-11.070***
	(0.006)	(0.011)	(0.001)
Gender	0.493	1.515*	3.689**
	(0.447)	(0.068)	(0.015)
Institutional Ownership	1.196	-1.852	0.697
	(0.315)	(0.192)	(0.580)
Observations	278	236	250
Pseudo R^2	0.293	0.411	0.369

Table 8:Entropy balancing

This table presents the covariate balance before and after applying entropy balancing. Panel A compares performance variables between firms that experienced a forced CEO turnover and those that did not, both before and after weighting. Panel B examines the differences in linguistic measures between CEOs of forced turnover firms and those of no-turnover firms, after weighting. The four models include fixed effects for firm, fiscal year, fiscal quarter, year-quarter, and industry. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Comparison of covariates between forced turnover and no turnover: before and after weighting

Variables	**Forced Turnover**	**No Turnover (Unweighted)**	**No Turnover (Weighted)**
Firm Size	7.741	7.964	7.741
Return	0.002	0.011	0.002
ROA	1.761	2.004	1.761
MTB	-0.009	0.013	-0.009
Observations	224	44,204	44,112

Panel B: LIWC measures of forced CEO turnover and no turnover in the weighted sample

Variables	**Model (1)**	**Model (2)**	**Model (3)**
LIWC linguistic variables			
Analytic	0.050**	0.051**	0.044**
	(0.024)	(0.022)	(0.045)
Authentic	-0.013*	-0.015**	-0.013*
	(0.056)	(0.043)	(0.059)
I Pronoun	0.504***	0.625***	0.444**
	(0.007)	(0.001)	(0.016)
They Pronoun	-0.931**	-0.852**	-0.890**
	(0.011)	(0.023)	(0.013)
Affective Process	-0.193**	-0.219**	-0.126
	(0.028)	(0.011)	(0.165)
Tentative	-0.302*	-0.354**	-0.337**
	(0.060)	(0.021)	(0.043)
Power	0.161*	0.189*	0.120
	(0.097)	(0.050)	(0.246)
Focus Present	0.199**	0.188**	0.157**
	(0.012)	(0.014)	(0.046)
Control variables			
Firm Size	-0.058	-0.078	-0.028
	(0.511)	(0.372)	(0.749)
ROA	-4.233	-2.833	-3.591
	(0.211)	(0.377)	(0.274)
Earnings Surprise	0.873	0.695	0.731
	(0.446)	(0.226)	(0.365)
Loss	-0.334	-0.319	-0.292
	(0.271)	(0.275)	(0.346)

MTB	-0.049	-0.080	-0.059
	(0.500)	(0.248)	(0.407)
Leverage	1.417***	1.451***	1.496***
	(0.005)	(0.005)	(0.002)
Following	0.154	0.125	0.201
	(0.422)	(0.495)	(0.280)
Return	0.163	0.191	0.719
	(0.908)	(0.898)	(0.581)
Tenure	0.394***	0.412***	0.380***
	(0.002)	(0.001)	(0.002)
Ownership	-32.362***	-36.215***	-33.637***
	(0.000)	(0.000)	(0.000)
Age	-5.497***	-5.368***	-5.238***
	(0.000)	(0.000)	(0.000)
Gender	0.734**	0.755**	0.672**
	(0.030)	(0.030)	(0.040)
Institutional Ownership	-0.234	-0.421	-0.237
	(0.680)	(0.447)	(0.666)
Constant	16.095***	15.605***	16.010***
	(0.000)	(0.000)	(0.000)
Industry FEs	Yes	Yes	Yes
Year FEs	Yes		
Quarter FEs			Yes
Year-Quarter FEs		Yes	
Observations	33,138	33,136	33,138
Pseudo R^2	0.183	0.217	0.157

Table 9:New CEO analysis

This table reports differences in linguistic measures for incoming CEOs following turnover events. For each type of turnover, we identify the new CEOs and compare the mean LIWC linguistic measures between departing and incoming CEOs. Panel A presents the results for forced turnovers, comparing fired CEOs to their successors (149 observations), with differences reported in the column titled "New CEO vs. Fired CEO." Panel B presents the results for voluntary turnovers, comparing retired CEOs to their successors (728 observations), with differences reported in the column titled "New CEO vs. Retired CEO." *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Comparison of LIWC linguistic measures between Fired CEOs and New CEOs

LIWC linguistic variables	**New CEO**	**Fired CEO**	**New CEO vs. Fired CEO**	**p-value**
Analytic	88.851	91.132	- 2.281***	(0.003)
Authentic	45.884	44.149	1.735	(0.217)
I Pronoun	1.363	0.713	0.650***	(0.000)
They Pronoun	0.282	0.247	0.035	(0.240)
Affective Process	4.557	4.314	0.242**	(0.039)
Tentative	1.141	1.125	0.016	(0.797)
Power	3.211	3.350	-0.140	(0.151)
Focus Present	7.505	6.699	0.806***	(0.000)

Panel B: Comparison of LIWC linguistic measures between Retired CEOs and New CEOs

LIWC linguistic variables	**New CEO**	**Retired CEO**	**New CEO vs. Retired CEO**	**p-value**
Analytic	91.064	90.202	0.862**	(0.020)
Authentic	45.513	44.980	0.547	(0.399)
I Pronoun	0.889	0.968	-0.078*	(0.072)
They Pronoun	0.256	0.250	0.005	(0.709)
Affective Process	4.655	4.683	-0.029	(0.644)
Tentative	1.068	1.192	-0.124***	(0.000)
Power	3.385	3.592	-0.207***	(0.000)
Focus Present	6.698	6.696	0.002	(0.981)

Table 10:Difference-in-difference analysis of new CEOs

This table presents the difference-in-differences (DID) regression results comparing new CEOs following forced versus voluntary turnovers. In each column, the dependent variable is one of the eight LIWC linguistic variables measured in the final conference call of the departing CEO and the first conference call of the new CEO after the previous CEO's departure. *FV* is an indicator variable equal to one for forced turnovers and zero for voluntary turnovers. *Post* is an indicator variable equal to one for the first conference call of the incoming CEO and zero otherwise. Reported statistics are based on robust standard errors clustered at the firm level, with p-values shown in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	**Analytic**	**Authentic**	**I Pronoun**	**They Pronoun**	**Affective process**	**Tentative**	**Power**	**Focus Present**
FV	1.409	-2.655	-0.333*	0.005	-0.362*	-0.089	-0.103	-0.167
	(0.280)	(0.292)	(0.064)	(0.925)	(0.092)	(0.406)	(0.578)	(0.617)
Post	1.198**	0.894	-0.107	-0.012	-0.052	-0.100**	-0.244***	-0.094
	(0.024)	(0.348)	(0.153)	(0.551)	(0.546)	(0.030)	(0.002)	(0.462)
FV×Post	-4.122***	1.774	0.829***	0.018	0.316*	0.156*	0.084	0.962***
	(0.000)	(0.396)	(0.000)	(0.674)	(0.053)	(0.069)	(0.529)	(0.000)
Control variables								
Firm Size	1.401	1.687	-0.214	-0.112	-0.049	-0.270	-0.060	-0.891
	(0.576)	(0.667)	(0.426)	(0.227)	(0.888)	(0.283)	(0.817)	(0.108)
ROA	21.201	26.931	-1.540	-0.163	-0.109	-0.643	2.820	-5.549
	(0.182)	(0.428)	(0.506)	(0.762)	(0.964)	(0.681)	(0.189)	(0.179)
Earnings Surprise	-2.082	-1.415	1.484	0.169	0.111	-0.340	-0.950	1.019
	(0.817)	(0.921)	(0.153)	(0.557)	(0.923)	(0.667)	(0.426)	(0.614)
Loss	0.984	2.331	0.218	-0.006	0.029	-0.025	0.002	-0.237
	(0.438)	(0.297)	(0.199)	(0.898)	(0.881)	(0.835)	(0.992)	(0.436)
MTB	0.179	0.498	-0.098	0.016	-0.033	-0.007	-0.055	-0.185
	(0.760)	(0.715)	(0.381)	(0.568)	(0.780)	(0.910)	(0.560)	(0.388)
Leverage	1.082	-1.409	-0.184	0.115	0.658	0.082	0.040	0.995
	(0.853)	(0.875)	(0.792)	(0.592)	(0.394)	(0.890)	(0.962)	(0.432)
Following	1.883	3.997*	-0.075	-0.057	-0.017	0.029	-0.006	-0.312
	(0.178)	(0.082)	(0.656)	(0.311)	(0.944)	(0.829)	(0.974)	(0.372)
Return	3.087	-5.633	-0.245	-0.005	0.261	-0.722*	-0.412	-0.920
	(0.515)	(0.497)	(0.680)	(0.976)	(0.733)	(0.074)	(0.471)	(0.447)

Constant	73.526***	23.715	3.007	1.290*	4.979*	3.430*	3.995**	14.665***
	(0.000)	(0.456)	(0.162)	(0.083)	(0.083)	(0.082)	(0.044)	(0.001)
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,547	1,547	1,547	1,547	1,547	1,547	1,547	1,547
R^2	0.612	0.645	0.539	0.621	0.653	0.610	0.633	0.636

Table 11:CFO Analysis

In this table, we identify a control sample of firms with non-departing CEOs using a propensity score matching procedure, as discussed in Table 9, to compare the language styles of CFOs in firms with fired CEOs to those in matched firms (within industry and fiscal year) with non-departing CEOs. Each CFO observation in the forced turnover subsample is matched with one CFO observation in the no-turnover subsample using nearest neighbor matching with a caliper of 0.01, which produces 213 matched observations.

LIWC linguistic variables	Forced Turnover	No Turnover	Forced vs. No	p-value
Analytic	96.920	96.926	0.006	(0.986)
Authentic	40.620	41.966	1.347	(0.371)
I Pronoun	0.406	0.355	-0.052	(0.322)
They Pronoun	0.056	0.060	0.004	(0.653)
Affective Process	3.553	3.698	0.145	(0.135)
Tentative	1.316	1.352	0.036	(0.541)
Power	3.030	3.035	0.006	(0.954)
Focus Present	4.517	4.376	-0.141	(0.986)

Table 12:Difference-in-difference analysis of CFOs

This table reports the difference-in-differences (DID) regression results for the CFO sample, comparing language use following forced versus voluntary CEO turnovers. In each column, the dependent variable is one of eight LIWC linguistic variables measured in the final conference call for a CFO under a departing CEO and the first conference call for the CFO after the CEO's departure. *FV* is an indicator variable equal to one for forced turnovers and zero for voluntary turnovers. *Post* is an indicator variable equal to one for the first conference call following the CEO departure and zero otherwise. Reported statistics are based on robust standard errors clustered at the firm level, with p-values shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Variables	**Analytic**	**Authentic**	**I Pronoun**	**They Pronoun**	**Affective process**	**Tentative**	**Power**	**Focus Present**
FV	-0.259	0.081	0.020	-0.006	0.084	0.018	0.166	0.107
	(0.493)	(0.970)	(0.663)	(0.721)	(0.616)	(0.843)	(0.266)	(0.617)
Post	0.062	0.169	-0.002	-0.008	0.002	-0.020	0.011	-0.112
	(0.766)	(0.817)	(0.933)	(0.232)	(0.975)	(0.501)	(0.793)	(0.103)
FV×Post	0.277	0.482	0.026	0.018	0.003	-0.011	0.051	0.162
	(0.647)	(0.774)	(0.588)	(0.308)	(0.982)	(0.885)	(0.643)	(0.344)
Control variables								
Firm Size	-1.302	1.020	0.162	-0.005	-0.263	0.014	-0.112	0.381
	(0.306)	(0.780)	(0.149)	(0.833)	(0.296)	(0.927)	(0.653)	(0.334)
ROA	5.315	38.945	-0.146	0.097	-0.842	-0.301	1.167	-1.647
	(0.667)	(0.192)	(0.850)	(0.757)	(0.694)	(0.782)	(0.480)	(0.647)
Earnings Surprise	7.783	-32.449*	-0.523	-0.133	1.969	0.320	0.347	-1.018
	(0.461)	(0.092)	(0.357)	(0.568)	(0.215)	(0.598)	(0.780)	(0.710)
Loss	0.167	-0.100	-0.085*	0.011	0.165	0.061	-0.067	-0.180
	(0.699)	(0.967)	(0.074)	(0.590)	(0.316)	(0.561)	(0.513)	(0.457)
MTB	-0.374	-1.575	0.043	0.005	0.006	-0.058	0.049	0.049
	(0.334)	(0.201)	(0.232)	(0.657)	(0.950)	(0.345)	(0.638)	(0.742)
Leverage	0.692	-4.652	-0.462**	0.039	-0.763	-0.612	-0.468	-0.075
	(0.768)	(0.609)	(0.034)	(0.578)	(0.263)	(0.141)	(0.418)	(0.953)
Following	-0.249	-0.310	-0.090	0.001	0.184	0.028	-0.087	-0.349
	(0.655)	(0.898)	(0.210)	(0.976)	(0.461)	(0.808)	(0.656)	(0.235)
Return	-0.624	3.005	0.129	0.004	-0.171	0.078	-0.282	-0.180
	(0.778)	(0.701)	(0.475)	(0.964)	(0.788)	(0.835)	(0.558)	(0.826)

Constant	108.205***	35.536	-0.656	0.091	5.576**	1.481	4.039**	2.196
	(0.000)	(0.231)	(0.465)	(0.666)	(0.011)	(0.211)	(0.042)	(0.486)
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,703	1,703	1,703	1,703	1,703	1,703	1,703	1,703
R^2	0.685	0.786	0.640	0.652	0.758	0.778	0.825	0.781

Table 13:Logistic regression results for question-and-answer (Q&A) part

This table presents estimated coefficients from a logistic regression of LIWC-derived linguistic measures in CEOs' earnings conference calls on the likelihood of a forced CEO turnover, using the question-and-answer (Q&A) section of the calls. The four models incorporate various fixed effects, including firm, fiscal year, fiscal quarter, year-quarter, and industry fixed effects. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Forced CEO Turnover			
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
LIWC linguistic variables				
Analytic	0.009	0.017*	0.018*	0.015
	(0.444)	(0.071)	(0.062)	(0.104)
Authentic	-0.005	-0.016**	-0.016**	-0.016**
	(0.582)	(0.023)	(0.026)	(0.032)
I Pronoun	0.226	0.221*	0.218*	0.205*
	(0.144)	(0.071)	(0.072)	(0.091)
They Pronoun	-0.426*	-0.505***	-0.492**	-0.517***
	(0.098)	(0.009)	(0.010)	(0.008)
Affective Process	0.125	-0.042	-0.038	-0.039
	(0.168)	(0.598)	(0.631)	(0.622)
Tentative	0.083	-0.057	-0.057	-0.063
	(0.503)	(0.616)	(0.615)	(0.574)
Power	-0.133	-0.092	-0.090	-0.075
	(0.396)	(0.488)	(0.497)	(0.570)
Focus Present	0.081	0.096	0.096	0.083
	(0.304)	(0.105)	(0.101)	(0.157)
Control variables				
Firm Size	0.123	-0.186*	-0.190*	-0.163*
	(0.767)	(0.059)	(0.053)	(0.088)
ROA	-6.703	-7.551**	-7.431**	-7.468**
	(0.102)	(0.030)	(0.030)	(0.023)
Earnings Surprise	-0.302	0.090	0.228	0.225
	(0.913)	(0.941)	(0.850)	(0.829)
Loss	-0.935**	-0.224	-0.199	-0.217
	(0.036)	(0.485)	(0.541)	(0.499)
MTB	-0.445**	-0.196*	-0.196*	-0.164
	(0.014)	(0.087)	(0.089)	(0.125)
Leverage	2.745**	1.082*	1.076*	1.140**
	(0.028)	(0.055)	(0.055)	(0.039)
Following	0.259	0.192	0.193	0.169
	(0.534)	(0.330)	(0.328)	(0.381)
Return	-2.201	-4.581***	-4.704***	-4.335***
	(0.162)	(0.002)	(0.002)	(0.003)
Tenure	2.460***	0.402***	0.391***	0.373***

	(0.000)	(0.000)	(0.001)	(0.001)
Ownership	-97.103***	-35.230***	-35.082***	-34.647***
	(0.000)	(0.001)	(0.001)	(0.001)
Age	-6.579***	-4.109***	-4.002***	-3.752***
	(0.000)	(0.000)	(0.000)	(0.000)
Gender	0.527	0.666**	0.647**	0.618*
	(0.409)	(0.039)	(0.046)	(0.055)
Institutional Ownership	-0.338	-0.386	-0.364	-0.224
	(0.780)	(0.492)	(0.513)	(0.681)
Constant		10.930***	10.895***	9.887***
		(0.000)	(0.001)	(0.003)
Industry FEs		Yes	Yes	Yes
Year FEs		Yes		
Quarter FEs				Yes
Year-Quarter FEs	Yes		Yes	
Firm FEs	Yes			
Observations	3,766	32,696	32,692	32,696
Pseudo R^2	0.240	0.093	0.109	0.074

Chapter 2

“Interlocks in the Shadow”: How Big Firms Lead Information Flow

1. Introduction

The diffusion of information through social and organizational networks is a central topic in economics, sociology, and finance. Network structures not only determine who communicates with whom, but also how quickly and credibly information travels, and who is likely to be influenced. In financial markets, information can propagate rapidly through these networks, shaping investor beliefs, managerial expectations, and market outcomes (Hong et al., 2005; Shive, 2010). In the corporate setting, this flow of information is often mediated through shared directors, forming what are known as interlocking directorates. These board interlocks provide an important channel for such diffusion, as shared directors can transmit not only factual information but also norms, strategic perspectives, and interpretations of external shocks (Bizjak et al., 2009; Engelberg et al., 2013). These interlocks enable firms to observe and respond to each other's decisions, creating patterns of strategic mimicry and coordination, especially under conditions of uncertainty (Acemoglu et al., 2012; Cohen et al., 2008; Fracassi, 2017; Hwang & Kim, 2009).

Within corporate governance, board interlocks have been studied extensively for their role in transmitting norms and practices related to executive compensation, financial policies, innovation, and voluntary disclosure. Directors who serve on multiple boards act as conduits of governance ideas and firm behavior, creating a network through which practices diffuse over time (Bizjak et al., 2009; Chen et al., 2023; Chiu et al., 2013; Fich & Shivdasani, 2006; Haunschild, 1993; Stuart & Yim, 2010). This network-based flow of information has been shown to affect earnings guidance issuance and withdrawal (Cai et al., 2014), peer learning about tax avoidance (Dyreng et al., 2010), and even the diffusion of corporate social responsibility practices (Marquis et al., 2007). However, no study has yet examined whether information flow via interlocks is asymmetric, particularly if large firms disproportionately influence smaller firms in adopting disclosure strategies.

This paper focuses on a novel dimension of interlock-driven information flow: the size asymmetry between connected firms. Specifically, we ask whether the influence of interlocked firms on disclosure decisions is moderated by relative firm size. Do smaller firms emulate the behavior of larger peers when connected via board ties? Is the flow of disclosure-related information asymmetric, flowing more strongly from large to small firms than in the opposite direction? These questions are central to understanding not only how information flows through networks, but also who drives these flows and under what conditions (Fracassi & Tate, 2012;

Gofman, 2017). We argue that firm size is a fundamental determinant of informational influence in corporate networks. Larger firms often have better-developed disclosure infrastructures, greater access to legal and financial resources, and more extensive interactions with regulators and analysts (Lang & Lundholm, 1993; Masulis & Mobbs, 2014). As such, their disclosure decisions are likely to be perceived as more credible or informative by smaller peers. This credibility gap may cause smaller firms to refer to the actions of larger firms in their network, particularly in periods of high uncertainty when internal signals are noisy or unreliable.

To test our hypotheses, we examine the phenomenon of earnings guidance withdrawals during the early stages of the COVID-19 pandemic. Earnings guidance withdrawals are rare events under normal market conditions, typically signaling heightened uncertainty or a breakdown in forecasting ability. Cai et al. (2014) examine event quarters from 2002 to 2010 and identify 251 guidance stoppers. Similarly, Chen, Matsumoto, and Rajgopal (2011) identify only 96 firms that either stop providing quarterly guidance or switch to annual guidance over the period 2000–2006. In contrast, the COVID-19 pandemic represents a highly compressed and extreme disclosure environment, motivating our focus on a narrow three-month window during which guidance withdrawals were unusually frequent and clustered in time. During the first half of 2020, hundreds of U.S. firms withdrew previously issued guidance in response to the economic volatility and informational fog created by the pandemic. This provides a rich setting for studying the diffusion of disclosure behavior through interlocking director networks.

Importantly, our goal is not to explain guidance withdrawals per se, nor to explore the general impact of COVID-19. Rather, we use the pandemic as a natural experimental context in which uncertainty was widespread, and disclosure decisions became salient and observable. This setting allows us to isolate the informational role of board interlocks, and to assess whether firm size mediates how such information is interpreted and acted upon. In this way, our study contributes to the growing literature that uses exogenous shocks to study organizational learning and information transmission in networks.

Our empirical design focuses on focal firms and their connection to prior guidance withdrawal through shared board members. The sample consists of 1,749 U.S. public firms that issued earnings guidance in 2019, of which 610 withdrew guidance between March and May 2020. Among all firms, 1,066 have at least one director connected to a firm that had already withdrawn guidance,

allowing us to examine whether such exposure influences subsequent withdrawal decisions. To capture heterogeneity in information transmission, we classify interlock ties based on the relative size of the focal firm and the connected withdrawal firm and examine whether withdrawal behavior varies systematically across these size-based connections.[4]

Our empirical results provide strong support for the hypothesis that information flows asymmetrically through board networks based on firm size. We find that small firms connected to larger firms that previously withdrew guidance are more likely to withdraw guidance themselves. In contrast, we find no evidence that large firms are influenced by smaller connected peers, nor do we find significant effects for connections between similarly sized large firms. These patterns are consistent with a model in which smaller firms use larger firms' disclosure decisions as informative signals, while larger firms rely more heavily on their own internal information and resources.We later focus particularly on audit committee interlocks, given the central role that audit committees play in disclosure oversight and financial reporting integrity (Klein, 2002). When we interact our size-connection measures with an indicator for shared audit committee membership, we find that small firms connected to larger firms through audit interlocks are more likely to withdraw guidance. This amplification effect underscores the importance of committee-specific expertise in shaping disclosure contagion.

Director experience further moderates these effects. We find that spillovers are concentrated among firms whose interlocked directors have longer tenure on the larger firm's audit committee. Specifically, when the shared director has above-median experience in the connected (larger) firm, the coefficient rises, suggesting that experienced directors are more effective conduits of information and influence. This finding aligns with research on director reputation and career concerns (Masulis & Mobbs, 2014; Sila et al., 2017), indicating that directors with deeper embeddedness in larger firms bring greater credibility to their smaller board appointments. These findings emphasize that the diffusion of corporate decisions is not just a matter of interlocking

[4] We classify size-based connections using the relative market capitalization of the focal firm and the connected firm that withdrew guidance. Firms are categorized as *Small* or *Big* based on whether their size falls below or above the median size of connected withdrawal firms. This yields four mutually exclusive categories: *Small–Small* (both firms are small), *Big–Small* (the focal firm is small and the connected withdrawal firm is large), *Small–Big* (the focal firm is large and the connected firm is small), and *Big–Big* (both firms are large).

directorates but also depends on the size of connected firms, specific expertise and experience embedded in those interlocks.

Our findings prove robust results across alternative specifications and identification strategies. First, we verify that results are not sensitive to how we define the connected withdrawal firm: when we use either the first firm in the network to withdraw or the largest connected withdrawer by total assets (rather than the most recent withdrawer), the results remain the same and statistically significant. Second, we test alternative audit connection definitions and find that the effect loses significance when we weaken the connection requirement—such as requiring audit overlap only on the withdrawing firm's side or using an averaged measure across all connected firms—reinforcing that bilateral audit committee ties are necessary for effective transmission. Third, we explore whether industry similarity confounds our results by separately estimating effects for same-industry versus cross-industry interlocks, finding that the firm size effect is significant only for cross-industry connections, which suggests genuine information spillovers rather than sectoral mimicry. Finally, we verify that compensation and governance committee interlocks show no significant effects, confirming the specialized role of audit committees in disclosure decisions. These robustness checks collectively support our interpretation that large firms influence smaller connected peers through credible, committee-specific audit channels rather than through spurious correlations or general network effects.

This paper makes several contributions to the literature on corporate networks, voluntary disclosure, and governance. First, we extend the board interlock literature by introducing firm size asymmetry as a critical structural moderator of information transmission. While extensive prior work documents that interlocks facilitate the diffusion of practices such as option backdating (Bizjak et al., 2009), tax avoidance strategies (Brown, 2011), earnings management (Chiu et al., 2013), and M&A decisions (Cai & Sevilir, 2012), this literature has largely treated interlock effects as uniform across firm pairs. Our findings challenge this assumption by showing that the direction and magnitude of influence depend fundamentally on the relative size of connected firms. Specifically, we demonstrate that information flows predominantly from large to small firms, not vice versa, and that connections between similar sized firms exhibit weaker spillover effects. This directional asymmetry suggests that corporate networks function not merely as conduits for information exchange, but as hierarchical structures in which status and resources determine whose

decisions are observed and emulated. By documenting this size-based gradient, we provide a more nuanced understanding of how interlocks shape corporate behavior and which network ties are most consequential

Second, we contribute to the voluntary disclosure literature by exploring how firms learn from peers during periods of heightened uncertainty. Prior research on earnings guidance withdrawal focuses primarily on firm-specific determinants such as litigation risk, earnings volatility, and proprietary costs (Chen et al., 2011; Houston et al., 2010). Our study shifts the focus to learning, demonstrating that withdrawal decisions are not made in isolation but are influenced by the observable actions of connected peers. Importantly, we show that this learning is conditional: smaller firms withdraw guidance in response to larger peers' actions, but larger firms do not respond symmetrically to smaller peers. This finding has implications for understanding how disclosure norms propagate through corporate populations and why certain practices become widespread during crises even when they may not optimize individual firm outcomes.

Third, we advance the literature on network-based contagion in corporate settings by identifying the specific governance mechanisms through which influence travels. We show that audit committee interlocks are particularly effective channels for transmitting disclosure decisions, consistent with the specialized oversight role these committees play in financial reporting. Moreover, we demonstrate that the potency of these channels depends on director experience: spillovers are strongest when the shared director has longer tenure on the larger firm's audit committee, suggesting that embedded knowledge and credibility amplify informational influence. These findings refine our understanding of why some interlocks matter more than others and highlight the importance of disaggregating board ties by committee function and director characteristics.

The rest of the paper is organized as follows. Section 2 reviews the related literature and develops our hypotheses. Section 3 describes the data and variable construction. Section 4 presents empirical results. Section 5 offers robustness tests. Section 6 concludes.

2. Literature Review and Hypothesis Development

To develop our empirical predictions, we draw on three interconnected strands of literature that are critical for understanding how disclosure decisions are shaped within corporate networks. First, we review research on inter-firm information transmission, which explains how firms gather and respond to external signals through various market- and governance-based channels. Second, we discuss the role of interlocking directorates in facilitating such transmission, focusing on the board-level pathways that can enable governance norms and strategic decisions to diffuse across firms. Third, we examine the literature on earnings guidance withdrawal, a rare but revealing disclosure event, to contextualize how firms navigate uncertainty and strategic signaling. Together, these literatures provide the theoretical and empirical foundation for our hypotheses concerning the asymmetric influence of large firms on smaller peers during the COVID-19 crisis.

2.1. Information Flow

Information does not remain confined within firm boundaries. A growing literature in finance shows that firms learn from and respond to information originating from other firms (Cai et al., 2014; Shue, 2013). Inter-firm information flow can occur through various channels, including industry peers, product market competitors, shared institutional investors, analyst coverage, and board interlocks (Cai et al., 2014; Chen et al., 2023; Cohen et al., 2008; Fracassi, 2017; Hoberg & Phillips, 2010; Leary & Roberts, n.d.).

Early theoretical work by (Froot et al., 1993) models how firms can learn from the investment activity of their peers when faced with common shocks or uncertainty. Similarly, (Hong et al., 2005) show empirically that momentum profits are stronger among firms in the same industry, suggesting that investors use peer performance as a proxy for firm-specific signals. Later studies provide more direct evidence that product market rivals are important sources of informational spillovers. Hoberg & Phillips (2010) construct a measure of product market similarity using text-based techniques and show that earnings news from a product market peer leads to significant return reactions in a focal firm.

Common analyst coverage has also been identified as a significant channel of cross-firm information diffusion. Hong & Kacperczyk (2010) show that analysts who cover multiple firms help transmit information across their coverage portfolios. This mechanism is strengthened when

analysts have more influence over investor beliefs. Cohen & Frazzini (2008) document that institutional investors facilitate inter-firm information flow via trading behavior. Specifically, they find that when an institution has information about one firm, it adjusts its holdings in economically related firms, generating predictable cross-stock return patterns. Dasgupta et al. (2010) complement this with evidence that board networks serve as information bridges: firms connected via interlocking directorates exhibit more informative prices, suggesting that information flows through social and governance ties.

Banerjee et al. (2024) investigate the effects of transparency shocks, such as public SEC investigations, on peer firms. They show that firms increase their own disclosure and governance quality in response to such events at peers, particularly when they are in the same industry or share common investors or analysts. This response is consistent with firms internalizing the reputational and regulatory risk observed in others. Hassan et al. (2019) use textual analysis of earnings calls to measure firm-level political risk and show that firms adjust their disclosures based on political themes emphasized in peers' communications. Their results support the notion that managers track and respond to peers' public statements, especially under uncertainty. These studies underscore that firms continuously monitor peer actions and adapt their own behavior accordingly, particularly during periods of uncertainty when firm-specific signals may be noisy or unreliable.

2.2. Board Interlock and Information Transmission

Interlocking directorates where individuals serve on multiple corporate boards play a role in shaping firm behavior through information sharing, norm diffusion, and coordination across firms. Interlocks may act as channels for transmitting governance practices, disclosure norms, and strategic decisions (Cai & Sevilir, 2012; Fracassi, 2017).

Early research on interlocks emphasized their potential to create agency problems or entrenchment (Fich & Shivdasani, 2006), but more recent studies emphasize their informational benefits. Fracassi (2017) by using board network data, finds that firms connected via interlocks exhibit more similar corporate policies and stock return co-movement, consistent with information spillovers. Dasgupta et al. (2010) show that greater board connectivity is associated with more informative prices, suggesting that interlocks help propagate firm-specific information across peers. Cai & Sevilir (2012) document that M&A activity is more likely among firms with interlocking directors, reinforcing the view that interlocks facilitate strategic alignment.

Beyond general policy convergence, research reveals that even specific and sometimes opportunistic practices diffuse systematically through board networks. Bizjak et al. (2009) show that backdating practices in executive compensation tend to cluster among interlocked firms, suggesting that knowledge about such opportunistic practices diffuses through board ties. Brown (2011) finds that the use of corporate-owned life insurance as a tax shelter is more likely among firms whose directors are connected to others already employing this strategy, indicating that complex tax planning ideas can spread through governance networks. Chiu et al. (2013) examine earnings management and reveal that directors with past experience at firms engaging in aggressive accrual practices transmit this behavior to their current boards, highlighting how governance norms and accounting discretion are carried across firms. More recently, Chen et al. (2023) provide recent evidence that knowledge spillovers particularly those related to technology and product market strategies are facilitated by shared directors who enable information flow between firms.

2.3. Earnings Guidance Withdrawal

Earnings guidance refers to voluntary, forward-looking disclosures in which managers provide forecasts or expectations about future firm performance, most commonly earnings per share for upcoming quarters or fiscal years. In the U.S., earnings guidance has become a widespread disclosure practice, as managers use guidance to shape investor expectations and reduce information asymmetry between the firm and capital market participants (Ajinkya et al., 2005; Beyer et al., 2010). Prior research documents that a substantial fraction of U.S. firms issue earnings guidance on a recurring basis, often quarterly, and that guidance provision is closely tied to analyst following and institutional ownership (Beyer et al., 2010; Cotter et al., 2006; Matsumoto, 2002).

Despite its benefits, firms sometimes choose to stop issuing guidance. Houston et al. (2010) find that firms withdrawing guidance experience a decline in analyst coverage and increased uncertainty, consistent with a weaker information environment. Chen et al. (2011) document that firms that stop guidance are often motivated by rising earnings volatility or strategic concerns. They also find that markets interpret withdrawals negatively, particularly when not accompanied by alternative disclosures.

Building on this literature in a period of heightened uncertainty, Aaron et al. (2021) and Hope et al. (2023) study firms that withdrew guidance during the COVID-19 pandemic. Aaron et al.

(2021) document that industry-level exposure to pandemic-related unemployment shocks significantly predicts withdrawal decisions, with firms in harder-hit sectors more likely to suspend guidance. Hope et al. (2023) further show that withdrawals are driven by exposure to economic uncertainty rather than poor financial results; such firms face higher analyst forecast dispersion and trading volume, but not necessarily price declines. Their results suggest that guidance withdrawals during crises reflect strategic silence rather than adverse performance signals.

Taken together, these strands of literature motivate our empirical analysis of how information transmitted through board networks shapes firms' disclosure decisions during periods of uncertainty.

2.4. Mediatory Role of Size and Hypothesis Development

Taken together, these three strands of research suggest that inter-firm information flow particularly through board interlocks can shape disclosure choices in meaningful ways to adopt corporate actions, such as backdating stock options (Bizjak et al., 2009), using corporate-owned life insurance as a tax shelter (Brown, 2011), engaging in earnings management (Chiu et al., 2013), leveraging knowledge spillovers (Chen et al., 2023), and influencing corporate acquisition activities (Haunschild, 1993; Stuart & Yim, 2010) when they have interlocked directors connected to firms that have already adopted those practices. This suggests that board interlocks facilitate the exchange of information and the diffusion of corporate decisions.

The decision to withdraw quarterly earnings guidance is often linked to poor financial performance and heightened uncertainty and can lead to negative market reactions, including adverse investor perceptions and reputational damage (Cai et al., 2014; S. Chen et al., 2011; Dye, 1985; Houston et al., 2010; Verrecchia, 1983). In such cases, managers may rely on interlocked directors with prior experience in guidance withdrawal to inform their decision-making (Cai et al., 2014).

Firm size plays a significant role in shaping director incentives, as serving on the board of a larger company offers higher visibility, prestige, and financial rewards (Adams & Ferreira, 2008; Ryan & Wiggins, 2004; Shivdasani, 1993). These benefits enhance a director's reputation and increase their likelihood of obtaining additional directorships (Yermack, 2004). Masulis & Mobbs (2014) find that directors often allocate their time and energy toward larger, more prestigious firms, where their reputation and visibility are more prominent. These directors are also more likely to

participate in demanding committees, such as audit and compensation, and remain committed to these directorships despite poor firm performance. As a result, they may offer higher level of oversight and engagement in firms where their personal and professional reputation is most on the line, leading to disparities in monitoring across firms of different sizes (Knyazeva et al., 2013; Masulis & Mobbs, 2014). The key idea is that directors who sit on the boards of larger firms have opinions that hold greater influence (Dharwadkar et al., 2020).

Sila et al. (2017) find that firms with independent directors who have strong reputations tend to exhibit richer information environments, including more disclosures, higher stock price informativeness, and lower crash risk. Similarly, Dharwadkar et al. (2020) show that these firms also exhibit lower earnings management and fewer restatements. Bryan & Mason (2020) extend this research by analyzing reputation incentives of independent directors relate to accrual quality and audit fees. They find that when a firm has a greater share of independent directors with weaker reputation incentives, it tends to face higher audit fees, suggesting that auditors perceive such governance structures as riskier.

As the literature on board interlocks shows, firms observe and learn from peer firms' disclosure decisions through shared directors. During the COVID-19 pandemic, when uncertainty was widespread and internal forecasting became unreliable, interlocked directors were exposed to withdrawal decisions made at connected firms, potentially informing how boards evaluated the costs and benefits of continuing guidance. As noted before, prior literature demonstrates that board connections facilitate the diffusion of corporate practices (Bizjak et al., 2009; Fracassi, 2017), and such channels may be especially relevant during crisis periods when firms seek external reference points for consequential disclosure choices. At the same time, heightened litigation risk and reputational concerns during periods of extreme uncertainty may cause directors to filter, rather than mechanically imitate, peer actions. Accordingly, exposure to prior withdrawal decisions through board ties is expected to shape firms' guidance withdrawal behavior, though the direction and strength of this influence may depend on the nature of the interlock and the information environment. This forms the basis for our first hypothesis:

H1 (Board Interlock Effect):

Firms' guidance withdrawal decisions are influenced by board interlock connections to firms that previously withdrew guidance.

While prior work has demonstrated that firms respond to peer behavior and that board ties can facilitate this process, the role of size asymmetry in moderating such responses remains underexplored. In what follows, we build on these insights to develop testable hypotheses about how the relative size of connected firms affects the likelihood of guidance withdrawal during a period of widespread uncertainty.

Following the literature on director reputation, we link firm size and board interlocks to disclosure decisions, thereby extending research on the contagion of accounting practices within corporate networks. The evidence indicates that firms do not make disclosure decisions in isolation; instead, they are influenced by interlocked peers, with larger firms playing a dominant role in shaping disclosure trends.

H2 (Size-Conditioned Spillover):

Firms connected through board interlocks to larger firms were more likely to withdraw guidance during the pandemic, with smaller firms being especially influenced by the decisions of their larger counterparts.

Given their oversight of financial reporting and external audits, audit committees play a crucial role in shaping disclosure policies. Prior research suggests that firms connected through audit committee interlocks often exhibit similar accounting policies and disclosure decisions (Dharwadkar et al., 2020; Shropshire, 2010). Audit committee interlocks are particularly relevant because they help mitigate agency and entrenchment issues that may arise from board interlocks (Devos et al., 2009; Dharwadkar et al., 2020). Prior literature suggests that governance and accounting practices can spread through both board and audit committee interlocks (Bizjak et al., 2009; Chiu et al., 2013; Dharwadkar et al., 2020).

The audit committee has primary responsibility for overseeing financial reporting, disclosure quality, and interactions with external auditors, making it the most direct channel through which information about earnings guidance and its withdrawal is likely to be transmitted (Klein, 2002; Dhaliwal et al., 2011). In contrast, compensation and governance committees focus on executive pay design, succession planning, board composition, and long-term governance policies, areas that are less directly tied to short-horizon disclosure decisions such as guidance withdrawal. As a result, even when directors serve on these committees across firms, we do not expect compensation or

governance committee interlocks to meaningfully influence the timing or likelihood of guidance withdrawal.

During periods of heightened economic uncertainty, such as the COVID-19 pandemic, firms often encounter difficulties in issuing reliable management guidance. Hope et al. (2023) find that many firms withdrew their guidance during the pandemic not due to poor expected performance, but because of elevated uncertainty. Interestingly, investors did not react negatively to these withdrawals, as reflected in stable stock prices and analyst forecasts. Building on Cai et al. (2014), who document that both audit and non-audit committee interlocks are positively associated with guidance withdrawal, with a stronger effect for audit committees, we note that their analysis is conducted over a long panel period under normal market conditions. We focus on the COVID-19 period to explore how audit committee interlocks influence information flow during a time of uncertainty. In such volatile contexts, directors may also be more concerned with potential litigation risk, which could in turn influence the extent to which audit interlocks affect decisions like guidance withdrawal. Therefore, our third hypothesis:

H3 (Interlock Type Strength):

Spillover effects from guidance withdrawal are stronger via audit committee interlocks than through governance and compensation interlocks.

The experience and tenure of directors play a crucial role in how corporate policies diffuse through interlocked board networks. Dharwadkar et al. (2020) show that the formation of audit committee interlocks is a key driver of accounting policies spillovers, as the alignment in special items between interlocked firms increases significantly after an interlock is established. This highlights that newly formed interlocks create opportunities and fresh channels for information transfer. However, this study does not explicitly consider the role of director tenure or experience in shaping these effects. Zhang, (2021) finds that policy diffusion among interlocked firms is influenced by directors' career concerns, particularly for younger directors or those with shorter tenures, who may be more responsive to peer behavior. This suggests that less experienced directors might be more inclined to adopt the practices of their interlocked peers due to reputational motivations or a lack of established authority. Building on these insights, we propose that director experience moderates the guidance withdrawal spillovers. Specifically, if a director has served longer at a connected firm that previously withdrew guidance, they may be more confident and

influential in encouraging a similar decision at the focal firm. In contrast, directors with shorter tenures or less experience may be hesitant to advocate for such changes, either due to limited influence or a reluctance to promote unfamiliar practices. Building on these insights, we propose that director experience moderates the guidance withdrawal spillovers.

H4 (Director Tenure Influence):

The influence of an interlock on guidance withdrawal is stronger when the director has longer tenure with the peer firm that previously withdrew guidance.

3. Sample Data and Descriptive Statistics

To identify a concentrated period of guidance withdrawals, we focus on the window between March and May 2020. This timing coincides with the SEC's April 8, 2020, public statement encouraging firms to provide forward-looking disclosures amid COVID-19 uncertainty, while offering safe-harbor protections for revised guidance. Despite the SEC's guidance, many firms chose not to revise their forecasts but instead withdrew them altogether. While guidance withdrawals are exceptionally rare under normal market conditions (Chen et al., 2011; Houston et al., 2010), the COVID-19 period witnessed an unprecedented wave of withdrawals. These withdrawals were typically positioned as temporary responses to market uncertainty, not as permanent cessations due to poor expected performance (Aaron et al., 2021). This makes the COVID-19 period an ideal setting to study how guidance withdrawal decisions, triggered by uncertainty rather than deteriorating fundamentals, diffuse across corporate networks especially from larger to smaller firms via board interlocks.

Our initial sample consists of firms in Compustat with issued management guidance in I/B/E/S database in 2019[5]. We begin with 2,251 firms that provided earnings forecasts for fiscal year 2020, of which 709 withdrew guidance and 1,542 maintained it during the crisis. By comparison, Aaron et al. (2021) study 1,670 U.S. public firms, of which 751 withdrew guidance. The difference in sample size reflects differences in sample construction rather than scope, and both samples capture a large and representative set of firms providing earnings guidance prior to the pandemic. We split

[5] A firm is considered to have issued earnings guidance if its fiscal year-end for the earnings estimate is in 2020 and it provided the estimate in 2019, prior to the Covid-19 pandemic.

our sample as withdrawal and maintainer firms. Firms are classified as withdrawal if they withdrew guidance with a filing date between March 1, 2020, and May 30, 2020; otherwise, they are classified as maintainers. We remove firms that provided or withdrew guidance in January or February 2020, as the economic impact of COVID-19 was not yet widely recognized—the World Health Organization declared COVID-19 a pandemic on March 11, 2020. We use directEDGAR to identify firms that withdrew their guidance formally in their 8-K filing. Our method finds withdrawing firms as those whose forward-looking earning guidance includes specific keywords.[6] We finally generate an indicator variable named *Guidance Withdrawal*, which equals one if the firm withdrew guidance and zero for guidance maintainers.

Our variable of board connections, *Withdrawal Connection*, captures whether a firm shares a director with another firm that previously withdrew guidance. For each firm in our sample, we track board connection using BoardEX, identifying directors serving on the firm's board by end of 2019. A firm is classified as having withdrawal interlocks if at least one of its directors also served on the board of another firm that withdrew guidance before the focal firm. Thus, *Withdrawal Connection* is set to one if any director of our sample firm served on the board of another company that withdrew providing guidance due to Covid-19 pandemic, and zero otherwise.

The sample size in this study is constrained by the unique setting required to identify information transmission through board interlocks during the COVID-19 period. Specifically, our analysis relies on earnings guidance withdrawals, which occur infrequently under normal economic conditions. While expanding the sample to include a broader time period could increase the number of observations, doing so would weaken the identification strategy, as the COVID-19 shock provides an exogenous and time-specific source of uncertainty that is central to our analysis. This setting allows us to better capture the urgency and pressure faced by firms, making it possible to observe how information flows through interlocked networks in response to a common shock.

Moreover, our research design focuses on the sequencing of withdrawals, specifically identifying which firms follow others within the network. This requires precise timing and

[6] We consider two keyword dictionaries for "guidance" and "withdraw". For guidance we use "guidance" or "outlook" or "outlooks", and for withdraw, we include "remove" or "removed" or "removes" or "removing" or "rescing" or "rescinded" or "rescinding" or "rescinds" or "retract" or "retracted" or "retracted" or "revoke" or "revoked" or "revokes" or "revoking" or "suspend" or "suspending" or "suspends" or "withdraw" or "withdrawing" or "withdrawn" or "withdraws" or "withdrew".

interconnected observations, which are not as prevalent outside the crisis period. As a result, increasing the sample size by extending the time horizon would not necessarily improve the analysis. Therefore, the relatively smaller sample reflects a deliberate trade-off to preserve the integrity of the empirical design and the economic relevance of the setting.

We collect control variables from various databases, including Compustat, the Institutional Brokers Estimate System (I/B/E/S), the Center for Research in Security Prices (CRSP), BoardEX and Thomson Reuters. All controls are measured as of the latest available date before March 2020. The sample selection for this paper, after merging all these databases, is presented in Table1. After matching with macroeconomic controls and board data, our final sample includes 1,749 firms, with 610 withdrawers and 1,139 maintainers. Among these, 1,066 firms have at least one board-level connection to a firm that had already withdrawn guidance—338 of which also withdrew guidance and 728 did not. This subset is crucial, as it allows us to identify cases where information exposure via interlocks is plausibly present. By focusing on firms that could have been influenced by a connected peer's withdrawal decision, we can test whether such exposure predicts subsequent withdrawal behavior, conditional on firm size asymmetry and committee-specific ties. Consistent with prior work on governance spillovers (e.g., (Cai et al., 2014; Dharwadkar et al., 2020; Fracassi, 2017), this enables a sharper test of interfirm information diffusion through shared directors.

[Insert Table 1 here]

Furthermore, these two groups form the core of our empirical tests. The 338 or exposed withdrawers are firms that had a withdrawal connection and also chose to withdraw issuing guidance during the crisis, suggesting potential information contagion or strategic imitation. In contrast, the 728 or exposed maintainers are firms that had similar exposure through board connections but chose not to withdraw guidance, providing a natural benchmark to assess variation in responsiveness to peer behavior. The contrast between these groups enables us to test whether inter-firm connections, and particularly the relative position of firms within these networks, explain differential disclosure responses during the pandemic.

To control for exogenous variation in COVID-19's economic impact, we include a variable COVID Unemployment, constructed following the work by (Aaron et al., 2021). This measure captures the percentage drop in industry-level employment between February and April 2020, using detailed NAICS-based data from the Bureau of Labor Statistics. Firms are assigned a COVID

shock value based on the most granular NAICS code available (six-digit where possible). This approach ensures that the variable reflects heterogeneity in pandemic exposure across industries and serves as a control, not a primary explanatory variable in our analysis. As (Aaron et al., 2021) emphasize, unemployment-based measures of pandemic exposure predict withdrawal decisions and investor uncertainty, reinforcing the validity of this control in our setting.

Table 2 presents summary statistics for the key variables used in the analysis. Panel A provides descriptive statistics for the full sample, including guidance withdrawal decisions, firm characteristics, and board attributes. The data show withdrawal and maintainer firms with their respective proportions during the March–May 2020 period. Notably, the majority of sample firms had board-level connections to firms that previously withdrew guidance, representing the subset where information exposure through interlocking directorates is most relevant for our tests. The average firm has a market-to-book ratio of 2.10, a log firm size measure of $ 7.72, and a return on assets (ROA) of -1.9%. Approximately 28% of firms reported a loss, and the average board consists of nine directors, with institutional ownership averaging 74.9%.

Panel B compares firms that withdrew guidance (N=610) with those that maintained guidance (N=1,139). Firms that withdrew guidance were significantly more affected by COVID-19 unemployment rates and tended to be larger with an average COVID unemployment rate of 8.8%, compared to 5.9% for maintainers. Withdrawal firms also had greater analyst coverage, consistent with the notion that firms more scrutinized by the market may be more sensitive to information asymmetry and disclosure decisions. Institutional ownership was notably higher among guidance-withdrawing firms, suggesting that the presence of sophisticated investors may also shape disclosure policies during periods of uncertainty. Withdrawers, on average, had slightly lower return volatility and better recent performance, as indicated by higher ROA. Institutional ownership was notably higher among withdrawal firms compared to maintainers. In contrast, board structure variables such as board size, gender diversity, and average director age did not show significant differences between the two groups, implying that board composition alone may not explain differences in withdrawal behavior. Instead, network-based exposure through interlocks, as explored in the main analysis, may be a more salient driver of guidance withdrawal decisions.

Panel C compares firms that withdraw guidance with firms that maintain guidance among those with withdrawal connections in their director network. The subsample includes withdrawal firms (N = 338) and maintainer firms (N = 728). Several systematic differences emerge between the two groups. Withdrawal firms are exposed to significantly higher COVID-related unemployment shocks and exhibit higher financing activity, suggesting greater sensitivity to macroeconomic stress and capital market conditions. They are also larger on average and display significantly higher profitability, as measured by ROA. In addition, withdrawal firms are associated with lower stock illiquidity and higher institutional ownership, indicating greater market visibility and investor scrutiny. By contrast, we observe no statistically significant differences between withdrawal and maintainer firms with withdrawal connections in their network in terms of market-to-book ratios, loss indicators, share turnover, return volatility, stock returns, firm age, gender diversity, or board size. Overall, these patterns suggest that among firms with withdrawal connections, guidance withdrawal is more closely associated with firms' exposure to economic uncertainty, financing conditions, and monitoring intensity, rather than differences in governance structure or short-term market performance.

[Insert Table 2 here]

4. Withdrawal Connection and Information Flow Analysis

In this section, we analyze the effect of withdrawal connections on a firm's decision to withdraw earnings guidance. Our primary focus is on the direction and structure of information flow: specifically, whether firm size asymmetry, large to small firm linkages predicts withdrawal behavior. We begin by examining the effect of a previous withdrawal connection on a focal firm's likelihood of withdrawing earnings guidance.

We then investigate firm size connections between firms which withdrew guidance and the connected focal firm. To test for asymmetric influence, we adopt a categorical approach that classifies firm pairs based on their relative size, creating four distinct groups: Small-Small, Small-Big, Big-Small, and Big-Big connections. "Big" ("Small") denotes firms above (below) the sample median size:

Where:

- Small-Small: Both the focal firm and its connected peer are below the median
- Small-Big: The focal firm is large, but the connected withdrawer is small
- Big-Small: The focal firm is small, and the connected withdrawer is large
- Big-Big: Both the focal firm and the connected withdrawer are above the median

This classification strategy allows us to examine whether information flows uniformly across all connected pairs or whether the direction of influence depends on the size hierarchy between firms. Next, we analyze audit committee interlocks and whether audit committee interlocks amplify the size connection effect, consistent with findings that audit interlocks enhance credibility and governance spillovers across firms . Finally, we explore the role of director experience, assessing how a director's tenure on the committee influences the transfer of information.

4.1. Size Effect on Information Flow

We examine the relationship between a previous withdrawal board interlock and the decision to withdraw earnings guidance. To analyze this relationship, we estimate a linear probability model (Aaron et al., 2021; Cai et al., 2014), where the dependent variable, *Guidance Withdrawal*, is a binary variable that takes the value of one if a firm withdraws earnings guidance and zero otherwise. The explanatory variable, *Withdrawal Connection*, is an indicator variable that equals one if any director of the firm served on the board of another company that previously withdrew earnings guidance and zero otherwise.

Following the literature, we control for firm's exposure to COVID-19 pandemic, named *Covid Unemployment* (percentage changes in employment in each industry from February 2020 to April 2020). We consider firm-level characteristics that may influence earnings guidance policies, including *Firm Size* (natural logarithm of firm's market value of equity), *ROA* (return on assets, measured by earnings before extraordinary items scaled by total assets), *MTB* (market-to-book ratio, measured as the market value of equity plus book value of liabilities divided by book value of assets), *Return* (mean of monthly stock return), *Financing* (The total of net debt and net equity issues), *Loss* (a dummy variable equals to one if net income before extraordinary items is negative), and *Analyst* (number of analysts following the firm), *Illiquidity* (stock's illiquidity, measured based on Amihud, 2002), *Institutional Ownership* (Average percentage of shares outstanding held by all institutional investors), *Return Volatility* (Standard deviation of the monthly returns), *Share*

Turnover (Ratio of the annual average of daily trading volume over the numbers of shares outstanding) (Aaron et al., 2021; Cai et al., 2014; Hope et al., 2023; Masulis & Mobbs, 2014; Zhang, 2021).

Furthermore, we incorporate director-level controls, including *Age* (the average age of directors on the board), *Board Size* (total number of directors on board), and *Gender* (a dummy variable equals one if there are more female directors on board and zero otherwise). These board characteristics are included to control for governance quality and board monitoring capacity, which may independently influence disclosure decisions. Prior research shows that board composition affects corporate policies, including voluntary disclosure practices (Cai et al., 2014; Masulis & Mobbs, 2014). Importantly, we include month fixed effects to capture time sensitive factors, ensuring that the observed effect is not merely driven by the timing of withdrawals. We construct this measure using the filing date of guidance withdrawal for firms that withdrew guidance. Since there is no filing date for firms that maintained guidance, we assign them the filing date of their last withdrawal connected firm. This measure takes a value of 1, 2, or 3 if the withdrawal filing date falls in March 2020, April 2020, or May 2020, respectively. We, therefore, estimate the following linear regression model to test these relationships:

$$Guidance\ Withdrawal_{i,t} = \beta_1\ Withdrawal\ Connection_{i,t} + \beta_2\ Covid\ Unemployment_{i,t} + \beta_3\ Firm\ Controls_{i,t} + \beta_4\ Director\ Controls_{i,t} + \delta_1\ Time\ FE_{i,t} + \delta_2 Industry\ FE\ _{i,t} + \varepsilon_{i,t} \quad (1)$$

Models 1 and 2 in Table 3 present the regression results examining the determinants of guidance withdrawal, for the model outlined above as equation 1. Model 1 focuses on macroeconomic uncertainty using Covid Unemployment measure and its impact on guidance withdrawal. The coefficient on Covid Unemployment is significant and positive (0.569), consistent with prior studies (Aaron et al., 2021), suggesting that firms operating in industries hit harder by labor market shocks were more likely to retract guidance.

[Insert Table 3 here]

In Model 2, we introduce Withdrawal Connection and find a negative and statistically significant coefficient (-0.130). This suggests that firms with a connected director from a peer firm that previously withdrew guidance were less likely to withdraw their own guidance. This result

contrasts with Cai et al. (2014), who argue that board connections increase the likelihood of withdrawal. The difference may stem from the context: while they analyze a longer pre-pandemic period, our study focuses on the acute three-month window of COVID-19 uncertainty. We find that the unconditional association between interlock connections and guidance withdrawal is negative. This difference is economically intuitive given our setting. During the COVID-19 pandemic, guidance withdrawal was not universally interpreted as bad news (Hope et al., 2023), and directors faced heightened litigation and reputational risks. In this environment, interlocked directors may discourage guidance withdrawal unless it is supported by strong informational justification., resulting in a disciplining rather than imitative effect. This result underscores the importance of examining connection heterogeneity, not all board ties exert uniform influence.

Next, we consider our sample with previous withdrawal connection to examine our main hypotheses regarding size connection. We, therefore, estimate the following linear regression model to test these relationships:

$$Guidance\ Withdrawal_{i,t} = \beta_1\ Big\_Small_{i,t} + \beta_2\ Small\_Big_{i,t} + \beta_3\ Big\_Big_{i,t} + \beta_4\ Audit_{i,t} + \beta_5\ Big\_Small_{i,t} * Audit_{i,t} + \beta_6\ Small\_Big_{i,t} * Audit_{i,t} + \beta_7\ Big\_Big_{i,t} * Audit_{i,t} + \beta_8\ Covid\ Unemployment_{i,t} + \beta_9\ Firm\ Controls_{i,t} + \beta_{10}\ Director\ Controls_{i,t} + \delta_1\ Time\ FE_{i,t} + \delta_2 Industry\ FE\ _{i,t} + \varepsilon_{i,t} \quad (2)$$

Models 3 and 4 the sample of firms with a previous withdrawal connection, incorporating the firm control and director control variables across all models. Model 3 introduces a measure of size connections, which captures whether a firm is linked via board interlocks to a larger, smaller, or similarly sized firm that previously withdrew guidance. This variable enables a more granular examination of how the relative size of connected peers influences a firm's own disclosure behavior during a period of heightened uncertainty.

To construct this variable, we first classify each firm in the sample as either large or small, based on whether its total assets are above or below the median size of all connected firms in the withdrawal network. For firms that withdrew guidance (treatment group), we determine this size status using the firm right before our focal firm which they withdrew guidance. For firms that did not withdraw guidance (control group), we use the size of the most recent firm they are connected to that had already withdrawn guidance. We refer to this peer as the connected withdrawal firm.

Each firm is then assigned one of four size connection categories, depending on the firm's own size and that of the connected withdrawal firm. This classification allows us to test whether guidance withdrawal behavior is more likely to diffuse from larger to smaller firms, consistent with the idea that large firms play a disproportionate role in shaping disclosure norms in interfirm networks (Dharwadkar et al., 2020; Masulis & Mobbs, 2014). The final distribution across categories shows that 322 firms are classified as Big-Small, 284 as Big-Big, 238 as Small-Small, and 197 as Small-Big. These groupings form the basis of our analysis of asymmetry in information flow. Importantly, Small-Small is omitted in the regression as the benchmark category, which allows us to interpret all other size connection coefficients in relation to that baseline. This means each coefficient reflects whether the probability of guidance withdrawal differs for firms in that connection type, compared to those connected to similarly sized small peers.

The results provide evidence that disclosure behavior diffuses asymmetrically based on firm size. The coefficient on Big-Small is positive and statistically significant (0.090, p-value = 0.026), indicating that with large to small connections, the likelihood of guidance withdrawal is higher by 0.09. This finding is consistent with the view that larger firms play a central role in setting disclosure norms that are subsequently followed by smaller, connected peers. Prior studies have shown that directors prioritize their service on larger boards, given the higher prestige, compensation, and reputational benefits (Fahlenbrach, 2020; Masulis & Mobbs, 2014). These incentives may lead directors to transfer disclosure strategies observed in larger firms to their smaller appointments, especially when operating in uncertain environments such as the early phase of the COVID-19 pandemic.

The governance literature also highlights the importance of firm size in shaping disclosure incentives. Larger firms tend to offer directors greater visibility and prestige (Adams & Ferreira, 2008; Shivdasani, 1993), higher compensation (Ryan & Wiggins, 2004), and increased chances of securing additional board seats (Yermack, 2004). Sila et al. (2017) further show that independent directors with strong reputation concerns are more likely to serve on firms that engage in greater voluntary disclosure. As a result, larger firms often exhibit more transparent disclosure practices, potentially reducing the need to withdraw guidance during uncertain times.

In contrast, the coefficients for Small-Big (-0.010, p-value = 0.831) and Big-Big (0.031, p-value = 0.460) are statistically insignificant. The absence of a significant effect for Small-Big

connections suggests that smaller firms do not meaningfully influence the guidance behavior of larger firms, reinforcing the directional nature of information flow. Similarly, the lack of an effect for Big-Big connections implies that disclosure convergence among large firms may be less relevant in this setting, possibly due to a greater reliance on firm-specific disclosure strategies or higher internal informational capacity.

The classification scheme and findings are consistent with network-based models of information diffusion that emphasize hierarchical relationships (Banerjee et al., 2024; Fracassi, 2017). Within these frameworks, information is more likely to be adopted when transmitted from a credible, high-status source -in this case, a larger firm- to a less prominent recipient. The significant Big-Small effect in our results aligns with this theory and suggests that board networks function not just as conduits of social capital, but also as channels for strategic information transfer during periods of external disruption.

Model 3 also includes a set of firm and director level controls. Among these, the Financing variable is positive and statistically significant (1.591, p-value = 0.003), indicating that firms with stronger access to capital markets are less likely to withdraw guidance. This result is consistent with the idea that financially flexible firms face fewer constraints and thus have greater ability to maintain forward-looking disclosure. The coefficient on Return is negative and marginally significant (-0.908, p-value = 0.083), suggesting that firms experiencing weaker stock performance are more likely to retract guidance, potentially in response to market uncertainty or performance pressures. Institutional Ownership remains positive and significant (0.235, p-value = 0.001), reinforcing prior evidence that institutional investors demand timely and credible information and may exert pressure on firms to update guidance during turbulent periods.

To further investigate the mechanism of information diffusion in inter-firm networks, Model 4 introduces interaction terms between audit interlock and size connection. Prior literature suggests that audit interlocks can serve as an institutional conduit for the transmission of governance practices and disclosure strategies (Dhaliwal et al., 2011; Menon & Williams, 2004). Audit interlocks may facilitate the transfer of credible information not just because of interpersonal ties, but due to shared exposure to auditor scrutiny, common reporting standards, and reputational spillovers. The presence of a shared auditor or audit committee member can create informal pressures for disclosure consistency across connected firms, especially when market uncertainty

is high (DeFond & Lennox, 2011). In this sense, audit interlock can serve as a more structured and credible communication channel than general board ties, particularly when the informational asymmetry between connected firms is large.

We are particularly interested in whether audit interlock moderates the role of firm size asymmetry in disclosure behavior. Given that larger firms typically enjoy stronger reputations, better governance infrastructure, and greater access to capital markets (Adams & Ferreira, 2008; Masulis & Mobbs, 2014), they may serve as reference points for smaller connected firms during crisis periods. If a small firm is connected to a large firm via a shared auditor, it may interpret the larger firm's guidance withdrawal as an informational signal, prompting it to adjust its own disclosure behavior accordingly. Including the interaction between audit interlock and size connection allows us to assess whether audit ties amplify the directional flow of disclosure norms from larger to smaller firms, as suggested by network theory (Banerjee et al., 2024; Fracassi, 2017).

The coefficient on Audit Interlock alone is negative and statistically significant (-0.127, p-value = 0.033), suggesting that for firms with shared auditors, the likelihood of guidance withdrawal is lower by 0.127. This result is consistent with prior findings that stronger governance and monitoring structures often associated with audit oversight can reduce disclosure uncertainty and discourage guidance withdrawal (DeFond & Lennox, 2011; Gul et al., 2010; Klein, 2002). However, the presence of significant interaction effects in Model 4 reveals a more nuanced story. The coefficient on Big-Small × Audit Interlock is positive and significant (0.155, p-value = 0.047), indicating that audit interlocks alter the direction and intensity of information flow between firms of different sizes. Specifically, when a small firm is connected to a larger firm via audit interlock, the likelihood of guidance withdrawal is higher by 0.155. This suggests that audit interlocks may facilitate the transfer of disclosure behavior from larger to smaller firms, effectively reversing the baseline dampening effect of audit oversight in these asymmetrical relationships.

The other interaction terms, Small-Big × Audit Interlock (0.094, p-value = 0.286) and Big-Big × Audit Interlock (0.116, p-value = 0.143) are positive but not statistically significant, suggesting that the effect of audit interlock is most salient in the Big-Small configuration. In other words, the informational advantage conveyed by a shared auditor is conditional on the relative status of the firms involved. This finding supports the view that reputational spillovers and governance diffusion are strongest when the information flows from high-status, well-governed firms (i.e.,

large firms) to lower-status firms (i.e., small firms) through credible channels like audit interlock (Masulis & Mobbs, 2014; Sila et al., 2017).

Model 5 presents a joint specification that includes audit, compensation, and governance committee interlocks and their interactions with size categories simultaneously. The results are consistent with those reported in Model 4 for audit committee. In particular, the coefficient on Audit remains negative and statistically significant, indicating that audit committee interlocks are associated with a lower unconditional likelihood of guidance withdrawal. At the same time, the interaction between Big–Small connections and Audit committee interlocks remains positive and statistically significant, suggesting that audit committee ties facilitate the transmission of withdrawal behavior from larger to smaller connected firms. The coefficients on compensation and governance committee interlocks are economically small and statistically insignificant, and their inclusion does not alter the estimated effects of audit committee interlocks.

Overall, these results underscore the role of audit interlock as an amplifier of size-based information transmission. Rather than exerting a uniform influence, audit interlocks appear to shape disclosure behavior in strategically asymmetrical ways, depending on the structure of inter-firm connections. The evidence suggests that smaller firms may leverage shared audit ties to align their disclosure practices with those of larger, more reputable peers, particularly when operating under heightened uncertainty. Across all models, Institutional Ownership remains highly significant, suggesting that firms with more institutional investors are more likely to withdraw guidance, possibly due to pressure for timely and transparent updates from sophisticated investors. The Return variable shows a negative and significant relationship with guidance withdrawal in all models except Model 2, suggesting that firms experiencing worse stock performance are more inclined to withdraw guidance. Finally, the Financing variable is significant in Models 3 to 5, highlighting that firms with stronger financing capacity are less likely to withdraw guidance, likely due to increased financial stability and greater access to capital markets.

4.2. Director Experience

In this section, we incorporate audit role tenure to explore whether directors' time in role as an audit committee member shape decisions regarding guidance withdrawal. Audit committees occupy a distinct position within the board structure, with primary responsibility for overseeing financial reporting quality, disclosure credibility, and interactions with external auditors. Prior

research emphasizes that audit committee members face heightened reputational and litigation concerns relative to directors serving on other committees, particularly during periods of elevated uncertainty (Klein, 2002; Srinivasan, 2005). Importantly, the effectiveness of audit committee interlocks in transmitting information is likely to depend on directors accumulated experience in their audit roles. Directors with longer tenure on an audit committee are more deeply embedded in the firm's reporting processes, possess greater familiarity with the firm's internal controls and disclosure practices, and are more credible sources of advice to other boards on which they serve (Dharwadkar et al., 2020; Masulis & Mobbs, 2014; Zhang, 2021).

Audit committee members with substantial experience at firms that had already withdrawn guidance were likely better equipped to evaluate these trade-offs and to convey practical insights regarding disclosure credibility, auditor interactions, and investor response. Consequently, the informational influence of audit interlocks should be strongest when the shared director has accumulated meaningful experience on the audit committee of the connected firm, especially when that firm is larger and faces greater scrutiny from investors and regulators. Therefore, we hypothesize that the influence of audit committee interlocks on guidance withdrawal is stronger when the shared director has greater audit committee experience at the connected firm.

This section examines whether the time in role of audit committee members shapes the transmission of guidance withdrawal decisions through board connections. Building on the size-based network structure developed earlier, we evaluate how director experience on audit committees changes within Big–Small, Small–Big, Big–Big, and Small–Small size connections. Table 4 presents the results across four panels (A through D), each corresponding to a different size-connection category. Within each panel, we estimate four specifications that progressively incorporate firm characteristics, governance controls, and alternative definitions of audit committee experience. This design allows us to assess whether the influence of audit committee interlocks on guidance withdrawal depends not only on the relative size of connected firms, but also on the depth of audit experience accumulated by the shared director.

[Insert Table 4 here]

Across all Panels, Model 1 focuses on situations where the interlocking director has more experience in the connected firm (the firm with which the focal firm shares a director) that has withdrawn guidance compared to the focal firm itself. Model 2 examines the reverse, where the

director in the focal firm has greater tenure in the audit committee role than the connected firm. Model 3 investigates firms where the director in the connected firm has above median experience (4.6 years) in the audit committee role, which may reflect greater expertise and influence in shaping decisions. Model 4 captures cases where the focal firm's director has above median experience (5 years) in the audit committee role.

The results highlight the significant role of director experience in shaping guidance withdrawal decisions. Specifically, Models 1 and 3 of Panel A show positive and statistically significant coefficients (0.180 and 0.358, respectively), indicating that firms with interlocking audit directors who have more experience in connected firms that previously withdrew guidance are more likely to adopt similar disclosure practices. This suggests that smaller firms, with less experienced audit committees, are influenced by the practices of larger, more experienced firms, particularly in uncertain environments. On the other hand, Models 2 and 4 of Panel A show weaker and insignificant results, suggesting that the experience of the director within the focal firm or in a less experienced connected firm does not have the same influence on guidance withdrawal decisions.

The results in Panels B through D further underscore that the transmission of guidance withdrawal decisions through audit committee interlocks is highly context dependent. Outside of Big–Small connections, we do not find consistent evidence that audit committee experience facilitates the transfer of withdrawal behavior. In Panel B (Small–Small connections), the negative and statistically significant coefficients in Models 1 and 3 indicate that audit committee experience accumulated in similarly sized firms does not translate into increased withdrawal likelihood, consistent with the absence of a credible information advantage in this setting. In Panel C (Small–Big connections), the negative coefficient in Model 2 suggests that audit committee experience embedded within the focal firm does not encourage withdrawal when the connected firm is smaller. Finally, Panel D (Big–Big connections) yields no statistically significant effects across specifications, indicating limited scope for experience-based information transmission when both firms are large and possess substantial internal reporting expertise.

Together, these findings support the argument that information flows from more experienced, larger firms to smaller firms with less experienced audit committees, influencing their decisions

regarding guidance withdrawal. This underscores the importance of audit committee experience, both within the focal firm and across connected firms, in shaping corporate disclosure behavior.

4.3. Time to Guidance Withdrawal Model

As an alternative to the regression approach, we estimate guidance withdrawal using a Cox proportional hazard model. Unlike standard regression methods, the Cox model explicitly accounts for right-censoring, which is common in survival data. In this context, right-censoring occurs because some firms have not withdrawn guidance by the end of the observation period. The Cox model allows us to assess how firm- and network-level characteristics influence the hazard, or risk, of withdrawal over time, without imposing parametric assumptions on the baseline hazard (Cleves, 2008; Cox, 1972).

To implement the hazard model, we construct a sample that includes both firms that withdrew guidance and firms that maintained guidance throughout the crisis period. While withdrawal firms have a clearly defined event date, firms that maintain guidance do not experience an observable withdrawal event. To ensure a consistent timing framework, we assign maintaining firms a quasi withdrawal date based on matched withdrawal firms with similar characteristics. Specifically, we match maintaining firms to withdrawal firms on observable firm characteristics measured prior to the pandemic and use the withdrawal date of the matched firm to align calendar time exposure. This approach allows maintaining firms to remain in the risk set over a comparable time horizon while being treated as right-censored observations, consistent with the structure of the Cox model.

The hazard analysis is conducted on a matched sample of 810 firms, consisting of 263 firms that withdrew guidance during the crisis period and 547 firms that maintained guidance and are treated as right-censored observations. The smaller sample size relative to earlier sections reflects the additional data requirements imposed by the duration framework, including the construction of time-to-event measures and the availability of matching variables used to align withdrawal firms and maintainers. As a result, the hazard model focuses on a balanced subset of firms for which withdrawal timing and covariates are consistently observed.

In the Cox proportional hazard model, a positive coefficient indicates a larger hazard rate, meaning a shorter time to guidance withdrawal. Table 5 reports the Cox model results. Model 1 includes all size-based connection categories, with Small–Small connections serving as the benchmark. The hazard ratio on Big–Small is 1.769 and statistically significant (P_value = 0.002),

indicating that small firms connected to larger firms that previously withdrew guidance face a higher risk of withdrawal and do so more quickly. In addition, the coefficient on Big–Big is also positive (1.513) and statistically significant (P_value = 0.040) in this baseline specification. This finding suggests that large firms connected to other large withdrawing firms may respond rapidly to shared information or common economic shocks.

[Insert Table 5 here]

Model 2 focuses on the baseline Big–Small channel and incorporates audit committee interlocks. The hazard ratio on Big–Small remains positive and significant (1.466, P_value= 0.011), while the audit committee indicator itself is not statistically significant. This pattern suggests that the acceleration of withdrawal timing is primarily driven by size-based information asymmetry rather than by audit committee membership alone, consistent with the idea that audit committees serve as a facilitating channel rather than an independent trigger of withdrawal. Model 3 sharpens this mechanism by conditioning on director experience. Restricting the sample to cases in which the interlocked director has greater audit committee experience at the connected firm, the hazard ratio on Big–Small increases substantially and remains statistically significant (5.134, P_value=0.006). This result indicates that information originating from larger firms is transmitted more forcefully when the shared director is more deeply embedded in the connected firm's audit committee, accelerating the focal firm's withdrawal decision. This finding is consistent with prior evidence that director experience enhances the effectiveness of policy diffusion through board networks (Dass et al., 2014; Fracassi & Tate, 2012).

From the control variables, the log-transformed Financing variable is significantly associated with an increased hazard of withdrawal across all specifications, potentially indicating greater capital needs or financial stress leading firms to withdraw forward-looking statements. Return volatility and average return are also logged and show expected directional effects, although their significance varies. The log of COVID-related unemployment exposure is positively signed in all models, supporting the idea that macroeconomic shocks increase pressure to withdraw guidance, though the estimates are not consistently significant.

Collectively, the results underscore a consistent pattern: small firms connected to large, experienced firms through audit interlocks are more likely to withdraw guidance and do so more

quickly. This finding highlights the importance of size asymmetry and informational influence in networked governance structures, especially during uncertain periods.

4.4. Compensation and Governance Committee

Our earlier analyses show that audit committee interlocks particularly from large to small firms serve as a key channel for information transmission, influencing the likelihood and timing of guidance withdrawal. We now explore whether similar dynamics operate through other board committees, namely the compensation and governance committees. While these committees are not directly responsible for financial disclosures, they shape important aspects of firm governance such as executive incentives, risk preferences, and oversight culture, all of which may indirectly affect disclosure behavior in times of uncertainty (Bizjak et al., 2009; Cai & Sevilir, 2012; Fich & Shivdasani, 2006).

Table 6 reports regression results examining whether interlocks in the compensation and governance committees are associated with guidance withdrawal. Models 1 and 2 focus on compensation committee interlocks, while Models 3 and 4 examine governance committee interlocks. Across these specifications, we include size-based connection categories to assess whether the influence of these committees varies with the relative size of the connected firms. In contrast to the results for audit committee interlocks, the estimates in Table 6 do not provide consistent evidence for compensation or governance committee. The main effects of compensation and governance committee interlocks are statistically insignificant, and their interactions with size-based connections are likewise insignificant across specifications. While the Big–Small indicator is positive and statistically significant in Model 2, the corresponding interaction terms with compensation remains insignificant, suggesting that the observed size-based effect is not driven by these committees.

[Insert Table 6 here]

Overall, the findings in Table 6 indicate that interlocks through compensation and governance committees do not play a meaningful role in shaping firms' guidance withdrawal behavior. Taken together with the earlier results, this pattern reinforces the committee-specific nature of information transmission in board networks. While directors may serve on multiple committees, only interlocks involving audit committee responsibilities—where oversight of financial reporting and disclosure practices is central—appear to be relevant for the diffusion of guidance withdrawal

decisions during the crisis period. This finding is consistent with research showing that audit committees are more tightly linked to disclosure quality and regulatory compliance (Carcello et al., 2011; Krishnan, 2005), while compensation and governance committees may operate with broader, longer-term mandates less sensitive to immediate external shocks.

5. Robustness Analyses

Our identification strategy hinges on the idea that interlocked ties with larger firms (Big–Small connections) act as critical information channels between firms. Guidance withdrawal during COVID-19 pandemic provides the setting to test information flow between firm because of the fact that many firm withdrew their earning guidance in this period. To ensure the robustness of this mechanism, we explore whether our findings are sensitive to how we define the connected withdrawal firm and the nature of the audit connection. Tables 7 and 8 present results from four robustness tests each, which further support our central argument: disclosure contagion is asymmetric and flows predominantly from larger to smaller firms through meaningful audit committee ties.

5.1. Alternative Definitions of the Connected Withdrawal Firm

In this section, we examine whether our main findings are sensitive to alternative definitions of the connected withdrawal firm, focusing on which withdrawing firm within the network is most relevant for shaping a focal firm's disclosure decision.

5.1.1. First Withdrawal in the Network

In Model 1 of Table 7, we redefine the connected firm as the first firm within the interlocked network to withdraw guidance, rather than the most recent withdrawer. This alternative definition captures whether early disclosure signals within the network shape subsequent withdrawal decisions. Under this specification, the main effects of the size-based connection indicators are not statistically significant. However, the interaction between Big–Small connections and audit committee interlocks remains positive and statistically significant. This finding indicates that early withdrawal decisions by larger connected firms influence smaller firms' disclosure behavior when the connection operates through the audit committee.

[Insert Table 7 here]

5.1.2. Biggest Withdrawing Firm

Next, in Model 2 of Table 7, we define the connected firm as the largest firm (by total assets) within the interlock network that withdrew guidance before the focal firm. This approach directly tests the informational hierarchy hypothesis , that larger firms serve as central hubs in information transmission, and their decisions disproportionately shape the behavior of smaller peers. The findings are again robust: the Big-Small × Audit interaction becomes even more statistically significant, highlighting the powerful role of large firms in shaping disclosure decisions during uncertain periods.

5.2. Alternative Audit Connection Definitions

In this section, we examine whether our results depend on how audit committee connections between firms are defined. Specifically, we consider alternative audit connection structures that weaken or diffuse the channel through which disclosure-related information may be transmitted.

5.2.1. Audit Connection: One-Sided Overlap

In Model 3 of Table 7, we relax the audit connection definition by requiring only that the withdrawal firm's director sits on its own audit committee and is also on the board of the focal firm, without needing to serve on the focal firm's audit committee. This structure preserves a form of governance tie but weakens its direct influence over the focal firm's disclosure process. The results show that, under this relaxed definition, the Big-Small × Audit interaction becomes statistically insignificant, suggesting that mere board presence is insufficient for information transmission in the absence of direct audit committee influence.

More importantly, this lack of significance in Model 3 further underscores a central insight of our paper: the Big-Small connection is a more robust and powerful determinant of disclosure spillovers than audit interlock type alone. That is, it is not just any interlock that matters, it is an interlock that exists within an asymmetrical size-based relationship, where the smaller firm is structurally more likely to absorb governance cues from the larger firm. This aligns with our broader claim that informational hierarchies drive behavioral contagion in disclosure decisions.

5.2.2. Diffuse Average Influence Across Connections

In Model 4, we construct a more diffuse measure of connected firm influence by averaging the total assets of all previously withdrawal firms within the focal firm's director network. We also consider whether any of those withdrawal firms share an audit committee director with the focal firm. This specification tests whether generalized network exposure, rather than ties to specific withdrawal firms, is sufficient to influence disclosure decisions. Model 4 further weakens the sharpness of the size-based spillover by constructing an average-based measure: the mean size of all previously withdrawal firms in the network, combined with any prior audit committee overlap. Here too, the Big–Small × Audit interaction term loses significance, reinforcing that diffuse or generalized exposure to large firms is not sufficient to trigger guidance withdrawal. Rather, the effect is strongest and most consistent when the focal firm has a salient, directional tie to a specific larger firm that withdrew guidance. These results again support the core idea that the structure and asymmetry of interfirm connections not just the existence of interlocks determine the strength of information transmission.

5.3. Industry Effects and the Nature of Informational Spillovers

To explore whether the effectiveness of audit interlocks depends on industry similarity, we separate the sample based on whether the focal and connected firms operate in the same or different industries (as defined by a two-digit SIC match). If disclosure spillovers primarily reflect sector-specific shocks or norms, we would expect stronger effects in intra-industry interlocks. In contrast, if audit interlocks serve as informational governance channels, especially from larger to smaller firms, then cross-industry connections may be more meaningful, as they are less likely to be driven by imitation or herding.

In this analysis, we focus on Big–Small connections because prior results consistently show that disclosure spillovers arise only in size-asymmetric relationships where smaller firms are connected to larger peers. Other size-based connections do not exhibit robust effects in earlier specifications and therefore provide limited additional insight into the information transmission mechanism. Table 8 reports these results. Model 1, which captures same-industry interlocks, shows no significant association between Big-Small connections and guidance withdrawal. However, Model 2, which isolates cross-industry interlocks, reveals a positive and statistically significant effect for Big–Small ties. This result suggests that when audit interlocks span different industries,

they are more likely to represent credible informational links rather than mere sectoral contagion or benchmarking.

[Insert Table 8 here]

These findings align with Cai et al. (2014), who show that interlocks influence disclosure policy through channels beyond product-market similarity. By avoiding potential conflicts of interest or redundancy in intra-industry ties, firms may benefit from fresh perspectives via experienced directors from outside their competitive space. Moreover, this cross-industry effect reinforces our core argument that information flows more effectively when a smaller firm is linked to a larger, credible governance source, rather than a peer or competitor.

5.4. Audit Experience and the Quality of Information Transmission

We next examine whether the depth of audit experience in the connected firm affects the potency of information flow. As established earlier in the paper, the role of audit interlocks is not just structural, but also functional: it matters whether the connected director brings substantial, relevant experience from their prior board service.

Table 8, Model 3 evaluates interlocks where the audit experience of the connected director is below the median. Here, Big-Small effects are insignificant, supporting the notion that mere presence of interlocks is insufficient for meaningful spillover. By contrast, Model 4, which considers above-median audit experience, reveals a positive and marginally significant Big-Small coefficient . This result implies that when the connected firm is both larger and its director brings substantial audit experience, the likelihood of a smaller firm withdrawing guidance increases.

This finding is in line with the literature on board capital and director influence. For example, (Fich & Shivdasani, 2006; Masulis & Mobbs, 2014) emphasize that the impact of interlocks depends on director reputation, tenure, and functional roles. It also supports the argument that interlocks matter most when they are from larger, more credible sources to smaller, more uncertain firms which is a core premise of our theoretical framing.

6. Conclusion

This paper investigates how firm size and board interlocks shape the diffusion of disclosure decisions within corporate networks. Using earnings guidance withdrawals during the COVID-19 pandemic as an exogenous shock, we document that connections to larger firms significantly increase both the likelihood and speed of withdrawal by smaller connected firms, with the strongest effect occurring when the interlock involves shared audit committee members. These findings suggest that firm size acts as a conduit for informational influence, amplifying the impact of decisions made by larger, more visible market players.

Our study contributes to the literature on corporate networks, disclosure policy, and governance by uncovering a new interaction between firm size and information transmission channels. Beyond the pandemic context, these results have broader implications for understanding how corporate decisions propagate through interconnected boards, as well as for policymakers evaluating the systemic consequences of interlocking directorates. Importantly, our research highlights the unique role of audit interlocks in facilitating strategic decisions. Firms connected through audit committees especially those with larger or more experienced audit members are more likely to withdraw earnings guidance, emphasizing the expertise embedded in these relationships. This underscores the need to consider the specific functions and expertise associated with different types of interlocks, rather than treating all interlocks as homogeneous information conduits.

One limitation of this study is that board interlocks may capture multiple channels of influence, including information transmission and social dynamics, which are difficult to fully disentangle. In addition, the analysis focuses on the COVID-19 period, characterized by elevated uncertainty, which may limit the generalizability of the results to more typical economic conditions.

Future research could extend this work by exploring whether similar dynamics operate in other strategic domains such as investment, financing, or risk management, and by assessing the long-term effects of size-based influence on market transparency and corporate behavior. Overall, our findings refine the understanding of how board interlocks operate in practice and offer valuable insights into the conditions under which they influence firm decisions.

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Appendix A

Variable	Definition
Guidance Withdrawal	Binary variable equal to 1 if the firm withdrew earning guidance with a filing date between March 1, 2020, and May 30, 2020, 0 otherwise.
Withdrawal Connection	Indicator variable equal to 1 if any director of the firm serves on the board of another firm that previously withdrew guidance, 0 otherwise.
Small-Small	Both the focal firm and its connected withdrawal firm are below the median size
Big-Small	The focal firm is small, but the connected withdrawal firm is large
Small-Big	The focal firm is large, but the connected withdrawal firm is small
Big-Big	Both the focal firm and its connected withdrawal firm are above the median size
Firm Size	Natural logarithm of the firm's market value of equity.
Audit Interlock	Indicator variable equal to 1 if two firms share a common audit committee member, 0 otherwise.
Compensation Interlock	Indicator variable equal to 1 if two firms share a common compensation committee member, 0 otherwise.
Governance Interlock	Indicator variable equal to 1 if two firms share a common governance committee member, 0 otherwise.
Covid Unemployment	Percentage change in employment in each industry from Feb 2020 to Apr 2020, capturing industry exposure to COVID-19 shocks.
ROA	Earnings before extraordinary items scaled by total assets.
MTB	Market value of equity plus book value of liabilities divided by book value of assets.
Return	Mean of monthly stock returns.
Financing	Total net debt and net equity issues.
Loss	Dummy variable equal to 1 if net income before extraordinary items is negative, 0 otherwise.
Analyst	Number of analysts following the firm.
Illiquidity	Stock illiquidity measure based on Amihud (2002).
Institutional Ownership	Average percentage of shares outstanding held by institutional investors.
Return Volatility	Standard deviation of monthly stock returns.

Variable	Definition
Share Turnover	Ratio of annual average daily trading volume over the number of shares outstanding.
Age	Average age of directors on the board.
Board Size	Total number of directors on the board.
Gender	Dummy variable equal to 1 if more female directors on the board, 0 otherwise.
Director Experience	Tenure (years) of audit committee members in the connected firm or focal firm, used to assess expertise influence.

Table 1: Sample Selection

This table outlines the procedures used to construct our sample. We begin by obtaining the initial dataset from the I/B/E/S Guidance database. The sample is then restricted to firms that issued management forecasts for the fiscal year 2020. Additionally, we remove firms that provided or withdrew guidance in January or February 2020, as the economic impact of Covid-19 was not yet widely recognized (e.g., the World Health Organization declared Covid-19 a pandemic on March 11, 2020). As a result, our final sample period spans from March to May 2020.

	Firms	guidance withdrawals	guidance maintainers
Firms with issued guidance for fiscal year 2020	2,251	709	1,542
Firms with board interlock and unemployment data	1,749	610	1,139
Firms with a previous withdrawal board interlock	1,066	338	728

Table 2:Summary Statistic

This table reports summary statistics for the sample. Panel A reports descriptive statistics for the full sample, including firm characteristics, board attributes, and financial variables. Panel B compares the means of firms that withdrew guidance (withdrawal firms) and those that maintained guidance (maintainer firms). Guidance Withdrawal is a binary variable equal to one if a firm withdrew earnings guidance for the fiscal year 2020 and zero otherwise. Withdrawal Connection is a binary variable equal to one if at least one board member serves on the board of another firm that previously withdrew guidance and zero otherwise. ***, **, * denote significance at 1%, 5%, and 10%.

Panel A: Full sample descriptive statistics

	N	Mean	SD	P25	Median	P75
Guidance Withdrawal	1749	0.349	0.477	0.000	0.000	1.000
Withdrawal Connection	1749	0.609	0.488	0.000	1.000	1.000
Covid Unemployment	1749	0.069	0.117	0.007	0.021	0.087
MTB	1732	2.104	1.656	1.083	1.503	2.389
Financing	1731	0.032	0.052	0.007	0.026	0.045
Firm Size	1736	7.715	1.970	6.438	7.794	9.013
Loss	1749	0.281	0.450	0.000	0.000	1.000
ROA	1736	-0.019	0.194	-0.010	0.025	0.06
Illiquidity	1736	0.035	0.138	0.000	0.001	0.004
Share Turnover	1736	0.009	0.017	0.005	0.007	0.01
Return Volatility	1738	0.111	0.075	0.065	0.094	0.134
Return	1738	0.022	0.035	0.008	0.021	0.036
Analyst	1749	8.136	7.087	3.000	6.000	12.000
Institutional Ownership	1749	0.749	0.268	0.663	0.839	0.944
Age	1749	63.802	5.670	60.500	64.000	67.000
Gender	1749	0.233	0.423	0.000	0.000	0.000
Board Size	1749	9.147	2.348	8.000	9.000	11.000

Panel B: Withdrawal vs. Maintainer firms

	Withdrawal (N=610)	Maintainer (N=1,139)	Difference Withdrawal - Maintainer	P_value
Withdrawal Connection	0.499	0.484	0.016	0.502
Covid Unemployment	0.097	0.050	0.046	0.000***
MTB	2.105	2.012	0.093	0.230
Financing	0.035	0.030	0.006	0.023**
Firm Size	7.881	7.186	0.695	0.000***
Loss	0.248	0.294	-0.046	0.028**
ROA	0.010	-0.042	0.052	0.000***
Illiquidity	0.019	0.062	-0.043	0.000***
Share Turnover	0.009	0.010	-0.001	0.444
Return Volatility	0.106	0.117	-0.011	0.007***

Return	0.021	0.022	-0.001	0.734
Analyst	8.516	6.702	1.813	0.000***
Institutional Ownership	0.819	0.660	0.160	0.000***
Age	63.589	63.916	-0.327	0.251
Gender	0.252	0.222	0.030	0.153
Board Size	9.237	9.100	0.137	0.245

Panel C: Withdrawal vs. Maintainer firms with withdrawal connections

	Withdrawal (N=338)	Maintainer (N=728)	Difference Withdrawal - Maintainer	P_value
Covid Unemployment	0.088	0.057	0.031	0.000***
MTB	2.201	2.112	0.089	0.413
Financing	0.037	0.029	0.008	0.000***
Firm Size	8.332	8.029	0.303	0.019**
Loss	0.225	0.251	-0.027	0.348
ROA	0.021	-0.015	0.036	0.001***
Illiquidity	0.007	0.036	-0.028	0.001***
Share Turnover	0.009	0.009	0.000	0.584
Return Volatility	0.100	0.106	-0.006	0.137
Return	0.021	0.023	-0.002	0.266
Analyst	9.769	8.882	0.887	0.067*
Institutional Ownership	0.849	0.756	0.093	0.000***
Age	63.929	63.843	0.086	0.793
Gender	0.213	0.243	-0.030	0.280
Board Size	9.619	9.515	0.104	0.490

Table 3: Regression Results on Guidance Withdrawal

This table reports regression results examining the determinants of guidance withdrawal on board interlock variables, size connection categories, and control variables. The size connection categories (Small-Small, Big-Small, Small-Big, Big-Big) are defined based on the focal firm's size relative to its most recent connected firm that withdrew guidance, with Small–Small as the benchmark category. The five models incorporate month and industry fixed effects. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Guidance Withdrawal				
	Model 1	Model 2	Model 3	Model 4	Model 5
Withdrawal Connection		-0.130***			
		(0.000)			
Big-Small			0.090**	0.031	0.018
			(0.026)	(0.544)	(0.766)
Small-Big			-0.010	-0.046	-0.038
			(0.831)	(0.435)	(0.587)
Big-Big			0.031	-0.013	-0.031
			(0.460)	(0.798)	(0.613)
Audit				-0.127**	-0.130**
				(0.033)	(0.029)
Compensation					-0.010
					(0.891)
Governance					-0.037
					(0.595)
Big-Small * Audit				0.155**	0.155**
				(0.047)	(0.049)
Small-Big * Audit				0.094	0.089
				(0.286)	(0.320)
Big-Big * Audit				0.116	0.121
				(0.143)	(0.131)
Big-Small * Compensation					-0.057
					(0.537)
Small-Big * Compensation					0.009
					(0.932)
Big-Big * Compensation					0.045
					(0.637)
Big-Small * Governance					0.097
					(0.286)
Small-Big * Governance					-0.037
					(0.709)
Big-Big * Governance					0.017
					(0.847)
Covid Unemployment	0.569***	0.260	-0.131	-0.119	-0.126
	(0.000)	(0.121)	(0.525)	(0.564)	(0.549)
MTB	-0.004	-0.022***	-0.015	-0.014	-0.015

	(0.621)	(0.008)	(0.159)	(0.192)	(0.172)
Financing	0.518	0.454	1.591***	1.590***	1.628***
	(0.140)	(0.132)	(0.003)	(0.003)	(0.002)
Firm Size	0.019	0.028**	0.015	0.013	0.013
	(0.113)	(0.018)	(0.329)	(0.386)	(0.423)
Loss	0.043	0.016	-0.001	0.002	0.006
	(0.213)	(0.651)	(0.983)	(0.964)	(0.904)
ROA	0.175***	0.078	0.161	0.172	0.178*
	(0.008)	(0.244)	(0.131)	(0.106)	(0.100)
Illiquidity	-0.069	-0.084	-0.094	-0.099	-0.093
	(0.314)	(0.270)	(0.359)	(0.327)	(0.355)
Share Turnover	-0.076	0.130	0.266	0.241	0.168
	(0.811)	(0.665)	(0.805)	(0.824)	(0.879)
Return Volatility	0.248	0.158	0.043	0.014	-0.001
	(0.212)	(0.400)	(0.878)	(0.960)	(0.997)
Return	-0.765**	-0.558	-0.908*	-0.932*	-0.948*
	(0.045)	(0.131)	(0.083)	(0.076)	(0.073)
Analyst	-0.001	-0.002	0.000	0.000	0.001
	(0.641)	(0.367)	(0.915)	(0.899)	(0.862)
Institutional Ownership	0.346***	0.300***	0.235***	0.233***	0.235***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Age	-0.001	-0.001	0.003	0.003	0.003
	(0.493)	(0.756)	(0.291)	(0.304)	(0.266)
Gender	-0.004	0.012	-0.028	-0.026	-0.027
	(0.875)	(0.632)	(0.378)	(0.400)	(0.400)
Board Size	-0.010*	0.011*	0.014*	0.014*	0.014
	(0.071)	(0.070)	(0.083)	(0.079)	(0.100)
Constant	0.068	0.153	-0.298	-0.253	-0.253
	(0.631)	(0.524)	(0.338)	(0.419)	(0.421)
Industry Effects		YES	YES	YES	YES
Month Effects			YES	YES	YES
Observations	1,727	1,727	1,035	1,035	1,035
R-squared	0.084	0.228	0.233	0.237	0.241

Table 4:Regression results on audit committee experience and guidance withdrawal

This table presents regression results investigating how audit committee experience within interlocking directorates relates to firms' guidance withdrawal decisions. Panels A through D correspond to the four size connection categories. Within each Panel, Model 1 examines cases where the interlocking director has more audit committee experience in the connected firm (that withdrew guidance) than in the focal firm. Model 2 considers the reverse, where the director has greater experience in the focal firm than in the connected firm. Models 3 and 4 use the median audit committee experience across all connected firms as a benchmark. Model 3 focuses on connections where the director's experience in the connected firm is above the sample median, while Model 4 focuses on cases where the focal firm's director experience exceeds the median. The four models incorporate month and industry fixed effects. Control variables are suppressed for brevity. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Big-Small

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Variables				
Big-Small	0.195**	0.054	0.358*	-0.098
	(0.049)	(0.483)	(0.059)	(0.630)
Covid Unemployment	0.056	0.518	0.598	1.194
	(0.933)	(0.469)	(0.570)	(0.583)
Constant	-0.777	-0.651	-2.011	-0.112
	(0.224)	(0.308)	(0.222)	(0.945)
Control Vars	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES
Month Effects	YES	YES	YES	YES
Observations	168	183	85	74
R-squared	0.420	0.499	0.591	0.706

Panel B: Small-Small

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Variables				
Small-Small	-0.177*	-0.043	-0.290*	0.181
	(0.064)	(0.614)	(0.069)	(0.357)
Covid Unemployment	0.123	0.590	0.624	0.605
	(0.849)	(0.436)	(0.606)	(0.804)
Constant	-0.551	-0.608	-1.691	-0.139
	(0.387)	(0.340)	(0.352)	(0.930)
Control Vars	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES

Month Effects	YES	YES	YES	YES
Observations	168	183	85	74
R-squared	0.417	0.499	0.578	0.716

Panel C: Small-Big

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Variables				
Small-Big	0.083	-0.143*	-0.089	-0.197
	(0.481)	(0.091)	(0.716)	(0.402)
Covid Unemployment	-0.020	0.376	0.361	0.668
	(0.977)	(0.588)	(0.750)	(0.740)
Constant	-0.675	-0.646	-1.326	0.435
	(0.296)	(0.308)	(0.482)	(0.784)
Control Vars	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES
Month Effects	YES	YES	YES	YES
Observations	168	183	85	74
R-squared	0.400	0.506	0.543	0.711

Panel D: Big-Big

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Variables				
Big-Big	-0.072	0.090	0.035	0.005
	(0.451)	(0.241)	(0.858)	(0.980)
Covid Unemployment	-0.047	0.578	0.312	1.129
	(0.945)	(0.428)	(0.795)	(0.614)
Constant	-0.690	-0.649	-1.303	0.181
	(0.283)	(0.306)	(0.502)	(0.911)
Control Vars	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES
Month Effects	YES	YES	YES	YES
Observations	168	183	85	74
R-squared	0.399	0.503	0.541	0.702

Table 5: Cox Proportional Hazard Model Estimating Time to Guidance Withdrawal
This table presents estimated coefficients from Cox proportional hazard models examining the effect of board connections on the timing of Guidance Withdrawal. Model 1 considers all size connection categories where Small-Small is the benchmark. Model 2 includes Big–Small connections and audit committee. Model 3 incorporates audit committee experience. All specifications include month and industry fixed effects. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3
Big-Small	1.769***	1.466**	5.134***
	(0.002)	(0.011)	(0.006)
Small-Big	1.140		
	(0.575)		
Big-Big	1.513**		
	(0.040)		
Audit		0.878	
		(0.374)	
Covid Unemployment	1.129*	1.109	1.315
	(0.076)	(0.129)	(0.347)
MTB	0.961	0.954	1.379**
	(0.511)	(0.429)	(0.038)
Financing	1.391***	1.395***	2.272**
	(0.000)	(0.000)	(0.014)
Firm Size	1.131	1.143	1.708
	(0.157)	(0.115)	(0.106)
Loss	1.119	1.124	0.096*
	(0.649)	(0.637)	(0.057)
ROA	5.697*	5.886**	3.245
	(0.053)	(0.047)	(0.608)
Illiquidity	0.219	0.219	0.004
	(0.242)	(0.249)	(0.549)
Share Turnover	1.096	1.116	0.525
	(0.666)	(0.600)	(0.526)
Return Volatility	0.885	0.894	12.937**
	(0.625)	(0.652)	(0.018)
Return	0.007	0.005*	0.000**
	(0.105)	(0.085)	(0.025)
Analyst	1.005	1.003	1.086
	(0.711)	(0.833)	(0.215)
Institutional Ownership	2.192**	2.160**	1.370
	(0.042)	(0.048)	(0.851)
Age	1.032**	1.026*	0.952
	(0.040)	(0.084)	(0.492)
Gender	0.948	0.934	2.089
	(0.752)	(0.684)	(0.186)

Board Size	1.016 (0.723)	1.013 (0.777)	0.844 (0.247)
Industry Effects	YES	YES	YES
Month Effects	YES	YES	YES
Observations	810	810	141

Table 6:Regression Results for Compensation and Governance Committee Interlocks

This table presents regression estimates examining whether interlocks in the compensation and governance committees influence a firm's decision to withdraw guidance. Models 1 and 2 focus on compensation interlocks, while Models 3 and 4 analyze governance interlocks. All specifications include month and industry fixed effects. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Guidance Withdrawal			
	Compensation		Governance	
	Model 1	Model 2	Model 3	Model 4
Big-Small		0.104**		0.065
		(0.026)		(0.171)
Small-Big		-0.008		-0.004
		(0.882)		(0.938)
Big-Big		0.025		0.022
		(0.585)		(0.641)
Compensation	-0.010	0.003		
	(0.758)	(0.964)		
Governance			-0.009	-0.034
			(0.791)	(0.602)
Big-Small * Compensation		-0.056		
		(0.531)		
Small-Big * Compensation		-0.005		
		(0.958)		
Big-Big * Compensation		0.027		
		(0.765)		
Big-Small * Governance				0.088
				(0.314)
Small-Big * Governance				-0.033
				(0.726)
Big-Big * Governance				0.024
				(0.780)
Covid Unemployment	-0.119	-0.128	-0.119	-0.142
	(0.566)	(0.538)	(0.564)	(0.492)
MTB	-0.012	-0.015	-0.012	-0.015
	(0.255)	(0.151)	(0.259)	(0.149)
Financing	1.573***	1.604***	1.575***	1.612***
	(0.003)	(0.003)	(0.003)	(0.002)
Firm Size	0.007	0.015	0.007	0.015
	(0.659)	(0.339)	(0.653)	(0.342)
Loss	-0.001	-0.001	-0.002	0.002
	(0.982)	(0.978)	(0.975)	(0.974)
ROA	0.186*	0.164	0.185*	0.163
	(0.086)	(0.126)	(0.088)	(0.128)
Illiquidity	-0.086	-0.091	-0.086	-0.091

	(0.404)	(0.371)	(0.407)	(0.376)
Share Turnover	0.373	0.132	0.387	0.345
	(0.732)	(0.904)	(0.723)	(0.751)
Return Volatility	0.021	0.052	0.021	0.024
	(0.939)	(0.854)	(0.941)	(0.933)
Return	-0.982*	-0.915*	-0.989*	-0.919*
	(0.063)	(0.083)	(0.061)	(0.079)
Analyst	0.000	0.000	0.000	0.000
	(0.918)	(0.912)	(0.913)	(0.887)
Institutional Ownership	0.234***	0.234***	0.235***	0.240***
	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.003	0.003	0.003	0.003
	(0.250)	(0.250)	(0.249)	(0.309)
Gender	-0.029	-0.027	-0.029	-0.029
	(0.356)	(0.388)	(0.367)	(0.367)
Board Size	0.013	0.014*	0.013	0.014*
	(0.102)	(0.095)	(0.104)	(0.088)
Constant	-0.206	-0.312	-0.214	-0.286
	(0.502)	(0.322)	(0.483)	(0.354)
Industry Effects	YES	YES	YES	YES
Month Effects	YES	YES	YES	YES
Observations	1,035	1,035	1,035	1,035
R-squared	0.227	0.234	0.227	0.235

Table 7:Robustness Tests: Alternative Definitions of Connected Firms and Audit Connections

This table presents the results of robustness tests evaluating the sensitivity of our findings to alternative definitions of connected firm withdrawals and audit committee connections. The dependent variable is an indicator for whether the focal firm withdrew earnings guidance. Model 1 defines the connected firm as the first firm in the network to withdraw guidance (First Withdrawal), while Model 2 uses the largest connected withdrawing firm based on total assets (Biggest Withdrawal). Model 3 modifies the audit connection requirement to only consider overlap on the audit committee from the withdrawing firm's side. Model 4 constructs an average-based measure of influence using the mean size of all previously withdrawing firms in the network and any prior audit committee connection.

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Big-Small	-0.024	-0.062	0.054	0.059
	(0.634)	(0.262)	(0.410)	(0.442)
Small-Big	0.005	0.013	-0.038	0.121
	(0.932)	(0.863)	(0.595)	(0.204)
Big-Big	-0.079	-0.069	-0.011	-0.047
	(0.108)	(0.215)	(0.867)	(0.532)
Audit	-0.102*	-0.121*		
	(0.095)	(0.088)		
Audit-Withdrawing			-0.075	
			(0.227)	
Audit-Any Previous				-0.018
				(0.804)
Big-Small * Audit	0.141*	0.219***	0.056	-0.037
	(0.078)	(0.010)	(0.494)	(0.680)
Small-Big * Audit	0.139	0.113	0.047	-0.078
	(0.134)	(0.342)	(0.597)	(0.480)
Big-Big * Audit	0.107	0.108	0.069	0.018
	(0.188)	(0.201)	(0.384)	(0.833)
Covid Unemployment	-0.161	-0.129	-0.136	-0.113
	(0.444)	(0.531)	(0.512)	(0.588)
MTB	-0.016	-0.014	-0.015	-0.015
	(0.151)	(0.212)	(0.170)	(0.175)
Financing	1.568***	1.507***	1.568***	1.523***
	(0.003)	(0.005)	(0.003)	(0.004)
Firm Size	0.006	0.007	0.015	0.011
	(0.699)	(0.640)	(0.330)	(0.483)
Loss	0.012	0.005	0.002	-0.000
	(0.805)	(0.911)	(0.960)	(1.000)
ROA	0.193*	0.194*	0.170	0.176
	(0.072)	(0.071)	(0.112)	(0.101)
Illiquidity	-0.117	-0.109	-0.102	-0.113
	(0.259)	(0.286)	(0.315)	(0.276)
Share Turnover	0.565	0.414	0.372	0.462
	(0.606)	(0.712)	(0.732)	(0.674)

Return Volatility	-0.038	0.067	0.034	0.080
	(0.891)	(0.809)	(0.905)	(0.776)
Return	-0.719	-0.837	-0.892*	-0.831
	(0.168)	(0.113)	(0.090)	(0.115)
Analyst	0.000	0.001	0.000	-0.000
	(0.924)	(0.864)	(0.976)	(0.989)
Institutional Ownership	0.242***	0.232***	0.234***	0.234***
	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.002	0.002	0.003	0.002
	(0.374)	(0.423)	(0.276)	(0.415)
Gender	-0.039	-0.038	-0.029	-0.040
	(0.218)	(0.223)	(0.365)	(0.206)
Board Size	0.012	0.015*	0.013*	0.014*
	(0.124)	(0.066)	(0.099)	(0.095)
Constant	-0.135	-0.149	-0.252	-0.252
	(0.663)	(0.617)	(0.420)	(0.401)
Industry Effects	YES	YES	YES	YES
Month Effects	YES	YES	YES	YES
Observations	1,045	1,041	1,035	1,041
R-squared	0.238	0.235	0.235	0.233

Table 8:Robustness Checks: Industry Effects and Audit Experience on Guidance Withdrawal

This table presents the results of robustness checks examining the influence of industry-specific factors and audit experience on guidance withdrawal decisions. Model 1 and Model 2 differentiate the impact of audit committee interlocks within the same industry versus across different industries, revealing that interlocks across industries have a significant effect, while those within the same industry do not. Models 3 and 4 assess the role of audit experience, showing that the effect of audit interlocks is significant only when the connected firm's audit experience exceeds the median level. All specifications include month and industry fixed effects. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Guidance Withdrawal			
	Model 1	Model 2	Model 3	Model 4
Big-Small	0.072	0.081**	0.044	0.168*
	(0.377)	(0.040)	(0.642)	(0.070)
Covid Unemployment	0.720	-0.231	0.077	0.156
	(0.386)	(0.295)	(0.925)	(0.778)
MTB	-0.026	-0.013	-0.022	-0.009
	(0.252)	(0.337)	(0.356)	(0.762)
Financing	0.222	2.215***	3.221*	2.123
	(0.764)	(0.003)	(0.052)	(0.163)
Firm Size	-0.007	0.022	0.010	0.034
	(0.850)	(0.187)	(0.825)	(0.322)
Loss	0.153	-0.025	0.123	-0.192
	(0.143)	(0.668)	(0.334)	(0.106)
ROA	0.076	0.237	0.367	0.410
	(0.591)	(0.160)	(0.117)	(0.167)
Illiquidity	-0.466**	-0.025	-0.087	-0.083
	(0.029)	(0.842)	(0.726)	(0.704)
Share Turnover	0.575	0.761	0.220	23.069**
	(0.662)	(0.760)	(0.892)	(0.048)
Return Volatility	0.296	-0.074	-0.233	0.303
	(0.616)	(0.828)	(0.774)	(0.581)
Return	-1.140	-0.761	0.112	-4.792***
	(0.203)	(0.249)	(0.918)	(0.001)
Analyst	0.010	-0.002	0.007	0.005
	(0.201)	(0.569)	(0.462)	(0.582)
Institutional Ownership	0.054	0.275***	0.019	0.222*
	(0.725)	(0.002)	(0.898)	(0.096)
Age	-0.001	0.003	0.009	0.013*
	(0.839)	(0.315)	(0.230)	(0.078)
Gender	-0.020	-0.042	-0.047	0.090
	(0.832)	(0.212)	(0.593)	(0.300)
Board Size	0.056**	0.006	0.021	-0.015
	(0.016)	(0.472)	(0.388)	(0.534)
Constant	-0.368	-0.258	-0.788	-1.190**
	(0.534)	(0.425)	(0.156)	(0.047)
Industry Effects	YES	YES	YES	YES

Month Effects	YES	YES	YES	YES
Observations	196	839	173	178
R-squared	0.295	0.260	0.451	0.486

Chapter 3

“What Do All These Vice Presidents Do?”

The Costs and Benefits of Senior Executive Employment

1. Introduction

Executive team composition in corporations raises fundamental questions about optimal organizational design and value creation. This debate gained prominence in the iconic 1987 film Wall Street, where corporate raider Gordon Gekko questioned the necessity of Teldar Paper's 33 vice presidents, asking "what do all these vice presidents do?" This fictional scene, based on real speeches by activist investor Carl Icahn, captures a central tension in corporate finance: when do additional executives enhance firm value through coordination and information processing, and when do they represent costly bureaucratic excess? (Garicano, 2000; M. Jensen, 1986; R. G. Rajan & Wulf, 2006).

The relevance of this question has intensified in recent decades as corporate structures have grown increasingly complex (R. G. Rajan & Wulf, 2006). Modern corporations employ dozens or even hundreds of vice presidents across various functional and divisional roles, from operations and finance to marketing and human resources. These positions represent substantial costs to shareholders not only in direct compensation, which often exceeds millions of dollars per executive (Frydman & Jenter, 2010), but also in potential information frictions, bureaucratic inefficiencies, and agency problems (M. Jensen, 1986). Yet despite persistent skepticism from investors and governance advocates, firms have continued to expand their senior executive ranks over time (Guadalupe et al., 2014) suggesting that such positions may generate value when organizational and governance conditions support efficient coordination.

We focus on vice presidents because they represent a margin of senior executive employment that firms adjust in response to information and monitoring needs. Unlike CEOs or presidents, whose roles are largely fixed and extensively studied in the finance literature, vice presidents constitute a scalable layer of management whose number varies meaningfully across firms and over time. Corporate finance theory emphasizes that as firms grow larger or operate in more uncertain environments, internal information frictions increase, raising the risk of inefficient decision making and value loss (Harris & Raviv, 2002; Stein, 2002). Vice presidents typically oversee major functional or operational units and possess authority over investment and reporting decisions, positioning them as a relevant channel through which firms address these frictions. Prior accounting evidence recognizes vice presidents as senior officers involved in internal governance (Cheng et al., 2016).

Economic theory provides contrasting perspectives on the role of executive team employment, even though these views have not been tested directly in the context of vice presidents. From an information economics perspective, additional executives may facilitate coordination by aggregating, filtering, and transmitting information across specialized units as firms grow in size and scope (Garicano, 2000; Stein, 2002). This view emphasizes the potential value of executive specialization in mitigating internal information frictions. At the same time, classic agency models emphasize that executive expansion may reflect managerial incentives rather than efficiency, particularly when governance is weak (Jensen & Meckling, 1976, Jensen, 1986). In this setting, the creation of additional senior positions may serve private objectives -such as expanding managerial influence or diffusing accountability- rather than shareholder value (Bebchuk & Fried, 2005; Shleifer & Vishny, 1997). These perspectives suggest that the valuation consequences of vice president employment are likely to depend critically on firm characteristics and governance conditions. Distinguishing between these explanations and identifying the conditions under which each is more likely to dominate has important implications for corporate governance, executive compensation, and the design of internal organizational structures.

Our analysis combines detailed executive-level information with firm-level financial and market data. We obtain vice president employment data from BoardEx for the period 2005–2024 and merge these records with financial databases. Vice presidents are identified based on executive titles containing variations of "VP" or "Vice President," restricting attention to individuals classified as senior managers and excluding board-level roles to focus on operational executives. To measure firm value, we use Tobin's Q following standard practice in the corporate finance literature. Our final sample consists of 63,310 firm-year observations with complete information on executive employment, financial characteristics, board attributes, and business segments. To isolate firm-specific executive staffing choices, we construct a measure of excess vice president employment relative to relevant peers. Our primary benchmark is based on the text-based network industry classification (TNIC) of Hoberg & Phillips (2016), which groups firms according to similarity in product descriptions. We then examine the relation between excess VP employment and firm value using panel regressions with fixed effects, and we explore heterogeneity across firm size, operational complexity, governance regimes, and adverse economic conditions.

Our results reveal a strongly size-dependent relation between excess vice president employment and firm value. In larger firms, excess VPs are associated with higher valuations, consistent with increased coordination demands as organizational scale expands. In smaller firms, where such demands are more limited, excess VP employment does not generate comparable benefits. Mechanism tests show that the value of excess VPs is concentrated in periods of heightened adversity -such as industry downturns, large industry shocks, and economy-wide crises- when information frictions intensify and firms with additional senior executives outperform their peers. Outside these settings, excess VP employment does not create value, indicating that benefits arise only when organizational demands justify additional executive capacity.

Governance analyses further indicate that weak monitoring exacerbates the costs of excess VP employment, while stronger governance disciplines executive staffing choices and mitigates value losses, particularly in less complex firms. These findings are robust across a wide range of identification strategies, including propensity score matching, entropy balancing, instrumental variable estimation, alternative peer benchmarks, and alternative performance measures, suggesting that the observed patterns are not driven by selection, reverse causality, or specification choices. Together, the evidence highlights a clear trade-off: excess vice presidents enhance firm value when they expand coordination capacity under high complexity or adverse conditions, but impose agency-related costs when coordination needs are limited or governance constraints are weak.

This paper makes several contributions to finance and governance literature. Despite the prevalence and cost of vice presidents in modern corporate hierarchies, finance research has paid limited attention to their role in firm value. Existing work has focused primarily on governance at the board level, beginning with Yermack (1996), and on the characteristics and incentives of chief executive officers (Bertrand & Schoar, 2003; Malmendier & Tate, 2009). In contrast, the structure and size of executive teams below the board level remain comparatively understudied. This gap is notable given growing evidence that internal organization, managerial specialization, and coordination mechanisms are central to firm performance, particularly in large and complex firms (Bloom & Van Reenen, 2007; Guadalupe et al., 2014; R. G. Rajan & Wulf, 2006). These studies highlight important changes in internal structure but stop short of linking executive team size to firm value. As a result, it remains unclear whether the hiring more vice presidents reflects efficient

responses to coordination needs or agency-driven organizational slack. This question is particularly consequential given the substantial resources devoted to senior executives and ongoing debates about the effectiveness of internal governance mechanisms (Adams et al., 2010; Bebchuk & Weisbach, 2010). This paper contributes to the finance literature on organizational design by studying senior executive employment below the CEO level as an endogenous firm choice with valuation implications.

Furthermore, a growing body of research shows that internal governance mechanisms - such as the allocation of decision rights, internal monitoring, and managerial structure -play a central role in shaping firm behavior and performance (Acharya et al., 2011; Cheng et al., 2016; Landier et al., 2013). Related work examines how subordinate executives, executive horizons, and internal controls affect outcomes such as innovation, earnings management, and market liquidity (Gao et al., 2023; Jain et al., 2016). Despite this progress, the size of the senior executive team itself -particularly the employment of vice presidents- has received no direct attention in the finance literature. Our study addresses this gap by conducting the first comprehensive examination of how vice president employment relates to firm value creation. Our analysis is motivated by three key research questions: First, do firms that employ excess vice presidents (relative to industry peers) create or destroy shareholder value? Second, how do firm characteristics such as size, complexity, and governance quality moderate the relationship between excess vice presidents and firm performance? Third, through what conditions do vice presidents' benefits or costs manifest?

This expansion of scope reveals important value creation mechanisms that have been overlooked in prior research, while also demonstrating that coordination benefits extend beyond the board level to encompass broader organizational design choices. Furthermore, our findings have important practical implications for corporate governance, executive compensation, and organizational design. By identifying the conditions under which excess VP creates or destroys value, we provide guidance for boards, compensation committees, and senior managers making organizational structure decisions (Edmans & Gabaix, 2016).

The remainder of this paper proceeds as follows. Section 2 reviews the relevant literature on organizational structure, coordination and vice presidents. Section 3 describes our data sources, variable construction, and empirical methodology. Section 4 presents our main empirical results examining the relationship between excess VP employment and firm value. Section 5 investigates

the mechanism through which excess VP benefits are realized. Sections 6 and 7 provides additional test and robustness analyses, and section 8 concludes.

2. Literature Review

2.1. Organizational Structure and Firm Performance

The relationship between organizational structure and firm performance has been extensively documented in the corporate finance literature, with board structure providing the foundational framework. Yermack's (1996) finding that smaller boards enhance firm value established that governance structure significantly affects performance, spawning extensive research on optimal organizational design. Recent work has extended these insights to examine broader aspects of corporate structure and executive team composition.

Coles et al. (2006) demonstrate that optimal board size varies with firm complexity, showing that large, complex firms benefit from additional directors due to advisory needs. Their work reveals that the relationship between governance structure and firm value depends critically on firm characteristics rather than following universal prescriptions. Some recent research has examined how organizational structure affects specific firm outcomes. Bernile et al. (2017) show that board diversity enhances firm performance by improving decision-making quality, while Minton et al., 2014 demonstrate that financial expertise on boards affects investment efficiency. These studies highlight how specific structural features create value through enhanced information processing and coordination.

2.2. Coordination within Firms

Coordination refers to the allocation of decision rights and information within the firm that enables interdependent activities to be aligned efficiently. In corporate finance, coordination is the mechanism through which firms transform dispersed information into value-creating investment and operating decisions. Garicano (2000) models organizations as hierarchies that economize on communication and problem-solving costs: managers handle non-routine problems and integrate specialized knowledge that subordinates cannot easily transfer. In this framework, hierarchy depth is an endogenous response to coordination demand, the extent to which production or investment tasks are interdependent and require shared information. Additional managerial layers create value

when the benefits of improved information integration exceed the costs of additional communication and control.

Stein (2002) embeds this logic in an internal-capital-market framework. Headquarters coordinate divisional investment when they can effectively process "soft" information and reallocate resources toward high-productivity projects. When information transmission is noisy or distorted, coordination breaks down and internal capital markets destroy value. Hence, coordination efficiency determines whether managerial hierarchies enhance or impair firm performance. Harris & Raviv (2002) further show that hierarchical communication structures influence firm value by shaping how information is aggregated for capital allocation. Together, these models define coordination as the economic process by which information from multiple agents is aggregated and acted upon to maximize firm value.

Subsequent research provides evidence that coordination needs vary systematically across firms. Rajan & Wulf (2006) document that firms restructure hierarchies as they grow, expanding the CEO's span of control and adding functional executives to manage cross-unit interdependence. Guadalupe et al. (2014) find that the prevalence of functional specialists rises with product diversification and geographic scope, consistent with higher coordination demand. Giroud & Mueller (2019) demonstrate that internal communication networks facilitate efficient resource reallocation, especially during economic downturns.

2.3. Vice presidents

Corporate finance research has traditionally focused on boards of directors and chief executive officers as the primary loci of governance and decision-making authority. However, firms also rely extensively on senior executives below the CEO level, commonly designated as vice presidents, who play an important role in internal governance. Prior work in accounting and finance defines vice presidents as top executives who hold formal officer titles and possess authority over major functional, operational, or strategic domains within the firm. For example, Cheng et al. (2016) classify vice presidents as part of the internal governance structure, distinct from boards but integral to managerial oversight and decision implementation. Similarly, Chen et al., (2024) Chen, treat vice presidents as senior officers whose presence reflects the firm's internal governance capacity. These studies establish vice presidents as economically meaningful actors rather than purely administrative personnel.

Existing evidence suggests that vice presidents contribute to firm outcomes through their proximity to operational information and their involvement in internal decision-making. Cheng et al. (2016) argue that senior executives below the CEO, including vice presidents, possess detailed knowledge of production, investment, and reporting processes, enabling them to influence real corporate actions. Chen et al. (2024) further show that the structure of the executive team, inclusive of vice presidents, is associated with firm-level performance measures, consistent with vice presidents exercising discretion over internal policies. Together, these studies imply that vice presidents operate at a critical informational layer within the firm, linking top-level strategic objectives to operational execution.

From the perspective of corporate finance, the presence of vice presidents can therefore be interpreted as an organizational response to internal information-processing and coordination demands. As firms grow larger and more complex, decision-making authority must be delegated to informed agents who can integrate localized information into broader organizational actions. Vice presidents occupy this intermediate position: they are senior enough to influence firm-wide decisions yet sufficiently embedded in specific functions or units to possess relevant information. While prior studies have not explicitly framed vice presidents in their analyses, their documented role in internal governance and decision-making suggests that variation in vice-presidential staffing may have important implications for firm value, particularly in settings where coordination demands are elevated.

The literature shows that organizational structure has first-order implications for firm performance, largely through its effects on information aggregation, monitoring, and decision making. Prior work focuses primarily on board structure and top leadership, documenting that governance arrangements affect firm value and that their effectiveness depends on firm size and complexity rather than following a uniform prescription (Coles et al., 2008; Yermack, 1996). Finance theory further emphasizes information processing and coordination as central mechanisms through which internal organizational choices influence value, particularly as firms grow larger or operate in more complex environments (Garicano, 2000; Stein, 2002). Despite these insights, the senior executive layer below the CEO—most notably vice presidents—has received little direct attention in the finance literature, notwithstanding its prevalence in modern corporations. Our analysis builds on this literature by examining how variation in vice president employment relates

to firm value, and whether the benefits of expanding senior executive capacity depend on firm characteristics and operating conditions.

3. Sample Data and Descriptive Statistics

3.1. Sample Data

We begin our sample collection by sourcing executive data from multiple databases, covering the period from 2005 to 2024. We obtain vice president (VP) data from BoardEx, firm-level financial data from Compustat, and stock price information from the Center for Research in Security Prices (CRSP). Our sample begins in 2005, when BoardEx coverage of senior executives below the CEO—including vice presidents—becomes sufficiently comprehensive and consistent across firms to reliably measure variation in VP employment. We supplement this with historical segments from Compustat, and board characteristics from BoardEx. We identify VP positions by tracking director titles that include variations "VP" or "Vice President". We focus on individuals classified as "Senior Manager" seniority level, excluding "Supervisory Director" and "Executive Director" positions to concentrate on operational executives rather than board members.

The sample selection process is summarized in Table 1. We begin with 133,137 VP observations from BoardEx. We then merge this dataset with Compustat and CRSP data to obtain firm-level financial and stock return information, yielding 79,013 observations. The reduction occurs because not all firms in BoardEx have complete financial data coverage in Compustat and CRSP, particularly smaller firms and those with limited trading history. Next, we incorporate board characteristics from BoardEx using company identifier and fiscal year. This merge produces 72,924 observations, as board data coverage varies across firms and years.

[Insert Table 1 here]

Prior corporate finance research emphasizes that organizational and governance structures respond endogenously to the scope and complexity of firm operations (Cheng et al., 2016). Including segment information therefore enables us to account for systematic differences in organizational complexity that are likely to influence both vice president employment and firm value. We finally add business segment information from Compustat segment files, incorporating the number of business segments and geographic segments to capture firm complexity. This merge results in 63,310 observations with complete segment data.

3.2. Main Variables of Interest

We use *Tobin's Q* as our measure of firm value, calculated as the market value of assets divided by the book value of assets. Following standard practice in corporate finance literature (Gompers et al., 2003; Kaplan & Zingales, 1997; Masulis et al., 2007), Tobin's Q is computed as (book assets + market value of common equity - common equity - deferred taxes) divided by book assets. This measure captures the market's assessment of a firm's growth opportunities and managerial effectiveness, making it particularly suitable for studying the relationship between executive structure and firm value. Tobin's Q has been widely adopted in studies examining corporate governance, executive compensation, and organizational structure because it reflects both current performance and future growth prospects as perceived by investors.

Our next main variable of interest is excess VP (*ExcessVP*), which measures whether a firm employs more or fewer VPs than would be predicted based on industry characteristics. This approach follows the methodology established in studies of excess employment and organizational structure (Chemmanur & Paeglis, 2005; Opler & Titman, 1994), allowing us to isolate the incremental effects of VP appointments beyond what firm fundamentals would suggest.

To construct *ExcessVP*, we supplement our dataset with peer-based benchmarks derived from the Hoberg & Phillips (2016) Text-Based Network Industry Classifications (TNIC) database. The TNIC approach offers significant advantages over traditional SIC-based industry classifications for identifying economically meaningful peer groups. TNIC classifications use textual analysis of firms' 10-K product descriptions to create dynamic, time-varying industry definitions that better capture actual product market competition and business model similarity.

We obtain the TNIC similarity scores (tnic3 dataset) from the Hoberg-Phillips data repository, which contains pairwise similarity measures between all publicly traded firms for each year from 1997 onwards. The TNIC-based approach is particularly valuable for our study because VP roles and organizational structures vary significantly across different business models, even within traditional industry categories. By using text-based similarity to identify peers, we can better control for the underlying business characteristics that drive VP employment decisions, allowing us to isolate the effects of excess VP appointments on firm performance.

Then for each firm-year observation in our sample, we construct peer-based measures using the TNIC similarity network. Specifically, we calculate the average natural logarithm of total vice presidents across a firm's text-based industry peers, weighted by their similarity scores. We merge the TNIC data with our VP dataset using the Gvkey-year identifier, excluding self-pairs to ensure we capture only external peer effects.

3.3. Descriptive Statistics

Table 2 presents summary statistics for the variables used in the analysis. The sample comprises 63,310 firm-year observations spanning 2005 to 2024. The average firm employs 12 vice presidents, with substantial variation across firms as evidenced by the standard deviation of 13.974. Our primary measures of excess VP employment (TNIC-based excess VP) shows an average of -0.141 with a standard deviation of 0.916, indicating that firms on average employ fewer VPs than their text-based industry peers would predict.

[Insert Table 2 here]

The sample firms exhibit typical characteristics of publicly traded companies. The average Tobin's Q is 1.908, suggesting that firms trade at a premium to book value, consistent with growth opportunities and intangible assets (Gompers et al., 2003; Kaplan & Zingales, 1997). Market-to-book ratios average 3.457, and firm size (measured as log of total assets) averages 6.84, representing firms with approximately $920 million in assets at the median. Return on assets averages -3.5%, reflecting the inclusion of loss-making firms, with 31.7% of observations reporting negative income. The average firm operates in 1.85 business segments, consistent with the prevalence of diversification strategies among large public companies (Berger & Ofek, 1995; Denis et al., 2002), has leverage of 21.8%, and invests 5.5% of assets in R&D activities, reflecting the innovation-intensive nature of many sample firms (Brown, 2011).

Industry concentration measures show average HHI values of 27.5% using TNIC-based peer definitions, indicating moderate concentration levels across industries (Hoberg & Phillips, 2016). Board characteristics show that 82.8% of directors are independent on average, consistent with NYSE and NASDAQ listing requirements and governance best practices (Adams et al., 2010), with mean board age of 61.1 years and 13.3% female representation.

We augment our dataset with CEO characteristics from ExecuComp, including tenure, age, gender, and ownership stakes. ExecuComp coverage focuses primarily on larger, publicly traded

firms, providing CEO data for 30,822 firm-year observations in our sample. The remaining observations without CEO data represent smaller firms or those with limited disclosure requirements, allowing us to conduct robustness tests on the CEO-augmented subsample while maintaining our full sample for primary analyses. CEO characteristics indicate average tenure of 8.1 years, with 4.4% of CEOs being female and average age of 56.6 years, consistent with prior studies of executive demographics (Bertrand & Schoar, 2003).

4. Empirical Analysis

Firms differ substantially in size, scope, and organizational complexity, which affects how information is aggregated and decisions are made within the firm. Corporate finance theory emphasizes that as firms grow larger and more diversified, information becomes more dispersed across managers and business units, increasing the need for internal coordination in capital allocation and operational decisions (Garicano, 2000; Harris & Raviv, 2002; Stein, 2002). While additional layers of senior management may improve information aggregation and coordination, they can also introduce communication frictions and agency costs. These competing forces imply that the value implications of vice president are unlikely to be uniform across firms. Motivated by this trade-off, we examine the relation between excess VP and firm value, beginning with baseline tests of the association and then exploring mechanisms related to coordination and governance as well as the benefits and costs of this relationship.

4.1. Excess VP and Firm Value

Prior to examining the relation between excess VP employment and firm value, we first analyze the determinants of VP staffing to better understand the firm characteristics associated with executive team structure. Table 3 reports regressions of the logarithm of VP employment on firm and board level variables. Model 1 includes firm and board characteristics, while Model 2 extends the specification by incorporating CEO level characteristics. The results show that VP employment is strongly positively related to firm size and R&D intensity, suggesting that larger and more innovative firms employ more vice presidents, consistent with greater coordination and information-processing needs. In contrast, leverage is negatively associated with VP employment, indicating that more financially constrained firms maintain leaner executive structures. We also

find that firms with losses and greater board independence tend to have higher VP intensity, while other governance and CEO characteristics exhibit weaker or less consistent relationships. Overall, these findings highlight that VP employment varies systematically with firm complexity and organizational demands, supporting its interpretation as a meaningful dimension of corporate structure.

[Insert Table 3 here]

Table 4 presents our main regression results examining the determinants of firm value based on excess VP employment. To analyze this relationship, we estimate our regressions where the dependent variable, *Tobin's Q*, measures firm valuation and the main explanatory variable, *Excess VP*, represents VP employment relative to industry peers constructed using text-based industry classifications.

[Insert Table 4 here]

Following the literature, we control for firm characteristics that may influence firm valuation, including Firm Size (natural logarithm of total assets), Business Segments (number of business segments), Leverage (total debt scaled by total assets), R&D (research and development expenditures scaled by total assets), Stock Return (stock return), HHI (industry concentration), ROA Volatility (standard deviation of return on assets), Financial Constraint (Malmendier & Tate, 2009), and Loss (indicator for negative net income) (Coles et al., 2008; Custódio et al., 2013; Yermack, 1996).

Furthermore, we incorporate board-level controls, including Independent Directors (percentage of independent directors), Average Board Age (mean age of board members), Board Gender Ratio (proportion of female directors), and Busy Directors (natural logarithm of directors serving on multiple boards) (Adams & Ferreira, 2009; Masulis & Mobbs, 2014). We include year fixed effects to capture time-varying macroeconomic factors, firm fixed effects and cluster standard errors at the firm level to account for within-firm correlation over time.

We estimate the following regression model to test these relationships:

$$Tobin's\ Q_{i,t} = \beta_1\ Excess\ VP_{i,t} + \beta_2\ Firm\ Controls_{i,t} + \beta_3\ Director\ Controls_{i,t} + \beta_4\ CEO\ Controls_{i,t} + \delta_1\ Time\ FE_{i,t} + \delta_2 Firm\ FE_{\ i,t} + \varepsilon_{i,t} \quad (1)$$

Models 1 and 2 in Table 4 show our results for equation (1). Model 1 establishes the baseline relationship between excess VP employment compared to their peers and Tobin's Q. Model 2 incorporates CEO characteristics to excess VP and firm value relationship. When we merge with ExecuComp data, our sample drops to 19,819 observations—approximately 50% of the original sample—because CEO characteristics are primarily available for larger, more established firms in the S&P indices. The coefficient on excess VP in Model 1 is -0.003 with a p-value of 0.883, indicating no statistically significant relationship between excess VP employment and firm value in the aggregate sample. This null result suggests that across all firms, employing more VPs than industry peers neither systematically creates nor destroys shareholder value on average. However, this average effect masks important heterogeneity that becomes apparent when we consider organizational complexity.

The sample reduction in Model 2 reflects a well-documented limitation of ExecuComp coverage that concentrates on larger firms (Custódio et al., 2013). In our sample, firms with CEO data are systematically larger (1.9 log points difference in assets), have higher firm values (0.08 higher Tobin's Q), and employ more excess VPs (0.54 standard deviations higher). Rather than compromising our primary analysis through this restriction, we follow the methodological approach used in seminal governance studies including Yermack (1996), Bebchuk et al. (2009), and Coles et al. (2008), which establish organizational structure effects in broad samples before testing robustness with executive controls where data permits.

In the CEO subsample as demonstrated in Model 2, the excess VP coefficient becomes positive and marginally significant (0.046, $p = 0.086$), consistent with coordination benefits being more pronounced in the larger, more complex firms that dominate ExecuComp coverage. Among CEO characteristics, tenure shows a positive effect (0.006, $p = 0.043$), while ownership displays a negative coefficient (-0.901, $p = 0.013$). CEO gender and age show no significant effects, indicating that excess VP coordination benefits operate independently of these demographic characteristics.

4.2. The Scope of Operations Effect

Corporate finance research emphasizes that the effects of organizational and governance choices depend on the scale and scope of firm operations. Larger and more diversified firms differ systematically from smaller, more focused firms in their investment opportunities, information

environments, and organizational demands. Coles et al. (2008) show that firms with greater operational scope optimally adopt more complex governance structures, reflecting increased advisory and informational needs. Similarly, Custódio et al. (2013) document that firms operating at larger scale and across diverse activities place greater value on managerial attributes that facilitate decision-making in complex environments. These findings suggest that the relation between VP and firm value is unlikely to be homogeneous across firms. We therefore examine whether the association between excess VP and firm value varies with the scope of firm operations, focusing on firm size and business segment complexity.

4.2.1. Firm Size

Firm size is a central proxy for organizational scale and operational complexity. Larger firms manage more assets, undertake more projects, and operate through more hierarchical structures than smaller firms, which can affect how decisions are made and monitored. Rajan & Wulf (2006) document that growing firms reorganize their internal hierarchies, expanding managerial layers to accommodate increased scale. These considerations suggest that the economic implications of employing more vice presidents than peer firms may depend on firm size. We therefore examine whether firm size moderates the association between excess VP and firm value using equation (2).

$$Tobin's\ Q_{i,t} = \beta_1\ Excess\ VP_{i,t} + \beta_2\ Excess\ VP_{i,t} * Firm\ Size + \beta_3\ Firm\ Controls_{i,t} + \beta_4\ Director\ Controls_{i,t} + \beta_5\ CEO\ Controls_{i,t} + \delta_1\ Time\ FE_{i,t} + \delta_2 Firm\ FE_{\ i,t} + \varepsilon_{i,t} \quad (2)$$

Model 3 in Table 4 returns to the full sample and introduces our key interaction term in equation (2), testing the central idea in our paper. The main effect of excess VP becomes negative and significant (-0.128, p = 0.064), while the interaction term (Excess VP × Firm Size) is positive and significant (0.019, p = 0.045). This pattern indicates that the value effect of excess VPs varies systematically with firm size. For smaller firms, the negative main effect dominates, suggesting that excess VP appointments destroy value. A one standard deviation increase in excess VP employment reduces Tobin's Q by approximately 0.12 for small firms, representing roughly 6% of the sample mean. This finding is consistent with concerns about bureaucratic costs in organizations where coordination benefits are minimal.

In contrast, the positive interaction term implies that the association between excess VP employment and firm value becomes more favorable as firm size increases. As firms grow larger, the marginal effect of excess VP employment on Tobin's Q turns positive, indicating that additional vice presidents are not uniformly value-decreasing across firms.

Models 4 and 5 provide direct evidence by splitting the sample at the median firm size (6.85 log assets, approximately $940 million) considering the CEO characteristics. Model 4 examines large firms and finds that excess VP employment has a positive and marginally significant effect on firm value (coefficient = 0.049, p = 0.059). This provides direct support that larger firms benefit from additional VPs because they require more sophisticated coordination mechanisms to manage complexity. Model 5 examines smaller firms and finds a smaller, statistically insignificant excess VP coefficient (0.028, p = 0.654), consistent with the idea that the benefits of additional senior executives are limited in smaller organizations.

Across specifications, the control variables exhibit patterns consistent with prior corporate finance literature. Firm size shows a negative coefficient across specifications, reflecting the size discount in public markets. Business segments display negative coefficients, consistent with diversification discounts (Berger & Ofek, 1995). Leverage shows strong negative effects, reflecting financial distress costs. R&D investment exhibits positive coefficients, capturing market premiums for innovation capabilities.

Taken together, these results show that the relation between excess vice presidents and firm value is size-dependent. Excess VP employment is associated with lower firm value in smaller firms, while in larger firms the association becomes positive and economically meaningful.

4.2.2. Business Segments

Business segments capture the scope of a firm's operations and are commonly used in the corporate finance literature as a proxy for diversification and organizational breadth (Berger & Ofek, 1995; Cheng et al., 2016; Rajan et al., 2000). Firms operating across multiple segments face greater challenges in allocating capital and monitoring divisional activities, which may affect the value implications of vice president employment.

Business segment diversification further distinguishes firms by the scope of their operations. Firms operating across multiple business segments face greater heterogeneity in

activities and investment opportunities than single-segment firms, which can complicate internal decision making. Coles et al. (2008) argue that firms with more complex operations require more extensive advisory structures to address increased informational demands. Custódio et al. (2013) similarly show that diversified firms place greater value on managerial experience that facilitates decision-making across varied business activities. Consistent with these findings, Rajan & Wulf (2006) document that firms adjust their organizational structures as operational scope expands. Taken together, this evidence suggests that the relation between excess VP and firm value may depend on the degree of segment diversification. We therefore examine whether this association varies with the number of business segments.

Model 1 of Table 5 includes business segments and its interaction with excess vice president employment in the full sample. Consistent with prior evidence on diversification discounts, the coefficient on business segments is negative and statistically significant, indicating lower firm value for more diversified firms. However, the interaction between excess vice presidents and business segments is small and statistically insignificant. This result suggests that diversification scope alone does not systematically alter the value consequences of excess VP employment once firm size and other firm characteristics are controlled for.

[Insert Table 5 here]

Models 2 and 3 further examine whether the role of excess vice presidents differs across firms with varying scope by splitting the sample into multi-segment and single-segment firms. In Model 2, which focuses on firms with more than one business segment, excess VP is negatively associated with firm value, while the interaction between excess vice presidents and firm size is positive and statistically significant. This pattern indicates that among diversified firms, excess VP employment is costly for smaller firms but becomes less detrimental and potentially value-enhancing as firm size increases. In contrast, Model 3 shows that for single-segment firms, neither excess VP employment nor its interaction with firm size is statistically significant, suggesting limited variation in the value effects of executive staffing when organizational scope is narrow.

Taken together, these results indicate that business segments alone do not determine whether excess VP affects firm value. Instead, firm size plays a central conditioning role, particularly among diversified firms. Diversification without sufficient scale may amplify

organizational costs associated with additional vice presidents, whereas large diversified firms appear better positioned to absorb and potentially benefit from expanded executive teams.

5. Mechanisms

The baseline results show that the association between excess VP and firm value varies systematically with firm size. In this section, we examine potential mechanisms underlying this relation. We conduct a set of conditioning analyses that assess whether the value implications of excess VP employment differ across economic environments where information frictions and decision-making challenges are plausibly more severe. This approach follows the corporate finance literature in using cross-sectional and time-series variation to evaluate whether observed effects are consistent with particular economic channels.

5.1. Information Environment and Economic Conditions

Corporate finance theory emphasizes that firms face greater information-processing challenges when uncertainty increases and external conditions deteriorate. During such periods, internal information becomes more difficult to aggregate, and capital allocation errors are more costly (Harris & Raviv, 2002; Stein, 2002). Motivated by this literature, we examine whether the relation between excess vice president employment and firm value varies with conditions that plausibly intensify information frictions, focusing on industry-level recessions and economic downturns.

5.1.1. Industry Recessions

Industry-level downturns provide a natural setting to assess whether excess VP becomes more or less costly when firms operate under adverse economic conditions. Corporate finance theory emphasizes that negative demand shocks increase uncertainty, tighten resource constraints, and magnify the costs of internal frictions, making organizational inefficiencies more consequential for firm value (Rajan et al., 2000; Stein, 2002). Consistent with this view, prior empirical work shows that firm value and operating performance are particularly sensitive to organizational structure during periods of economic distress (Giroud & Mueller, 2019).

To capture industry downturns, we employ two complementary measures commonly used in the finance literature. First, we construct industry recessions based on negative industry sales growth at the three-digit SIC level, which reflects declines in product market demand and operating

activity (Maksimovic & Phillips, 2002; Rajan et al., 2000). Second, we use negative industry stock returns as an alternative measure that captures market-wide reassessments of industry prospects and expectations (Kahle & Stulz, 2013). Aligning these measures with our excess VP benchmark, both excess vice president (*Excess VP*) employment and market concentration (*HHI*) are measured relative to the same industry classification.

The results using sales-growth-based industry recessions are reported in Models 1–3 of Table 6. Model 1 estimates the baseline specification and includes an indicator for negative industry sales growth (Industry recession). The coefficient on the recession indicator is negative and statistically significant, indicating that industry downturns are associated with lower firm value.

[Insert Table 6 here]

Model 2 extends this specification by introducing an interaction between excess VP employment and the industry recession indicator. The interaction term is positive but statistically insignificant, suggesting that moderate industry downturns do not materially alter the relation between excess VP staffing and firm value within firms. Model 3 refines the analysis by focusing on more severe industry downturns, defined as the bottom quintile of industry sales growth. In this specification, the interaction between excess VP employment and severe industry recessions is positive and marginally statistically significant. This pattern indicates that excess vice presidents become more value-enhancing when firms operate under sharply adverse industry conditions, consistent with the view that additional senior managerial capacity becomes more valuable when firms face heightened uncertainty and operational stress.

Model 4 employs an alternative measure of industry downturns based on negative industry stock returns. Consistent with the results for severe sales-growth-based recessions, the interaction between excess VP employment and industry recession is positive and statistically significant. This finding reinforces the conclusion that excess vice presidents are particularly valuable when firms confront adverse external conditions captured by both real activity and market-based recession measures.

5.1.2. Industry Shocks

We next examine whether the valuation effects of excess vice presidents vary during periods of extreme industry-level shocks, when firms face abrupt changes in their operating environment. Prior work in corporate finance emphasizes that sharp industry shocks heighten coordination demands and place greater pressure on internal decision-making structures (Giroud & Mueller, 2019; Maksimovic & Phillips, 2002). During such episodes, firms may benefit from additional vice presidents who facilitate information processing and rapid response, while in more stable environments excess managerial layers may be less valuable or even costly.

We define industry shocks using extreme realizations of industry-level sales, aggregated at the three-digit SIC level. Specifically, in each year we rank industries by total sales and classify an industry as experiencing a shock if it falls within the top or bottom three industries of the distribution. This approach isolates unusually large expansions and contractions in industry activity, consistent with the literature's focus on extreme rather than average conditions (Maksimovic & Phillips, 2002). Because shocks are defined at the SIC3 level, both excess vice president (*Excess VP*) employment and market concentration (*HHI*) are measured relative to the same industry classification.

Models 1 and 2 in Table 7 estimate the relation between excess vice presidents and firm value separately for firms operating within shock industries and outside shock industries, respectively. In Model 1, excess VP employment is positively associated with Tobin's Q during industry shocks, suggesting that additional VP are value-enhancing when firms face sharp industry-level disruptions. In contrast, Model 2 shows no meaningful valuation effect of excess vice presidents during non-shock periods, consistent with the idea that the benefits of additional managerial capacity are state-dependent. Together, these results indicate that excess vice presidents are most valuable when firms confront extreme industry conditions that intensify coordination and operational challenges.

[Insert Table 7 here]

5.1.3. Crisis Periods

We further investigate the mechanism by examining economy-wide crisis periods, during which uncertainty, financing frictions, and coordination costs are especially pronounced. The corporate finance literature documents that firm behavior and governance effectiveness change substantially during systemic crises, such as the global financial crisis and the COVID-19 shock (Albuquerque et al., 2020; Campello et al., 2010; Duchin et al., 2010). These episodes provide a natural setting to assess whether excess vice presidents help firms navigate adverse macroeconomic environments.

We define crisis periods to include the 2008–2009 financial crisis and the 2020–2021 COVID-19 crisis, and estimate separate regressions for crisis and non-crisis years. In Models 3 and 4 of Table 7, excess vice president employment is measured relative to peer firms using the TNIC industry classification. We also include the interaction between excess vice presidents and firm size to assess whether scale conditions the effectiveness of senior management during crises. Larger firms typically face greater organizational complexity and coordination challenges, which may increase the marginal value of additional top executives in turbulent periods (Coles et al., 2008; Custódio et al., 2013).

Model 3 (crisis periods) reveals a negative coefficient on excess VP employment (–0.428, $p = 0.028$), indicating that, on average, excess vice presidents are value-destroying during crises. This finding is consistent with the idea that additional managerial layers impose fixed costs and slow decision-making when resources are scarce and firms must operate under severe constraints. However, the interaction between excess VP employment and firm size is positive and highly significant (0.071, $p = 0.005$), indicating that the valuation effects of excess vice presidents vary sharply with firm scale. Model 4 (non-crisis periods) provides no significant results, outside crisis years, excess VP employment is not significantly related to firm value, and the interaction with firm size is small and statistically insignificant. This result suggests that the size-dependent benefits observed during crises are not present in normal times, when coordination pressures are less acute and firms can operate efficiently with leaner top management structures.

Taken together, these findings indicate that excess vice presidents are not universally beneficial, nor uniformly harmful. Instead, their valuation effects depend critically on both external conditions and firm scale. During crises, excess VP employment imposes costs for smaller firms

but can generate net benefits for large firms by alleviating frictions when they are most severe. This evidence supports a state- and scale-dependent mechanism, rather than a simple average effect.

5.2. Corporate Governance and Agency Discipline

While the preceding analyses focus on organizational complexity and external conditions that may increase coordination demands, excess vice president employment may also reflect agency-driven executive expansion rather than efficient organizational design. Agency theories predict that managers may expand the executive layer to increase control, prestige, or private benefits, particularly when governance mechanisms are weak. In such settings, additional vice presidents are less likely to be deployed in a value-enhancing manner and more likely to reflect organizational slack.

Corporate governance provides a natural mechanism to distinguish between these competing interpretations. Strong governance constrains managerial discretion and limits empire-building behavior, potentially ensuring that excess vice presidents are appointed only when their coordination or informational benefits justify their costs. In contrast, weak governance may allow excess executive employment to persist even when it does not improve firm value. We therefore examine whether the relation between excess vice president employment and firm value varies systematically with the strength of corporate governance.

5.2.1. Governance Measures

To examine whether governance conditions the valuation effects of excess vice president employment, we employ two widely used measures of shareholder protection that capture firms' exposure to managerial entrenchment and agency problems.

Our primary governance measure is the E-index developed by Bebchuk et al. (2009). The E-index focuses on six key antitakeover and entrenchment provisions—such as staggered boards and limits on shareholder amendments—that directly restrict shareholder rights and weaken external discipline. Lower values of the E-index indicate stronger shareholder protection and greater managerial accountability. The E-index has been shown to be strongly associated with firm valuation and investment efficiency and is commonly used in corporate finance to study agency conflicts and governance quality (Bebchuk et al., 2009; Masulis et al., 2007).

As a complementary measure, we construct a governance provisions index following the spirit of Gompers, Ishii, and Metrick (2003). GIM index aggregates the antitakeover and governance provisions observable in our data that restrict shareholder rights. Because the full set of twenty-four provisions used in the original Gompers et al. (2003) G-index is not available for our sample period, this measure captures a subset of governance provisions and should be interpreted as a proxy for overall governance strength. Higher values indicate weaker shareholder protection.[7]

Both governance measures vary primarily across firms rather than within firms over time, reflecting the slow-moving nature of governance structures documented in prior research (Bebchuk et al., 2009; Gompers et al., 2003). To preserve the cross-sectional variation necessary to identify governance effects, we therefore employ industry fixed effects at the SIC2 level, rather than firm fixed effects, in this section. This approach follows established governance studies that examine how institutional features moderate firm-level outcomes while controlling for industry characteristics (Duchin et al., 2010; Masulis et al., 2007).

In the analyses that follow, we use both interaction specifications and governance-based subsamples to assess whether shareholder protection disciplines excess VPs. This framework allows us to distinguish settings in which excess vice president employment reflects agency-driven expansion from those in which executive structure is more closely aligned with firm fundamentals.

5.2.2. Governance and Excess Vice presidents

This section examines whether corporate governance quality conditions the valuation effects of excess vice president. Agency theory predicts that weak governance enables managers to expand organizational hierarchies for private benefits, such as increased span of control, prestige, or reduced monitoring, even when such expansion does not maximize firm value (Jensen, 1986; Shleifer & Vishny, 1997). In this setting, excess vice presidents are more likely to reflect organizational slack or empire building. In contrast, stronger governance constrains managerial

[7] Following Gompers, Ishii, and Metrick (2003), we construct a governance provisions index by aggregating firm-level antitakeover and shareholder-rights provisions observable in ISS data. Each provision is coded as an indicator equal to one when the provision restricts shareholder rights and zero otherwise, and the index is computed as the unweighted sum across available provisions. Because several provisions used in the original GIM index are not consistently available over our sample period, the index reflects a subset of the original measures and should be interpreted as a proxy for overall governance strength rather than a direct replication. Higher values indicate weaker shareholder protection.

discretion and limits the scope for such behavior, thereby filtering executive appointments toward uses more closely aligned with shareholder interests.

Table 8 reports regression results examining how governance quality moderates the relation between excess vice presidents and firm value. We begin with the full-sample specifications. In Model 1, excess VP employment is positively associated with Tobin's Q, while the E-index enters negatively, consistent with prior evidence that managerial entrenchment reduces firm value (Bebchuk et al., 2009). These baseline results confirm that both executive structure and governance quality are economically relevant for firm valuation.

[Insert Table 8 here]

Models 2 and 3 split the sample based on the E-index to examine how governance conditions this relation. Model 2 focuses on firms with strong governance (low E-index). In this subsample, excess VP employment exhibits a negative main effect, while the interaction between excess VPs and firm size is positive and statistically significant. This pattern indicates that, even under strong governance, additional vice presidents are costly on average, but their costs are partially offset in larger firms where organizational scale and complexity may justify more specialized managerial roles.

Model 3 considers firms with weak governance (high E-index). In this subsample, neither the main effect of excess vice presidents nor its interaction with firm size is statistically significant. This finding suggests that weak governance attenuates the link between executive staffing and firm value, consistent with agency frictions obscuring whether additional executives serve productive or unproductive purposes. In such settings, executive expansion does not translate systematically into higher or lower firm value.

Models 4 through 6 repeat this analysis using the GIM index as an alternative proxy for governance quality. The results are consistent with those obtained using the E-index. In firms with weaker governance, excess VP employment is associated with lower firm value, while the interaction with firm size is positive and significant, indicating that scale partially mitigates—but does not eliminate—the costs of executive expansion. In contrast, under stronger governance regimes, both the main effect and the interaction become weaker and less precisely estimated.

Taken together, the evidence indicates that governance may play a disciplining role in executive staffing decisions. These findings suggest that governance is associated with how organizational complexity evolves and with the conditions under which excess vice president employment is most likely to affect firm value.

5.3. Interpreting the Costs and Benefits of Excess VPs

The results in Sections 4 and 5 indicate that excess vice president reflects a trade-off between organizational benefits and agency-related costs. Organizational layers can facilitate managerial specialization and information processing in complex firms, but they also introduce coordination costs and potential inefficiencies (Guadalupe et al., 2014; Rajan & Wulf, 2006). Whether additional executive capacity creates or destroys value therefore depends on the firm's operating environment and governance institutions.

Our baseline results indicate that excess VP employment is not uniformly value enhancing. Instead, its effect on firm value varies systematically with firm size, operating conditions, and governance quality. These patterns are consistent with the view that executive capacity represents a flexible organizational input whose value depends on whether it is deployed toward productive coordination or reflects managerial expansion beyond operational needs.

The benefit side of excess VP employment is most evident in large and complex firms, particularly during periods of heightened uncertainty or adverse economic conditions. In such environments, firms face greater information-processing demands, tighter coordination constraints, and increased reliance on internal managerial networks. Prior research shows that internal organizational structures play a critical role in shaping firms' responses to shocks and external disruptions (Giroud & Mueller, 2010). Consistent with this view, our crisis and industry-shock analyses suggest that excess VP capacity can mitigate valuation losses by facilitating faster decision-making, reallocating managerial attention, and stabilizing internal operations when coordination demands intensify.

At the same time, the costs of excess VP employment become salient when governance mechanisms are weak. Adding executive layers may reflect agency-driven empire building, increased managerial slack, or inefficient delegation that dilutes accountability (Jensen, 1986). Without effective internal governance, additional VPs may exacerbate coordination failures rather than resolve them, leading to lower firm value. This interpretation aligns with evidence that

internal governance structures shape how organizational resources are deployed and monitored within firms (Acharya et al., 2011).

Our governance results reinforce this interpretation. Excess VP employment is most costly in weakly governed firms, while its effects are attenuated or neutralized when governance is strong. Importantly, stronger governance is not associated with excess vice presidents being uniformly value-enhancing; instead, excess VP employment can exhibit different valuation implications across firms with different organizational characteristics. This finding is consistent with evidence that governance arrangements are not one-size-fits-all and interact with firm characteristics such as size and organizational scope (Coles et al., 2008).

The results indicate that excess vice president employment reflects a conditional trade-off between coordination capacity and agency-driven overinvestment. Additional executive capacity is value-enhancing when firms face high coordination demands, such as greater scale or adverse operating conditions. In contrast, under weak governance, excess VP employment is more likely to represent inefficient expansion that is not disciplined by shareholder interests, resulting in lower firm value. These findings highlight that the valuation effects of executive staffing depend on both firm fundamentals and governance constraints, helping reconcile mixed evidence in the prior literature.

6. Propensity Score matching and Entropy balancing

6.1. Propensity Score matching

To address potential endogeneity concerns arising from non-random VP appointment decisions, we employ propensity score matching (PSM) following Rosenbaum & Rubin (1983). Firms strategically appoint VPs based on their needs that may correlate with unobservable characteristics affecting firm value. PSM creates a quasi-experimental setting by matching treated firms (those with high excess VP employment) to control firms with similar observable characteristics, thereby reducing concerns that the documented relation reflects observable differences between firms with high and low excess VP employment.

We estimate two specifications with different treatment thresholds to examine whether our results are sensitive to the definition of "excess" VP employment. Model 1 defines high excess VP employment as firms in the top quartile (excess VP > 0.46), while Model 2 uses a more

conservative threshold at the 90th percentile (excess VP > 0.94). Using alternative treatment thresholds allows us to assess whether any valuation effects are driven by marginal deviations from industry norms or are concentrated among firms with the most pronounced excess VP employment. For both models, we estimate propensity scores using logistic regression that includes comprehensive firm and governance characteristics theoretically driving VP appointment decisions: firm size, business complexity (number of segments), leverage, R&D intensity, stock returns, industry concentration (HHI), earnings volatility, financial constraints, loss status, board independence, board age, gender diversity, director busyness, and CEO characteristics (tenure, ownership, gender, and age).

6.1.1. Matching Quality and Treatment Effects

To assess the validity of the matching procedure, we evaluate covariate balance and common support for both treatment definitions. We implement nearest-neighbor matching with a caliper of 0.01, which ensures close matches in propensity scores while retaining a large matched sample. The matching procedure achieves strong common support in both specifications. Using the top-quartile threshold, we match 8,218 treated observations to 12,734 control observations, yielding a matched sample of 20,952 firm-year observations. Using the more conservative 90th-percentile threshold, we match 4,219 treated observations to 16,736 control observations, for a total of 20,955 observations.

Table 9, Panel A presents detailed covariate balance diagnostics for both models. Covariate balance improves markedly after matching. In Model 1, the pseudo R^2 from the propensity score model declines from 0.147 before matching to 0.003 after matching, and the mean standardized bias falls to 2.7%. In Model 2, the pseudo R^2 declines from 0.216 to 0.004, with a mean standardized bias of 3.5%. Rubin's (2001) B and R statistics fall well within recommended thresholds in both models, indicating that the matched samples exhibit no economically meaningful imbalance across covariates. Although some variables remain statistically significant due to the large sample size, the remaining differences are economically small.

Panel B of Table 9 reports treatment effects. In the unmatched samples, firms with high excess VP employment exhibit higher average Tobin's Q than control firms in both specifications. After matching, the average treatment effect on the treated (ATT) remains positive and statistically significant. Importantly, the estimated treatment effects increase in magnitude after matching,

suggesting that simple comparisons understate the valuation differences between firms with high excess VP employment and otherwise comparable firms. Overall, the matching results indicate that observable firm and managerial characteristics do not drive the documented valuation differences.

[Insert Table 9 here]

6.1.2. Regression Analysis on Matched Samples

To further examine the robustness of the matching results, we estimate regressions on the matched samples using propensity score weights. These regressions include the full set of covariates used in the propensity score estimation, allowing us to control flexibly for remaining observable heterogeneity while preserving the matched-sample structure.

Panel C of Table 9 presents the regression results. In Model 1, which uses the top-quartile treatment definition and includes firm fixed effects, excess VP employment is positively associated with firm value and is marginally statistically significant. Model 2 uses the more conservative 90th-percentile treatment definition and includes industry fixed effects. The coefficient on excess VP employment is larger in magnitude and highly statistically significant. Overall, the matched-sample regressions reinforce the treatment effect estimates and demonstrate that the positive association between excess VP employment and firm value is not driven by observable differences in firm characteristics. The results indicate that valuation effects persist after accounting for selection on observables and are strongest among firms with the highest levels of excess VP employment.

6.2. Entropy Balancing

As a complementary approach to propensity score matching, we employ entropy balancing to further address selection concerns related to excess VP employment. Entropy balancing reweights control observations so that the distribution of covariates exactly matches that of treated firms on specified moments, thereby achieving covariate balance without discarding observations (Hainmueller, 2012). Compared to matching estimators, entropy balancing has the advantage of retaining the full sample while directly enforcing balance on observable firm, governance, and managerial characteristics. We apply entropy balancing using the same set of covariates included in the propensity score model and use the resulting weights in subsequent regressions.

Panel A of Table 10 shows that entropy balancing achieves exact balance between treated firms and weighted control firms across all covariates for both treatment definitions. In contrast to the unweighted control group, the weighted control group matches treated firms precisely in terms of firm size, business segments, leverage, R&D intensity, stock returns, industry concentration, earnings volatility, financial constraints and CEO characteristics. Panel B reports regression results using entropy-balanced samples. Consistent with the PSM findings, excess VP employment is positively associated with firm value in both specifications, with stronger and more statistically significant effects when excess VP employment is defined using the more stringent threshold. These results confirm that the positive valuation effects of excess VP employment are not driven by covariate imbalance or sample selection and are robust across alternative reweighting methodologies.

[Insert Table 10 here]

7. Robustness Analysis

To ensure the reliability of our main findings, we conduct several robustness tests that address potential concerns about endogeneity, measurement, and specification choices.

7.1. Instrumental Variable Approach

To address concerns that excess vice president (VP) employment may be endogenous to firm value - due to reverse causality (high-value firms hiring more VPs), omitted determinants of organizational structure, or correlated measurement error- we adopt an instrumental variables strategy. Following the logic in the governance and finance literature (Cheng et al., 2016; Jain et al., 2016), we exploit plausibly exogenous variation in VP norms at the industry level. Specifically, we instrument a firm's excess VP employment with the lagged three-digit SIC industry median of VP intensity, which captures persistent industry-level staffing practices and organizational design norms but is predetermined with respect to contemporaneous firm value.

Table 11 reports the two-stage least squares estimates. Column (1) presents the first-stage regression, showing that the lagged industry median VP measure is strongly associated with firm-level excess VP employment. This provide relevance condition which requires the instrument be strongly correlated with excess VP employment. The Kleibergen–Paap first-stage F-statistic equals 133.6, well above conventional thresholds (10), indicating that the instrument is not weak. The

exclusion restriction requires that the lagged industry median VP employment affects firm value only through its impact on firm-level VP staffing, and not through other channels. While this assumption cannot be tested directly, we provide several arguments to support its plausibility. First, the instrument is constructed as the lagged industry median, which reflects persistent organizational design norms and staffing practices rather than contemporaneous industry performance. By using lagged values, we mitigate concerns that the instrument captures current industry demand conditions or valuation shocks.

Second, our specification includes industry fixed effects and year fixed effects, which absorb time-invariant industry characteristics and common macroeconomic shocks. As a result, identification comes from within-industry, over-time variation in VP staffing norms, rather than cross-industry differences in performance. Third, we control for a rich set of firm-level characteristics, including size, profitability, leverage, and growth opportunities, which further reduces the likelihood that the instrument proxies for omitted firm-level determinants of value.

[Insert Table 11 here]

Column (2) reports the second-stage results. The coefficient on instrumented excess VP employment is positive and statistically significant, suggesting that higher excess VP employment is associated with higher firm value after accounting for endogeneity. The magnitude of the IV estimate is economically meaningful and comparable to the corresponding estimates, consistent with attenuation bias in the baseline specifications. Overall, the IV evidence supports the interpretation that excess VP employment reflects value-enhancing organizational investments rather than reverse causality driven by firm performance.

7.2. Lagged Vice President Employment

To address concerns that excess VP employment may respond endogenously to firm performance, we re-estimate our baseline specification using one-year lagged excess VP employment. This approach follows dynamic governance specifications that exploit temporal separation between organizational choices and performance outcomes (Wintoki et al., 2012).

As reported in Model 1 and Model 2 of Table 12, lagged excess VP employment is associated with a negative average effect on firm value, while the interaction between lagged excess VP and firm size remains positive and statistically significant. This pattern mirrors the baseline results and indicates that the value implications of excess VP employment depend

critically on firm scale, even when VP staffing decisions are measured prior to performance outcomes.

[Insert Table 12 here]

7.3. Alternative Size-Based Excess VP Measure

We next examine whether our findings depend on how excess VP employment is benchmarked across firms. Instead of constructing excess VP relative to industry-wide averages, we define excess VP using size-decile-specific benchmarks, comparing each firm to similarly sized peers within the same year. This approach addresses the possibility that coordination needs scale nonlinearly with firm size even within industries.

Results from Model 3 of Table 12 show that the size-based excess VP measure yields the same pattern as the baseline specification: excess VP employment is associated with lower firm value on average, while the interaction with firm size is positive and significant. These results indicate that our findings are not driven by the choice of industry benchmarks and reinforce the interpretation that the value of excess VP depends on organizational scale rather than mechanical benchmarking choices.

7.4. Alternative Performance Measures

Finally, we assess whether the coordination effects of excess VP employment extend beyond Tobin's Q to other economically meaningful performance outcomes. Models 4 and 5 of Table 12 examine two alternative dependent variables: the market-to-book ratio and firm-level product market share.

In Model 4, using the market-to-book ratio, excess VP employment continues to exhibit a negative average effect, while the interaction with firm size remains positive and significant. This result indicates that investors recognize the scale-dependent value of senior management capacity in forward-looking valuation measures beyond Tobin's Q.

In Model 5, we replace valuation outcomes with market share, defined as firm sales divided by total industry sales (Hoberg & Phillips, 2016). Excess VP employment is associated with higher market share in larger firms, as evidenced by the positive and significant interaction between excess VP and firm size. This finding suggests that excess VP employment enhances large firms'

ability to coordinate activities related to production, sales, and market penetration, translating organizational capacity into tangible product-market advantages.

8. Conclusion

This paper studies the economic role of vice president by examining how variation in VP employment relates to firm value. Using a comprehensive sample over nearly two decades, we show that the valuation effects of excess VP employment are highly conditional rather than uniform. Our central finding is that excess VP employment exhibits a pronounced size dependence. While additional vice presidents are associated with lower firm value in smaller firms, this relation reverses in larger firms, where excess VP employment is positively related to valuation. These results indicate that excess VP is neither inherently value creating nor value destroying; instead, its economic impact depends on whether firm scale and scope generate sufficient organizational demands to justify additional executive capacity.

We further show that the value of excess VP employment is most evident during periods of elevated operational stress, including industry downturns, large industry shocks, and economy-wide crises. In these settings, firms with greater senior executive capacity trade at higher valuations relative to peers, whereas no such effects appear outside adverse conditions. This pattern suggests that additional executives are most valuable when firms face heightened information-processing and decision-making demands, rather than as a permanent feature of organizational design.

Governance quality plays a critical role in shaping these outcomes. Under weaker governance, excess VP employment is associated with lower firm value, consistent with agency-driven overinvestment in executive positions. Under stronger governance, value destruction is mitigated and size-dependent benefits are preserved, indicating that monitoring and incentive alignment discipline executive staffing choices. Governance thus conditions whether more VP employment compared to peers reflects productive organizational investment or inefficient organizational slack.

A wide range of robustness tests—including propensity score matching, entropy balancing, instrumental variable estimation, alternative peer benchmarks, lagged specifications, and alternative outcome measures—confirm that our findings are not driven by selection, reverse causality, or measurement choices. Across specifications, the evidence consistently points to a

trade-off between the benefits of expanding senior executive capacity and the costs associated with agency and bureaucracy. As in much of the corporate finance literature on organizational design, we cannot fully rule out residual endogeneity in executive staffing decisions; while our identification strategies mitigate these concerns, they do not eliminate all sources of unobserved heterogeneity.

Overall, this study highlights senior executive employment below the CEO level as an economically meaningful dimension of internal organization. By linking VP employment to firm value in a conditional framework, our results underscore that organizational structure matters for valuation, but only insofar as it aligns with firm scale, operating conditions, and governance constraints. Understanding when executive expansion reflects efficient organizational investment versus agency-driven excess remains central to evaluating internal governance and organizational design in modern corporations.

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Appendix A

Variable	Definition
VP	Number of vice presidents employed by the firm in a given fiscal year, identified based on executive titles containing “VP” or “Vice President” in BoardEx.
Excess VP	Difference between the firm’s VP and the similarity-weighted average VP of peer firms within the same text-based network industry (TNIC).
Tobin’s Q	Market value of assets divided by book value of assets, calculated as (book assets + market value of equity − book equity − deferred taxes) scaled by book assets.
Firm Size	Natural logarithm of total assets.
Business Segments	Number of business segments reported in Compustat Segment files.
Geographic Segments	Number of geographic segments reported in Compustat Segment files.
Leverage	Total debt divided by total assets.
R&D	Research and development expenditures scaled by total assets
Stock Return	Annual stock return from CRSP.
HHI	Herfindahl–Hirschman Index measuring industry concentration.
ROA Volatility	Standard deviation of return on assets calculated over a rolling three-year window.
Financial Constraint	Indicator variable based on the financing constraints measure following Malmendier and Tate (2005).
Loss	Dummy variable equal to 1 if net income is negative, 0 otherwise.
Independent Directors (%)	Percentage of independent directors on the board.
Average Board Age	Average age of directors serving on the board.
Board Gender Ratio	Proportion of female directors on the board.
Busy Directors	Natural logarithm of the average number of outside board seats held by directors.
E-Index	Entrenchment index following Bebchuk, Cohen, and Ferrell (2009), constructed as the sum of six governance provisions.

Variable	Definition
GIM-Index	Governance provisions index aggregating antitakeover and shareholder-rights restrictions observable in ISS data, following the spirit of Gompers, Ishii, and Metrick (2003). Higher values indicate weaker shareholder protection.
Industry Recession	Indicator variable equal to 1 if industry-level sales growth at the three-digit SIC level is negative, 0 otherwise.
Severe Industry Recession	Indicator variable equal to 1 if industry-level sales growth falls into the bottom quintile of the distribution.
Industry Return Shock	Indicator variable equal to 1 if industry-level stock returns are negative.

Table 1:Sample Selection

This table outlines the sample construction process for our study examining the relationship between vice president employment and firm performance. We begin with BoardEx data containing vice president positions and progressively merge with financial data from Compustat, stock return data from CRSP, board characteristics from BoardEx, and segment information from Compustat segment files to create our final analytical dataset spanning 2005-2024.

	Number of observations
Firm-year VP observations from BoardEx	133,137
Firm-year VP observations with Compustat and CRSP data	79,013
Firm-year VP observations with board of director data from BoardEx	72,924
Firm-year VP observations with Segment data	63,310

Table 2:Summary Statistic

This table presents descriptive statistics in our analysis. VP represents the total number of vice presidents at each firm. Excess VP measures are constructed relative to industry peers using TNIC-based (text-based network industry classifications) benchmarks. Tobin's Q is calculated as market value of assets divided by book value of assets. Firm Size is the natural logarithm of total assets. Additional control variables include business segments, leverage, R&D intensity, board characteristics, and CEO demographics where available.

Panel A: Full sample descriptive statistics

	N	Mean	SD	P25	Median	P75
VP	60546	12.128	13.974	4.000	8.000	15.000
Log VP	60546	2.054	0.965	1.386	2.079	2.708
Excess VP	55220	-0.141	0.916	-0.693	-0.074	0.462
Tobin's Q	56519	1.908	1.489	1.034	1.372	2.136
MTB	60469	3.457	4.927	1.196	1.959	3.574
Firm Size	60546	6.840	2.097	5.392	6.855	8.233
Loss	60546	0.317	0.465	0.000	0.000	1.000
Leverage	60546	0.218	0.207	0.035	0.169	0.349
Business Segments	60546	1.850	1.273	1.000	1.000	3.000
ROA Volatility	59283	0.055	0.164	0.006	0.018	0.048
R&D	60546	0.055	0.146	0.000	0.000	0.047
Stock Return	52910	0.176	1.387	-0.220	0.0260	0.290
HHI	58404	0.275	0.271	0.084	0.158	0.365
Financial Constraint	45739	-0.726	39.279	-2.126	1.444	4.449
Independent Directors (%)	60546	82.825	10.348	80.000	85.714	88.889
Average Board Age	60545	61.077	4.883	58.143	61.375	64.25
Board Gender Ratio	60544	0.133	0.125	0.000	0.125	0.222
Busy Directors	60546	0.689	0.640	0.000	0.693	1.099
CEO Tenure	29558	8.091	7.724	2.836	5.996	10.998
CEO Ownership	25605	0.025	0.059	0.002	0.007	0.019
CEO Female	29854	0.044	0.206	0.000	0.000	0.000
CEO Age	29676	56.594	7.430	52.000	57.000	61.000

Table 3:Regression Results: VP employment

This table presents regression results examining the relationship between logarithm of vice president employment and firm characteristics. Model 1 includes firm and board characteristics, while Model 2 extends the specification by incorporating CEO level characteristics. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2
Firm Size	0.221***	0.218***
	(0.000)	(0.000)
Business Segments	0.005	0.004
	(0.394)	(0.561)
Leverage	-0.087**	-0.115**
	(0.011)	(0.017)
R&D	0.335***	0.525***
	(0.000)	(0.000)
Stock Return	-0.003**	-0.002
	(0.029)	(0.238)
HHI	0.016	0.012
	(0.412)	(0.650)
ROA Volatility	-0.090**	-0.026
	(0.013)	(0.670)
Financial Constraint	0.000	-0.000
	(0.728)	(0.935)
Loss	0.042***	0.038***
	(0.000)	(0.000)
Independent Directors (%)	0.003***	0.004***
	(0.000)	(0.000)
Average Board Age	0.001	-0.003
	(0.622)	(0.190)
Board Gender Ratio	0.083	-0.046
	(0.153)	(0.521)
Busy Directors	0.020**	0.010
	(0.029)	(0.378)
CEO Tenure		0.001
		(0.621)
CEO Ownership		-0.205
		(0.218)
CEO Female		-0.025
		(0.363)
CEO Age		0.000
		(0.896)
Constant	0.189	0.545***
	(0.128)	(0.004)
Year FEs	Yes	Yes
Firm FEs	Yes	Yes
Observations	43,806	20,969
R-squared	0.909	0.906

Table 4:Regression Results: Excess Vice Presidents, Firm Value, and Firm size effect

This table presents regression results examining the relationship between excess vice president employment and firm value measured by Tobin's Q. Model 1 shows the baseline relationship using firm and year fixed effects. Model 2 incorporates CEO characteristics available from ExecuComp, reducing the sample to 19,819 observations. Model 3 introduces the key interaction between excess VP employment and firm size to test the coordination hypothesis. Models 4 and 5 split the sample at median firm size to examine effects separately for large and small firms. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5
Excess VP	-0.003	0.046*	-0.128*	0.049*	0.028
	(0.883)	(0.086)	(0.064)	(0.059)	(0.654)
Firm Size	-0.183***	-0.239***	-0.179***	-0.265***	-0.136
	(0.000)	(0.000)	(0.000)	(0.000)	(0.186)
Excess VP * Firm Size			0.019**		
			(0.045)		
Business Segments	-0.037***	-0.026	-0.037***	-0.028	-0.065
	(0.008)	(0.168)	(0.008)	(0.165)	(0.285)
Leverage	-0.586***	-0.739***	-0.586***	-0.548***	-1.125***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
R&D	0.992***	0.222	0.989***	4.373**	0.248
	(0.000)	(0.682)	(0.000)	(0.015)	(0.674)
Stock Return	0.098***	0.130***	0.098***	0.112***	0.155***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI	-0.096*	-0.101	-0.099*	-0.029	-0.310*
	(0.089)	(0.182)	(0.078)	(0.713)	(0.052)
ROA Volatility	0.436***	-0.078	0.427***	0.168	-0.376
	(0.001)	(0.770)	(0.001)	(0.497)	(0.413)
Financial Constraint	0.000	-0.000	0.000	0.000***	-0.000
	(0.746)	(0.650)	(0.776)	(0.001)	(0.138)
Loss	-0.244***	-0.323***	-0.244***	-0.235***	-0.443***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Independent Directors (%)	-0.004***	-0.004*	-0.004***	-0.002	-0.009*
	(0.005)	(0.082)	(0.005)	(0.231)	(0.071)
Average Board Age	-0.003	0.004	-0.003	0.007	-0.005
	(0.360)	(0.515)	(0.366)	(0.237)	(0.671)
Board Gender Ratio	-0.049	0.000	-0.048	0.167	-0.627
	(0.713)	(0.999)	(0.718)	(0.320)	(0.161)
Busy Directors	-0.013	-0.009	-0.013	-0.057**	0.079
	(0.569)	(0.731)	(0.563)	(0.037)	(0.236)
CEO Tenure		0.006**		0.004	0.007
		(0.043)		(0.175)	(0.306)
CEO Ownership		-0.901**		-0.569	-0.839
		(0.013)		(0.121)	(0.228)
CEO Female		0.031		0.030	0.181
		(0.681)		(0.698)	(0.424)
CEO Age		0.002		0.002	0.003

		(0.410)		(0.442)	(0.642)
Constant	4.048***	4.153***	4.007***	3.908***	4.770***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year FEs	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Observations	41,088	19,819	41,088	14,063	5,756
R-squared	0.716	0.748	0.716	0.806	0.718

Table 5:Regression Results: Excess Vice Presidents, Firm Value and Scope of Operations
This table examines whether the relationship between excess vice president and firm value varies with firms' number of business segments. Firm value is measured by Tobin's Q. Model 1 estimates the full sample with business segment and excess VP interaction. Model 2 focuses on multi-segment firms and introduces the interaction between excess vice presidents and firm size to assess whether scale conditions the value implications of excess VP in diversified firms. Model 3 estimates the same specification for single-segment firms. All regressions include firm and year fixed effect. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3
Excess VP	0.004	-0.264***	-0.053
	(0.896)	(0.006)	(0.614)
Firm Size	-0.183***	-0.231***	-0.139***
	(0.000)	(0.000)	(0.003)
Excess VP * Firm Size		0.033***	0.011
		(0.008)	(0.488)
Business Segments	-0.037***		
	(0.008)		
Excess VP * Business Segment	-0.003		
	(0.720)		
Leverage	-0.587***	-0.335**	-0.773***
	(0.000)	(0.013)	(0.000)
R&D	0.992***	1.278**	1.027***
	(0.000)	(0.013)	(0.000)
Stock Return	0.098***	0.094***	0.101***
	(0.000)	(0.000)	(0.000)
HHI	-0.096*	-0.115*	-0.118
	(0.089)	(0.079)	(0.214)
ROA Volatility	0.436***	0.261	0.473***
	(0.001)	(0.500)	(0.001)
Financial Constraint	0.000	0.000	0.000
	(0.746)	(1.000)	(0.937)
Loss	-0.244***	-0.217***	-0.232***
	(0.000)	(0.000)	(0.000)
Independent Directors (%)	-0.004***	-0.003*	-0.005**
	(0.005)	(0.060)	(0.019)
Average Board Age	-0.003	0.007	-0.010*
	(0.359)	(0.122)	(0.084)
Board Gender Ratio	-0.050	0.171	-0.252
	(0.709)	(0.239)	(0.257)
Busy Directors	-0.013	-0.044*	0.030
	(0.567)	(0.070)	(0.452)
Constant	4.050***	3.449***	4.327***
	(0.000)	(0.000)	(0.000)
Year FEs	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Observations	41,088	18,554	22,534
R-squared	0.716	0.732	0.725

Table 6:Regression Results: Industry Recessions

This table examines whether the relation between excess vice president employment and firm value varies across adverse industry conditions. Firm value is measured by Tobin's Q. Models 1 and 2 define industry recessions using negative industry-level sales growth at the three-digit SIC level. Model 3 focuses on severe industry downturns, defined as the bottom quintile of industry sales growth. Model 4 defines industry recessions using negative industry-level stock returns. All specifications include firm and year fixed effects. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4
Excess VP	-0.001	-0.004	-0.005	-0.008
	(0.962)	(0.873)	(0.822)	(0.744)
Industry Recession	-0.042***	-0.042***	-0.028**	-0.120***
	(0.000)	(0.000)	(0.011)	(0.000)
Excess VP * Industry Recession		0.008	0.020*	0.023**
		(0.432)	(0.076)	(0.023)
Firm Size	-0.199***	-0.199***	-0.198***	-0.195***
	(0.000)	(0.000)	(0.000)	(0.000)
Business Segments	-0.039***	-0.039***	-0.039***	-0.040***
	(0.003)	(0.003)	(0.003)	(0.002)
Leverage	-0.602***	-0.602***	-0.603***	-0.600***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D	0.978***	0.979***	0.979***	0.984***
	(0.000)	(0.000)	(0.000)	(0.000)
Stock Return	0.099***	0.099***	0.098***	0.095***
	(0.000)	(0.000)	(0.000)	(0.000)
HHI	-0.089	-0.089	-0.094	-0.097
	(0.402)	(0.401)	(0.374)	(0.360)
ROA Volatility	0.426***	0.426***	0.426***	0.417***
	(0.001)	(0.001)	(0.001)	(0.002)
Financial Constraint	0.000	0.000	0.000	0.000
	(0.657)	(0.663)	(0.643)	(0.668)
Loss	-0.243***	-0.243***	-0.245***	-0.242***
	(0.000)	(0.000)	(0.000)	(0.000)
Independent Directors (%)	-0.006***	-0.006***	-0.006***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)
Average Board Age	-0.003	-0.003	-0.003	-0.003
	(0.421)	(0.421)	(0.422)	(0.440)
Board Gender Ratio	-0.020	-0.020	-0.022	-0.027
	(0.877)	(0.878)	(0.870)	(0.838)
Busy Directors	-0.015	-0.015	-0.015	-0.016
	(0.497)	(0.497)	(0.503)	(0.483)
Constant	4.235***	4.234***	4.226***	4.219***
	(0.000)	(0.000)	(0.000)	(0.000)
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Observations	44,906	44,906	44,906	44,906
R-squared	0.711	0.711	0.711	0.711

Table 7:Regression Results: Industry Shock and Crisis Periods

This table examines whether the relation between excess vice president employment and firm value varies across adverse industry and macroeconomic conditions. Models 1 and 2 focus on industry shocks, defined as industries ranked among the top or bottom three industries in annual industry-level sales. Model 1 reports results for firms operating in shock industries, while Model 2 reports results for firms in non-shock industries. Models 3 and 4 examine crisis periods, defined as the 2008–2009 financial crisis and the 2020–2021 COVID-19 crisis. Model 3 reports results for crisis years, and Model 4 for non-crisis years. All regressions include year and firm fixed effects. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4
Excess VP	0.187*	-0.010	-0.428**	-0.056
	(0.057)	(0.668)	(0.028)	(0.440)
Firm Size	-0.406***	-0.197***	0.010	-0.239***
	(0.002)	(0.000)	(0.894)	(0.000)
Excess VP * Firm Size			0.071***	0.008
			(0.005)	(0.445)
Business Segments	-0.050	-0.033***	-0.078*	-0.028**
	(0.417)	(0.003)	(0.061)	(0.036)
Leverage	-0.110	-0.656***	0.027	-0.685***
	(0.820)	(0.000)	(0.916)	(0.000)
R&D	1.240	0.975***	0.467	1.365***
	(0.277)	(0.000)	(0.216)	(0.000)
Stock Return	0.171***	0.096***	0.092***	0.132***
	(0.009)	(0.000)	(0.000)	(0.000)
HHI	7.119	-0.109	-0.008	-0.125**
	(0.484)	(0.306)	(0.957)	(0.039)
ROA Volatility	0.091	0.423***	0.965***	0.348**
	(0.898)	(0.002)	(0.007)	(0.027)
Financial Constraint	-0.000	0.000	0.000***	0.000
	(0.481)	(0.382)	(0.000)	(0.887)
Loss	-0.200***	-0.252***	-0.228***	-0.262***
	(0.005)	(0.000)	(0.000)	(0.000)
Independent Directors (%)	0.004	-0.007***	-0.000	-0.005***
	(0.494)	(0.000)	(0.965)	(0.002)
Average Board Age	-0.005	-0.003	0.013	-0.007*
	(0.813)	(0.496)	(0.180)	(0.064)
Board Gender Ratio	0.366	-0.083	0.072	-0.088
	(0.525)	(0.544)	(0.840)	(0.548)
Busy Directors	-0.021	-0.002	-0.048	-0.015
	(0.851)	(0.927)	(0.439)	(0.552)
Constant	4.830***	4.265***	0.841	4.663***
	(0.002)	(0.000)	(0.264)	(0.000)
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Observations	3,195	41,711	9,444	31,644
R-squared	0.844	0.705	0.846	0.737

Table 8:The Role of Corporate Governance

This table examines how corporate governance quality moderates the relationship between excess vice president and firm value. Models 1-3 use the E-index from Bebchuk, Cohen, and Ferrell (2009), while Models 4-6 use the GIM-index from Gompers, Ishii, and Metrick (2003). Lower values indicate stronger governance or shareholder protection. Models 2-3 and 5-6 split samples at governance measure means to examine the results under strong versus weak governance regimes. Standard errors are clustered at the firm level, and p-values are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Excess VP	0.107***	-0.292**	-0.005	0.106***	-0.455***	0.284
	(0.002)	(0.044)	(0.983)	(0.002)	(0.004)	(0.110)
E-Index	-0.067**					
	(0.016)					
GIM-Index				-0.021		
				(0.168)		
Firm Size	-0.040	-0.057*	-0.038	-0.027	-0.068*	-0.020
	(0.118)	(0.079)	(0.415)	(0.294)	(0.094)	(0.551)
Excess VP * Firm Size		0.047***	0.015		0.066***	-0.014
		(0.002)	(0.584)		(0.000)	(0.455)
Business Segments	-0.083***	-0.097***	-0.053*	-0.081***	-0.103***	-0.059***
	(0.000)	(0.000)	(0.078)	(0.000)	(0.000)	(0.010)
Leverage	-0.835***	-0.968***	-0.567**	-0.844***	-1.092***	-0.506**
	(0.000)	(0.000)	(0.028)	(0.000)	(0.000)	(0.018)
R&D	7.312***	6.987***	8.056***	7.337***	4.288***	10.774***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Stock Return	0.194***	0.166***	0.338***	0.193***	0.180***	0.236***
	(0.003)	(0.002)	(0.000)	(0.002)	(0.008)	(0.001)
HHI	0.449***	0.537***	0.291	0.462***	0.231	0.650***
	(0.000)	(0.000)	(0.108)	(0.000)	(0.101)	(0.000)
ROA Volatility	0.791	1.660**	-0.566	0.794	0.770	0.937
	(0.135)	(0.012)	(0.404)	(0.138)	(0.237)	(0.117)
Financial Constraint	0.001**	0.001**	0.001	0.001**	0.001*	0.001
	(0.041)	(0.049)	(0.337)	(0.040)	(0.082)	(0.187)
Loss	-0.752***	-0.706***	-0.799***	-0.755***	-0.728***	-0.754***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Independent Directors (%)	-0.007**	-0.008**	-0.004	-0.008**	-0.005	-0.010**
	(0.031)	(0.033)	(0.427)	(0.022)	(0.172)	(0.032)
Average Board Age	-0.019***	-0.011	-0.031***	-0.019***	-0.024***	-0.014
	(0.007)	(0.169)	(0.005)	(0.007)	(0.009)	(0.124)
Board Gender Ratio	0.148	-0.009	0.320	0.161	0.168	0.048
	(0.509)	(0.972)	(0.418)	(0.470)	(0.567)	(0.879)
Busy Directors	0.034	-0.010	0.111**	0.034	0.012	0.032
	(0.376)	(0.841)	(0.039)	(0.366)	(0.834)	(0.499)
CEO Tenure	0.006	0.007	0.004	0.005	0.006	0.008*
	(0.122)	(0.108)	(0.537)	(0.140)	(0.227)	(0.075)
CEO Ownership	-0.148	-0.302	-0.099	-0.099	-0.145	-1.483

	(0.738)	(0.540)	(0.916)	(0.826)	(0.780)	(0.238)
CEO Female	-0.103	-0.045	-0.137	-0.101	-0.047	-0.133
	(0.213)	(0.652)	(0.322)	(0.221)	(0.678)	(0.191)
CEO Age	-0.001	-0.003	-0.000	-0.001	0.001	-0.006
	(0.694)	(0.457)	(0.949)	(0.727)	(0.876)	(0.194)
Constant	4.152***	3.809***	4.289***	4.001***	4.401***	3.971***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,122	9,492	4,630	14,122	7,446	6,676
R-squared	0.326	0.329	0.365	0.325	0.300	0.403

Table 9:Propensity Score Matching Analysis

This table presents results from propensity score matching analysis addressing potential selection bias in VP appointment decisions. Model 1 defines high excess VP employment as the top quartile (excess VP > 0.46), while Model 2 uses the 90th percentile (excess VP > 0.94). Panel A reports covariate balance diagnostics after matching using nearest neighbor matching with a 0.01 caliper. Panel B reports treatment effects comparing unmatched and matched samples. Panel C presents regression results on matched samples with propensity score weights; Model 1 includes firm fixed effects while Model 2 includes industry fixed effects. The dependent variable is Tobin's Q. Standard errors are clustered at the firm level, with p-values in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Covariate Balance After Matching

	Matched (Model 1)			samples		Matched (Model 2)			samples	
Variables	**Treated**	**Control**	**Difference**	**p-value**	**Bias%**	**Treated**	**Control**	**Difference**	**p-value**	**Bias%**
Firm Size	8.621	8.608	0.013	0.627	0.8	8.834	8.872	-0.038	0.353	-2.1
Business Segments	2.345	2.255	0.090	0.000	6.4	2.535	2.404	0.131	0.000	8.9
Leverage	0.244	0.251	-0.007	0.010	-3.9	0.247	0.253	-0.006	0.111	-3.3
R&D	0.027	0.023	0.004	0.000	6.4	0.028	0.032	-0.005	0.027	-6.8
Stock Return	0.161	0.145	0.016	0.324	1.4	0.153	0.140	0.013	0.408	1.3
HHI	0.326	0.335	-0.009	0.040	-3.4	0.432	0.423	0.009	0.220	2.9
ROA Volatility	0.028	0.028	0.000	0.922	-0.1	0.026	0.029	-0.004	0.005	-6.3
Financial Constraint	4.055	-0.167	4.222	0.294	1.2	5.239	9.891	-4.652	0.253	-1.5
Loss	0.135	0.143	-0.008	0.143	-2.1	0.108	0.126	-0.018	0.011	-5.1
Independent Director	86.407	86.297	0.110	0.376	1.3	86.532	86.669	-0.137	0.428	-1.7
Average Board age	62.403	62.559	-0.156	0.009	-3.9	62.534	62.581	-0.047	0.561	-1.2
Board Gender Ratio	0.190	0.188	0.002	0.352	1.4	0.200	0.204	-0.004	0.085	-3.7
Busy Director	1.005	1.022	-0.018	0.076	-2.8	1.061	1.097	-0.036	0.009	-5.8
CEO Tenure	8.137	8.524	-0.387	0.002	-4.9	8.000	8.286	-0.286	0.089	-3.7
CEO ownership	0.018	0.018	0.000	0.731	-0.4	0.017	0.018	-0.001	0.556	-1.1
CEO Female	0.043	0.040	0.003	0.292	1.6	0.044	0.048	-0.004	0.378	-1.9
CEO Age	57.116	57.446	-0.330	0.002	-4.6	57.317	57.520	-0.203	0.173	-2.9
Observations	8,218	12,734				4,219	16,736			

Panel B: Treatment Effects

	Model 1			Model 2		
Sample	**Treated**	**Control**	**Difference**	**Treated**	**Control**	**Difference**
Unmatched	2.068	1.952	0.116***	2.163	1.956	0.207***
	(5.72)		(8.39)			
Matched (ATT)	2.067	1.771	0.295***	2.162	1.893	0.269***
	(9.36)		(6.61)			

Panel C: Regression Results on Matched Samples

	Model 1	Model 2
Excess VP	0.056*	0.235***
	(0.059)	(0.000)
Firm Size	-0.300***	-0.062*
	(0.000)	(0.052)
Business Segments	-0.012	-0.101***
	(0.594)	(0.000)
Leverage	-0.425**	-1.081***
	(0.018)	(0.000)
R&D	0.881	2.835***
	(0.402)	(0.001)
Stock Return	0.137***	0.310***
	(0.000)	(0.006)
HHI	-0.000	0.099
	(0.996)	(0.497)
ROA Volatility	-0.047	1.199
	(0.885)	(0.163)
Financial Constraint	0.000***	0.000
	(0.000)	(0.728)
Loss	-0.266***	-0.464***
	(0.000)	(0.000)
Independent Directors (%)	-0.003	-0.005
	(0.281)	(0.239)
Average Board Age	0.006	-0.019*
	(0.372)	(0.059)
Board Gender Ratio	0.187	0.530
	(0.383)	(0.124)
Busy Directors	-0.046	0.057
	(0.171)	(0.266)
CEO Tenure	0.006	0.005
	(0.180)	(0.336)
CEO Ownership	-0.826*	1.488
	(0.096)	(0.190)
CEO Female	0.070	-0.143
	(0.465)	(0.254)
CEO Age	-0.001	-0.010*
	(0.815)	(0.055)
Constant	4.580***	4.490***
	(0.000)	(0.000)
Year FEs	Yes	Yes
Industry FEs		Yes
Firm FEs	Yes	
Observations	11,433	5,787
R-squared	0.806	0.355

Table 10:Entropy Balancing

This table presents the covariate balance before and after applying entropy balancing. Panel A reports mean covariate values for treated firms, unweighted control firms, and entropy-balanced control firms for two treatment definitions. Panel B reports weighted regression results using the entropy-balanced samples. Model 1 defines high excess VP employment as firms in the top quartile of excess VP, while Model 2 defines treatment as firms in the top decile. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Comparison of covariates: before and after weighting

	Treated	Control (Unweighted)	Control (Weighted)	Treated	Control (Unweighted)	Control (Weighted)
Firm Size	8.629	7.353	8.629	8.844	7.604	8.844
Business Segments	2.349	2.028	2.349	2.543	2.055	2.543
Leverage	0.244	0.215	0.244	0.248	0.221	0.248
R&D	0.027	0.034	0.027	0.028	0.033	0.028
Stock Return	0.161	0.182	0.161	0.152	0.179	0.152
HHI	0.327	0.263	0.327	0.434	0.252	0.434
ROA Volatility	0.028	0.036	0.028	0.026	0.035	0.026
Financial Constraint	4.069	6.467	4.069	5.251	5.594	5.255
Loss	0.135	0.192	0.135	0.108	0.185	0.109
Independent Director	86.410	84.220	86.410	86.540	84.710	86.540
Average Board age	62.400	62.080	62.400	62.530	62.120	62.530
Board Gender Ratio	0.190	0.155	0.190	0.200	0.161	0.200
Busy Director	1.007	0.720	1.007	1.064	0.774	1.063
CEO Tenure	8.140	8.749	8.140	8.003	8.638	8.004
CEO ownership	0.018	0.030	0.018	0.017	0.027	0.017
CEO Female	0.043	0.050	0.043	0.044	0.048	0.044
CEO Age	57.120	56.660	57.120	57.320	56.720	57.320
Observations	8,235	12,734		4,233	16,736	

Panel B: Regression Results on Matched Samples

	Model 1	Model 2
Excess VP	0.043*	0.202***
	(0.075)	(0.000)
Firm Size	-0.304***	-0.041
	(0.000)	(0.303)
Business Segments	-0.012	-0.123***
	(0.563)	(0.000)
Leverage	-0.524***	-1.012***
	(0.001)	(0.000)
R&D	-0.362	3.242***
	(0.663)	(0.005)
Stock Return	0.116***	0.162***
	(0.000)	(0.000)
HHI	-0.013	0.212

	(0.849)	(0.297)
ROA Volatility	-0.000	1.518**
	(0.999)	(0.038)
Financial Constraint	-0.000	0.000
	(0.719)	(0.377)
Loss	-0.278***	-0.524***
	(0.000)	(0.000)
Independent Directors (%)	-0.002	-0.007*
	(0.363)	(0.090)
Average Board Age	0.008	-0.010
	(0.159)	(0.313)
Board Gender Ratio	0.247	0.897***
	(0.146)	(0.001)
Busy Directors	-0.043	0.051
	(0.126)	(0.293)
CEO Tenure	0.006*	0.006
	(0.060)	(0.216)
CEO Ownership	-0.765*	1.058
	(0.074)	(0.416)
CEO Female	0.013	-0.207*
	(0.867)	(0.062)
CEO Age	0.001	-0.008*
	(0.860)	(0.069)
Constant	4.367***	4.036***
	(0.000)	(0.000)
Year FEs	Yes	Yes
Industry FEs		Yes
Firm FEs	Yes	
Observations	19,819	19,819
R-squared	0.786	0.331

Table 11:Instrumental Variable Analysis

This table reports two-stage least squares (2SLS) estimates of the relation between excess vice president employment and firm value. Excess VP employment is instrumented using the lagged three-digit SIC industry median of ln(VP), which captures persistent industry-level executive staffing norms. The first-stage regression is reported in Column (1), and the second-stage regression is reported in Column (2). Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	First Stage	Second Stage
	Excess VP	Tobin's Q
Lagged Industry Median VP	0.203***	
	(0.000)	
Excess VP (Instrumented)		0.314**
		(0.040)
Firm Size	0.264***	-0.050
	(0.000)	(0.224)
Business Segments	0.003	-0.085***
	(0.396)	(0.000)
Leverage	-0.126***	-0.788***
	(0.000)	(0.000)
R&D	0.329***	1.576***
	(0.000)	(0.000)
Stock Return	-0.002	0.092***
	(0.480)	(0.000)
HHI	-0.191***	0.190***
	(0.000)	(0.000)
ROA Volatility	-0.094***	0.542***
	(0.000)	(0.000)
Financial Constraint	0.000*	-0.000
	(0.064)	(0.831)
Loss	0.049***	-0.386***
	(0.000)	(0.000)
Independent Directors (%)	0.007***	-0.006***
	(0.000)	(0.000)
Average Board Age	0.005***	-0.017***
	(0.000)	(0.000)
Board Gender Ratio	0.435***	0.268***
	(0.000)	(0.004)
Busy Directors	0.090***	0.011
	(0.000)	(0.563)
Constant	-2.860***	3.546***
	(0.000)	(0.000)
Year FEs	Yes	Yes
Industry FEs	Yes	Yes

Observations	41,088	41,088
R-squared	0.396	0.282
First-Stage F-stat	133.601	

Table 12:Robustness Tests

This table reports robustness tests examining the sensitivity of the relation between excess vice president and firm value. Model 1and 2 use one-year lagged excess VP. Model 3 employs size-decile-based benchmarks to construct excess VP. Models 4 and 5 use alternative dependent variables: market-to-book ratio and firm market share, respectively. Reported statistics are based on robust standard errors clustered at the firm level. P-values are shown in parentheses. *,** , and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5
Excess VP				-0.131*	-0.018***
				(0.058)	(0.000)
Firm Size	-0.175***	-0.170***	-0.191***	-0.173***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Excess VP * Firm Size				0.019**	0.003***
				(0.042)	(0.000)
Lag Excess VP	-0.052***	-0.224***			
	(0.003)	(0.001)			
Lag Excess VP * Firm Size		0.026***			
		(0.004)			
Excess VP (Size based)			-0.188**		
			(0.027)		
Excess VP (Size based) * Firm Size			0.024**		
			(0.042)		
Business Segments	-0.036***	-0.037***	-0.037***	-0.038***	0.001
	(0.009)	(0.009)	(0.005)	(0.006)	(0.442)
Leverage	-0.592***	-0.590***	-0.615***	-0.584***	0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.726)
R&D	0.987***	0.986***	1.000***	0.999***	0.019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Stock Return	0.097***	0.097***	0.099***	0.099***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.470)
HHI	-0.047	-0.049	-0.057	-0.098*	0.004
	(0.349)	(0.336)	(0.248)	(0.083)	(0.441)
ROA Volatility	0.434***	0.427***	0.422***	0.421***	0.003*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.067)
Financial Constraint	0.000	0.000	0.000	0.000	-0.000
	(0.695)	(0.708)	(0.616)	(0.780)	(0.363)
Loss	-0.239***	-0.239***	-0.248***	-0.248***	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.366)
Independent Directors (%)	-0.004**	-0.004**	-0.004***	-0.004***	-0.000
	(0.011)	(0.012)	(0.002)	(0.004)	(0.279)
Average Board Age	-0.003	-0.003	-0.003	-0.003	0.001***
	(0.411)	(0.413)	(0.457)	(0.406)	(0.008)
Board Gender Ratio	-0.006	-0.006	-0.024	-0.043	0.015
	(0.964)	(0.967)	(0.859)	(0.747)	(0.251)
Busy Directors	-0.009	-0.009	-0.021	-0.016	0.000
	(0.695)	(0.698)	(0.354)	(0.485)	(0.964)
Constant	3.920***	3.860***	4.039***	3.979***	-0.073***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Year FEs	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Observations	41,053	41,053	43,806	41,088	41,088
R-squared	0.717	0.717	0.713	0.715	0.903